Barnard, J. Laurens, and G. S. Karaman, 1991. The families and genera of marine gammaridean Amphipoda (except marine gammaroids). Part 2. *Records of the Australian Museum, Supplement* 13(2): 419–866, ISBN 0-7305-5743-6. [30 August 1991].

doi:10.3853/j.0812-7387.13.1991.367 (= part 2),

doi:10.3853/j.0812-7387.13.1991.91 (= part 1)

ISSN 0812-7387

Published by the Australian Museum, Sydney

Records of the Australian Museum (1991) Supplement 13 (Part 2). ISBN 0 7305 8743 6

The Families and Genera of Marine Gammaridean Amphipoda (Except Marine Gammaroidea)

Part 2

J. LAURENS BARNARD[1] & GORDAN S. KARAMAN[2]

[1]Department of Invertebrate Zoology, National Museum of Natural History, NHB-163, Smithsonian Institution, Washington, D.C. 20560.

[2]Institute of Freshwater Research, Titograd, Yugoslavia, 81000.

Contents (of Part 2)

LYSIANASSIDAE Dana, 1849

Diagnosis. Article 3 of gnathopod 2 elongate, remainder of appendage forming mitten apically (Fig.93, all gnathopods); peduncle of antenna 1 short and stout, articles 2-3 much shorter than 1 and partly telescoped basally.

See Iphimediidae, Sebidae and Stegocephalidae.

Description. Body compact, chitin usually very smooth and shiny; accessory flagellum usually present and more than 3-articulate but occasionally vestigial; mouthparts enormously variable; lateral shape of epistome and upper lip valuable for identification; most species with smooth broad incisor bounded by cusp on each side, rarely toothed in middle, position of palp on mandible valuable; inner lobes of lower lip absent; tiny details of maxillae valuable, setae of inner plate, number and arrangement of spines on outer plate, ornamentation of palp; shape and setosity of maxilla 2 and ornamentation of maxillipeds variable; rarely maxillipedal palp absent; gnathopod 1 usually small, rarely enlarged, variable; configuration of coxae 1-4 variable; gnathopod 2 always small; pereopods relatively uniform among taxa, rarely prehensile; uropods 1-2 ordinary but inner ramus of uropod 2 occasionally notched; uropod 3 generally ordinary, rarely reduced; telson variable.

Relationship. Many taxa outside of Lysianassidae have elongate article 3 of gnathopod 2 but they can be traced through the early part of the keys to families. Sebidae are distinguished by the elongate antenna 1. Though taxonomists are now recognising minute distinctions in gnathopod 2 (loss of pineapple texture and setulation on articles 4-6) the general mitten-form shape is widespread and rarely mistakeable in this family when coupled with the shape of antenna 1.

Methods. The keys to genera are divided into sections which proceed outward from the basic key. Ahead of the basic key is a simple key to the subdivisions which is to be used by experienced taxonomists as a quick reminder as to which section is pertinent to their identification. Following Key O is a section of special groups and keys, representing those taxa firmly definable at subfamilial level.

The Lysianassidae have been and are being divided into groups by various taxonomists but no comprehensive synoptic classification has appeared as yet. To denote those few genera which have already been allocated to subfamilies we add to the diagnosis the operative phrase "Of xxx form:" in which the 'xxx' is either 'conicostomatin', 'cyphocarin', 'pachynin', or 'scopelocheirin'. With each genus the references later than 1980 can be ascertained by the reader to discover the various expositions on subfamily or group cohesiveness.

Removal. *Valettiella* Griffiths (1977b) is removed to *Gammarella* in the Gammaroidea.

Master Key to Lysianassidae

Simple Key to Subdivisions of Lysianassidae

1. Specimen aberrant, with either mandibular palp absent, incisor absent, uropod 3 absent or vestigial, or telson absent .... Key A
2. Mouthparts formed into conical bundle .... Key B
3. Gnathopod 1 chelate (but also continue to 4 afterwards) .... Key C
4. Middle of incisor dentate (but also continue to 5) .... Key D
5. Palp of maxilla 1 absent .... Key E
6. Coxae 1-2 both short together .... Key F
7. Mandibular palp attached proximal to molar .... Keys J-K
8. Telson entire .... Key G
9. Gnathopod 1 of scopelocheirin structure .... Key I
10. Inner plate of maxilla 1 with medial setae or with 5+ terminal setae .... Key M
11. Gnathopod 1 simple .... Key N
12. Gnathopod 1 subchelate .... Key O
13. Combination of telson entire, gnathopod 1 simple, mandibular palp distally placed .... Key L

Basic Key to Lysianassidae Subdivisions

1. Article 3 of gnathopod 2 elongate 2

—— Article 3 of gnathopod 2 not elongate .... not Lysianassidae

2. Aberrant, either mandibular palp absent, incisor absent, uropod 3 absent or vestigial, or telson absent .... Key A

—— Mandibular palp, incisor, uropod 3 and telson present 3

3. Mouthparts arranged in conical bundle, styliform .... Key B

—— Mouthparts arranged in quadrate bundle 4

4. Gnathopod 1 chelate [but after this procedure return to couplet 5 for further check] .... Key C

—— Gnathopod 1 subchelate or simple 5

5. Middle of incisor sharply dentate or inner plate of maxilla 1 with 4+ setae .... Key D

—— Middle of incisor smooth, inner plate of maxilla 1 with 0-2 setae 6

6. Palp of maxilla 1 absent .... Key E

—— Palp of maxilla 1 present 7

7. Both coxae 1-2 (and occasionally 3) reduced and covered by following coxae .... Key F

—— Coxae 1-2 together not reduced, often coxa 1 alone reduced 8

8. Mandibular palp attached proximal to molar .... Keys J-K

—— Mandibular palp attached opposite or distal to molar 9

9. Telson entire or emarginate .... Key G

—— Telson distinctly cleft though often minutely 10

10. Gnathopod 1 of scopelocheirin structure (Fig.52J) .... Key I

—— Gnathopod 1 ordinary, simple or subchelate 11

11. Inner plate of maxilla 1 with medial setae or with 5+ terminal setae .... Key M

—— Inner plate of maxilla 1 with only 3 or fewer terminal setae 12

12. Gnathopod 1 simple .... Key N

—— Gnathopod 1 subchelate 13

13. Confirm here telson cleft 14

—— Telson entire .... return to Key G

14. Gnathopod 1 chelate .... return to Key C

—— Gnathopod 1 subchelate or simple .... Key O

Key A (Aberrant Genera)

1. Palp of maxilliped 0-1 articulate 2

—— Palp of maxilliped 2+ articulate 4

2. Coxa 2 subequal to coxa 3 in length .... *Thoriella*

—— Coxae 1-2 much smaller than coxae 3-4 3

3. Body globose, thus pereonites 3-6 greatly inflated, inner rami of uropods 1-2 well developed .... (also Key F) *Danaella*

—— Body not globose, inner rami of uropods 1-2 vestigial .... (also Key F) *Chevreuxiella*

4. Coxae 1-2 reduced and covered by coxa 3 .... Key F

—— Coxae 1-2 large and visible together 5

5. Coxae 1-4 feeble, shorter than broad, article 2 of pereopods 5-7 linear, some pereopods prehensile .... also Key F

—— Coxae 1-4 robust, longer than broad 6

6. Mandibular palp present, incisor absent, telson entire, article 3 of gnathopod 1 elongate, uropod 3 tiny, rami weak or 1 ramus absent .... *Kerguelenia*

—— Mandibular palp absent, incisor present, telson deeply cleft, article 3 of gnathopod 1 short, uropod 3 large, aequiramous .... *Stephensenia*

Key B

(mouthparts arranged in conical bundle)

1. Coxa 1 or coxae 1-2 reduced together 2

—— Neither coxae 1 or 2 reduced 3

2. Coxae 1-2 reduced together and covered by coxa 3, gnathopod 1 filiform or feeble .... (also Key F) *Lepidepecreella*

—— Only coxa 1 reduced and covered by large coxa 2, gnathopod 1 giant, propodus huge .... *Trischizostoma*

3. Gnathopod 1 flagelliform, dactyl elongate and setose .... *Azotostoma*

—— Gnathopod 1 not flagelliform, dactyl not elongate, not strongly setose 4

4. Gnathopod 1 chelate 5

—— Gnathopod 1 not chelate .... Key H

5. Rami of uropod 3 present, palp of maxilla 1 absent .... *Prachynella*

—— Rami of uropod 3 absent, palp of maxilla 1 present .... *Derjugiana*

Key C

(Gnathopod 1 chelate)

(After completion of this key recheck to Basic Key Couplet 5)

1. Inner ramus of uropod 3 less than half as long as outer ramus or absent 2

—— Inner ramus of uropod 3 more than half as long as outer ramus 7

2. Rami of uropod 3 absent .... *Derjugiana*

—— Uropod 3 with 1-2 rami 3

3. Inner and outer plates of maxilliped extending equally, palp very slender .... *Gainella*

—— These characters not combined 4

4. Uropod 3 with 2 rami 5

—— Uropod 3 with 1 ramus 6

5. Article 1 of accessory flagellum elongate and flat, dactyl of maxilliped ordinary, mandibular palp opposite molar, article 6 larger than 5 on gnathopod 1 .... *Onesimoides*

—— Article 1 of accessory flagellum cylindrical, dactyl of maxilliped vestigial mandibular palp proximal to molar, article 6 equal to 5 on gnathopod 1 .... *Nannonyx*

6. Gnathopod 1 subchelate, palp of maxilliped ordinary, molar absent, coxa 1 slightly reduced and tapering, article 2 of antenna 1 very short .... *Pseudonesimoides*

—— Gnathopod 1 chelate, palp of maxilliped feeble, molar present, coxa 1 ordinary, article 2 of antenna about 45% as long as article 1 .... *Paronesimoides*

7. Telson cleft 8

—— Telson entire or emarginate 20

8. Palp of mandible set proximal to molar .... (and *Orchomene*) *Rimakoroga*

—— Palp of mandible set opposite or distal to molar 9

9. Coxa 1 not reduced 10

—— Coxa 1 reduced and partly covered by coxa 2 15

10. Gnathopod 1 not chelate (despite key protocol) .... *Cheirimedon*

—— Gnathopod 1 chelate 11

11. Article 2 of pereopods 5-7 indentured .... *Podoprionides*

—— Article 2 of pereopods 5-7 weakly serrate 12

12. Incisor dentate in middle .... *Valettia*

—— Incisor smooth in middle 13

13. Coxa 1 tapering below (but not reduced), inner ramus of uropod 2 with slight notch .... *Sophrosyne*

—— Coxa 1 not tapering below, inner ramus of uropod 2 lacking notch 14

14. Antenna 1 not cristate, dactyl of palp on maxilliped pointed .... *Kyska*

—— Antenna 1 cristate, dactyl on palp of maxilliped stubby .... *Pseudoanonyx*

15. Article 2 of pereopod 5 indentured .... *Podoprion*

—— Article 2 of pereopod 5 with small serrations 16

16. Carpus on gnathopod 1 of eusirid form .... *Opisa*

—— Carpus on gnathopod 2 ordinary 17

17. Propodus of gnathopod 1 huge .... *Coximedon*

—— Propodus of gnathopod 1 ordinary 18

18. Gnathopod 1 very elongate, chela long and thin .... *Euonyx*

—— Gnathopod 1 not elongate, chela short and broad 19

19. Epistome with anterior knob, labrum not dominant .... *Aristiopsis*

—— Epistome lacking knob, labrum dominant .... *Schisturella*

20. Article 2 of pereopods 5-7 indentured .... *Podoprionella*

—— Article 2 of pereopods 5-7 with small serrations 21

21. Mandibular palp placed proximal to molar, carpus of gnathopod 1 well developed, palp and inner plate of maxilliped ordinary 22

—— Mandibular palp placed opposite or distal to molar, carpus of gnathopod 1 evanescent, either inner plate or palp of maxilliped reduced 25

22. Head large, lateral lobe broadly rounded .... *Koroga*

—— Head ordinary, lateral lobe angular 23

23. Palp of maxilliped feeble, not exceeding outer plate, dactyl reduced, carpus of gnathopod 1 eusirid .... *Normanion*

—— Palp of maxilliped ordinary, exceeding outer plate, dactyl ordinary, carpus of gnathopod 1 not eusirid 24

24. Carpus of gnathopod 1 lobate, propodus large, inner ramus of uropod 2 with notch .... *Pseudokoroga*

—— Carpus of gnathopod 1 not lobate, propodus small, inner ramus of uropod 2 lacking notch .... *Orchomene*

25. Propodus of gnathopod 1 subchelate .... *Pachychelium*

—— Propodus of gnathopod 1 chelate 26

26. Coxa 1 reduced, articles 1-2 of antenna 1 with large teeth, gnathopod 1 very thin and elongate .... *Izinkala*

—— Coxa 1 not reduced, antenna 1 lacking teeth, gnathopod 1 ordinary 27

27. Inner plate of maxilliped tiny, palp well-exceeding outer plate, palp of maxilla 1 large .... *Pachynus*

—— Inner plate of maxilliped medium, palp not reaching apex of outer plate, palp of maxilla 1 absent 28

28. Posterior margin of propodus on gnathopod 1 weakly excavate .... *Prachynella*

—— Posterior margin of propodus on gnathopod 1 strongly excavate .... *Figorella*

Key D

(Subdivided into D-1 and D-2)

1. Inner plate of maxilla 1 with 4+ setae .... Key D-1

—— Incisor of mandible toothed in middle .... Key D-2

—— First two couplets together .... Keys D-1 and D-2

Key D-1

1. Gnathopod 1 of scopelocheirin form, dactyl thus vestigial and shrouded in setae .... Key I

—— Gnathopod 1 ordinary 2

2. Head small like *Hippomedon*, each lobe of cleft telson with 2-9 apical spines, epimeron 3 with very large posteroventral tooth 3

—— These characters absent or not in combination 4

3. Mandibular palp article 3 less than half as long as article 2 .... *Wecomedon*

—— Mandibular palp article 3 subequal to article 2 .... *Paratryphosites*

4. Telson entire, inner plate and palp of maxilliped reduced .... *Perrierella*

—— Telson cleft, maxilliped normal 5

5. Gnathopod 1 chelate 6

—— Gnathopod 1 not chelate 8

6. Article 2 of pereopod 5 indentured .... *Podoprion*

—— Article 2 of pereopod 5 not indentured 7

7. Coxa 1 not covered by coxa 2, epistome with large sharp tooth, incisor almost smooth .... *Euonyx*

—— Coxa 1 reduced and covered partly by coxa 2, epistome blunt, incisor heavily toothed .... *Valettia*

8. Head huge, lateral lobe almost evenly semicircular, inner plate of adult maxilla 1 with 1-2 large falcate seta(e) .... *Hirondellea*

—— Head ordinary, setae of maxilla 1 ordinary 9

9. Article 3 of gnathopod 1 elongate 10

—— Article 3 of gnathopod 1 not elongate 12

10. Gnathopod 1 simple .... *Alicella*

—— Gnathopod 1 subchelate 11

11. Coxa 1 ordinary (incisor mostly smooth) .... *Paralicella*

—— Coxa 1 shortened (incisor usually deeply toothed in middle) .... *Valettiopsis*

12. Coxa 1 not significantly shorter than 2, inner plate of maxilla 2 with row of facial setae .... *Valettietta*

—— Coxa 1 significantly shorter and smaller than coxa 1, inner plate of maxilla 2 lacking facial setae 13

13. Article 2 of antenna 2 swollen, inner plate of maxilla 2 parallel to outer plate, medial spines on outer plate of maxilla 1 irregularly distributed .... *Eurythenes*

—— Article 2 of antenna 2 ordinary, inner plate of maxilla 2 thrust medially, spines on outer plate of maxilla 1 uniformly distributed .... *Aristias*

Key D-2

1. Gnathopod 1 simple .... *Alicella*

—— Gnathopod 1 subchelate 2

2. Telson entire, inner ramus of uropod 3 reduced .... *Onesimoides*

—— Telson cleft, inner ramus of uropod 3 not reduced 3

3. Article 2 of pereopod 5 deeply indentured .... *Podoprion*

—— Article 2 of pereopod 5 with small serrations 4

4. Telson short, cleft less than halfway, inner plate of maxilla 1 with 2 setae .... *Aristiopsis*

—— Telson elongate, cleft three fourths, inner plate of maxilla 1 with 5+ setae 5

5. Setae on inner plate of maxilla 1 mostly terminal, gnathopod 1 chelate .... *Valettia*

—— Setae on inner plate of maxilla 1 medial, gnathopod 1 subchelate 6

6. Incisor not toothed in middle, molar simple .... *Paralicella*

—— Incisor toothed in middle, molar triturative 7

7. Coxa 1 reduced, urosome with strong acute tooth .... *Valettiopsis*

—— Coxa 1 not reduced, urosome lacking tooth .... *Valettietta*

Key E

(Palp of maxilla 1 absent)

(After finishing this key run specimen through later keys also Basic Key Couplet 7)

1. Mouthparts conical .... Key H

—— Mouthparts not conical 2

2. Telson entire, coxa 1 ordinary 3

—— Telson cleft, coxa 1 reduced 5

3. Gnathopod 1 chelate .... *Prachynella*

—— Gnathopod 1 subchelate or simple 4

4. Gnathopod 1 small and simple, palp of maxilliped reduced, uropod 3 lacking rami .... *Ocosingo*

—— Gnathopod 1 huge, subchelate, palp of maxilliped elongate, uropod 3 biramous .... *Pachychelium*

5. Coxa 1 with anteroventral cusp .... *Vijaya*

—— Coxa lacking anteroventral cusp 6

6. Article 2 of antenna 1 as long as article 1 .... *Bathyamaryllis*

—— Article 2 of antenna 1 shorter than article 1 7

7. Antenna 1 with tooth, mandibular palp attached opposite well-developed molar, uropod 2 with incision on inner ramus .... *Amaryllis*

—— Antenna 1 lacking tooth, mandibular palp attached proximal to vestigial molar, uropod 2 lacking incision on inner ramus .... *Pseudamaryllis*

Key F (Cyphocarins)

(Divided into 2 starting point keys)

Key 1 to the Cyphocarin Lysianassidae

1. Most of uropod 3, telson and most of maxillipedal palp absent 2

—— Most of uropod 3, telson and most of maxillipedal palp present 4

2. Inner rami of uropods 1-2 as long as outer, coxae 3-7 small and discontiguous, inner plates of maxillae 1-2 with thick setae .... *Thoriella*

—— Inner rami of uropods 1-2 short or vestigial, coxae 3-7 large and overlapping, inner plates of maxillae 1-2 with thin setae 3

3. Pereonites 3-6 ordinary, article 2 of pereopods 6-7 rectangular, maxilliped with tiny palp .... *Chevreuxiella*

—— Pereonites 3-6 swollen hugely, article 2 of pereopods 6-7 pyriform, maxilliped without palp .... *Danaella*

4. Only coxa 1 reduced and covered partly by coxa 2 5

—— Both coxae 1-2 reduced and partly covered by coxae 3-4 8

5. Article 2 of antenna 1 elongate .... *Bathyamaryllis*

—— Article 2 of antenna 1 not elongate 6

6. Antenna 1 lacking tooth .... *Pseudamaryllis*

—— Antenna 1 bearing tooth 7

7. Coxa 4 with anteroventral point .... *Vijaya*

—— Coxa 4 lacking anteroventral point .... *Amaryllis*

8. Base of primary flagellum on antenna 1 with callynophore 9

—— Base of primary flagellum on antenna 1 without callynophore 13

9. Coxa 3 short like coxae 1-2 and mostly covered by coxa 4 10

—— Coxa 3 large 11

10. Article 2 of pereopod 5 expanded and toothed .... *Cyphocaris*

—— Article 2 of pereopod 5 linear and smooth .... *Pseudocyphocaris*

11. Mandibular palp absent .... *Mesocyclocaris*

—— Mandibular palp present 12

12. Coxae 1-2 small .... *Cyclocaris*

—— Only coxa 1 small .... *Metacyclocaris*

13. Telson cleft 14

—— Telson entire 18

14. Telson deeply cleft (five eights+) 15

—— Telson weakly cleft (one third-) 16

15. Head ordinary, molar present, pereopods simple .... *Procyphocaris*

—— Head grotesque, molar absent, pereopods 3-6 prehensile .... *Paracyphocaris*

16. Article 2 of pereopods 5-7 well expanded, coxae 3-6 large 17

—— Article 2 of pereopods 5-7 unexpanded, coxae 1-7 all tiny .... *Cyphocarioides*

17. Mandibular palp and rakers absent, telson elongate .... *Metacyphocaris*

—— Mandibular palp and rakers present, telson short .... *Mesocyphocaris*

18. Rami of uropod 3 subequally extended, article 2 of pereopod 5 thin and distinct from pereopods 6-7 19

—— Uropod 3 parviramous, inner ramus short or absent, article 2 of pereopod 5 thin and distinct from pereopods 6-7, mandibular palp 3-articulate .... *Lepidepecreella*

—— Uropod 3 parviramous, inner ramus thus short, article 2 of pereopod 5 like that of pereopods 6-7, mandibular palp 3-articulate 20

19. Mandibular palp absent, uropod 3 ordinary .... *Crybelocephalus*

—— Mandibular palp present, inner ramus of uropod 3 shortened, outer ramus 1-articulate but notched .... *Pseudocyphocaris*

20. Urosomites 2-3 separate, article 2 of pereopods 5-7 rectangular .... *Cebocaris*

—— Urosomites 2-3 fused together, article 2 of pereopods 5-7 ovate .... *Crybelocyphocaris*

Key 2 to the Cyphocarin Lysianassidae

1. Only coxa 1 reduced and partly covered by coxa 2 .... see Key 1, Couplet 4

—— Both coxae 1-2 reduced and partly covered by coxa 3 2

2. Urosomites 2 and 3 coalesced 3

—— Urosomites 2 and 3 separate 4

3. Coxae 5-6 ordinary, mandibular palp present, palp of maxilliped ordinary, pereopods 3-5 prehensile .... *Crybelocyphocaris*

—— Coxae 5-6 enlarged, mandibular palp absent, palp of maxilliped vestigial, pereopods 3-5 not prehensile .... *Chevreuxiella, Danaella* see Key 1 couplet 3

4. Mandible lacking palp 5

—— Mandible bearing palp 7

5. Pereopods 4-5 prehensile, article 6 of gnathopod 1 shorter than article 5 .... *Mesocyclocaris*

—— Pereopods 4-5 not prehensile, articles 5 and 6 of gnathopod 1 subequal 6

6. Telson entire .... *Crybelocephalus*

—— Telson cleft .... *Metacyphocaris*

7. Uropod 3 inner ramus strongly reduced or absent 8

—— Uropod 3 rami subequal to each other, well developed 11

8. Pereopods simple .... *Lepidepecreella*

—— Pereopods prehensile 9

9. Telson entire .... *Cebocaris*

—— Telson cleft 10

10. Telson short, mandibular palp article 3 long, 3-articulate, coxae 3-4 relatively large, article 2 of pereopods 5-7 expanded .... *Mesocyphocaris*

—— Telson elongate, mandibular palp article 3 short, 2-articulate, coxae 3-4 tiny, article 2 of pereopods 5-7 thin .... *Cyphocarioides*

11. Coxa 2 much larger than 1 and covering it but coxae 3-4 small, not covering anterior coxae .... *Metacyclocaris*

—— Some of coxae 1-2 or 1-3 covered either by 3 or 4, coxa 4 large 12

12. Article 2 of pereopod 3 deeply indentured or with very long, simple posterodistal tooth; coxae 1-3 all small and covered by coxa 4 .... *Cyphocaris*

—— Article 2 of pereopod 3 not deeply indentured, only coxae 1-2 reduced and covered by coxae 3 or 4 13

13. Some pereopods prehensile .... *Paracyphocaris*

—— Pereopods simple 14

14. Mandible bearing triturative molar .... *Procyphocaris*

—— Mandible lacking distinct molar or with conicolaminate and unridged molar .... *Cyclocaris*

Key G

(Telson entire)

1. Maxilliped abnormal, either palp not exceeding outer plate or dactyl reduced to absent, or inner plate reduced to absent 2

—— Maxilliped normal, plates ordinary, palp well-exceeding outer plate, dactyl well developed, unguiform 10

2. Maxilla 2 medially setose and inner plate of maxilla 1 with 4+ setae, inner plate of maxilliped evanescent combined with palp 3-articulate and not exceeding outer plate .... *Perrierella*

—— Maxilla 2 not medially setose, inner plate of maxilla 1 with fewer than 3 setae, characters of maxilliped not in such combination 3

3. Inner plate of maxilliped well developed but palp not exceeding outer plate 4

—— Inner plate of maxilliped evanescent, palp well-exceeding outer plate 8

4. Article 2 of pereopods 5-7 indentured .... *Podoprionella*

—— Article 2 of pereopods 5-7 with small serrations 5

5. Carpus of gnathopod 1 eusirid and with thin lobe .... *Normanion*

—— Carpus of gnathopod 1 not eusirid, lacking thin lobe 6

6. Palp of maxilla 1 absent, rami of uropod 3 well developed .... *Prachynella, Figorella* (Key C)

—— Palp of maxilla 1 present, rami of uropod 3 = 0-1 7

7. Rami of uropod 3 = 2, plates of maxilla 2 thin .... *Nannonyx*

—— Rami of uropod 3 = 0, plates of maxilla 2 thin .... *Derjugiana*

—— Rami of uropod 3 = 1, plates of maxilla 2 broad ...... (also see couplet 13) *Pseudonesimoides*

8. Articles 1-2 of antenna 1 with large teeth, coxa 1 reduced, gnathopod 1 very thin, outer plate of maxilliped evanescent .... *Izinkala*

—— Articles 1-2 of antenna 1 without teeth, coxa 1 not reduced, gnathopod 1 ordinary, outer plate of maxilliped well developed 9

9. Gnathopod 1 chelate, palp of maxilla 1 large .... *Pachynus*

—— Gnathopod 1 large but subchelate, palp of maxilla 1 absent .... *Pachychelium*

10. Inner ramus of uropod 3 tiny or absent 11

—— Inner ramus of uropod 3 half as long as outer or longer 14

11. Gnathopod 1 simple, article 2 of pereopod 5 linear .... *Clepidecrella*

—— Gnathopod 1 subchelate, article 2 of pereopod 5 expanded 12

12. Inner ramus of uropod 3 tiny .... *Onesimoides*

—— Inner ramus of uropod 3 absent 13

13. Gnathopod 1 subchelate, palp of maxilliped ordinary .... *Paronesimoides*

—— Gnathopod 1 chelate, palp of maxilliped feeble .... *Pseudonesimoides*

14. Coxa 1 reduced .... (also return to Basic Key Couplet 10) *Ventiella*

—— Coxa 1 ordinary 15

15. Pereopod 3 hugely prehensile 16

—— Pereopod 3 not prehensile 17

16. Carpus of pereopod 3 eusirid .... *Endevoura*

—— Carpus of pereopod 3 not eusirid .... *Ensayara*

17. Gnathopod 1 simple .... Key V

—— Gnathopod 1 subchelate 18

18. Head with large rounded ocular lobes .... *Koroga*

—— Head ordinary 19

19. Inner ramus of uropod 2 simple 20

—— Inner ramus of uropod 2 with notch 21

20. Mandibular palp set proximal to molar .... *Orchomene*

—— Mandibular palp set opposite molar .... *Adeliella*

21. Article 4 of male and female antenna 2 expanded .... *Lysianella*

—— Article 4 of female antenna 2 not expanded 22

22. Propodus of gnathopod 1 expanded, carpus very short and lobate, thus broader than long, plates of maxilla 2 thin .... *Pseudokoroga*

—— Propodus of gnathopod 1 ordinary, carpus ordinary, plates of maxilla 2 ordinary 23

23. Molar evanescent or absent .... *Pseudambasia*

—— Molar large and triturative 24

24. Gnathopod 1 more slender, telson usually with notch, antenna 2 not powerful .... *Boeckosimus (= Onisimus)*

—— Gnathopod 1 stouter, telson only emarginate or entire, antenna 2 powerful .... *Onisimus (= Pseudalibrotus)*

Key H (Conicostomatin Genera)

1. Uropod 3 biramous 2

—— Uropod 3 without rami or rami vestigial 6

2. Antenna 1, accessory flagellum nearly as long as primary flagellum; mandibular palp attached just proximal to molar 3

—— Antenna 1, accessory flagellum half or less than half length of primary flagellum; mandibular palp attached extremely proximally 5

3. Epistome strongly produced; mandible with small accessory spines .... *Socarnoides*

—— Epistome not strongly produced; mandible without accessory spines 4

4. Maxilla 1, palp well developed, 2-articulate .... *Shackletonia*

—— Maxilla 1, palp small, 1-articulate .... *Acidostoma*

5. Urosome not compressed; uropods 1 to 3, rami subequal in length; maxillipedal palp 4-articulate ....(? and *Douniaella) Phoxostoma*

—— Urosome compressed; uropods 1 to 3, inner ramus reduced; maxillipedal palp 3-articulate ....*Conicostoma*

6. Maxilliped, inner plate elongate, styliform or substyliform 7

—— Maxilliped, inner plate short, subquadrate 8

7. Head completely concealed by pereonite 1 and coxa 1, inner ramus of uropods 1 and 2 reduced or absent; telson flat ....*Ocosingo*

—— Most of head visible; rami of uropods 1 and 2 subequal in length; telson hemiacetabulate ....*Stomacontion*

8. Head concealed by pereonite 1 and coxa 1; outer plate of maxilliped with smooth cutting edge ....*Acontiostoma*

—— Most of head visible; outer plate of maxilliped with serrate distomedial cutting edge ....*Scolopostoma*

Key I

(Gnathopod 1 of Scopelocheirin structure)

1. Inner plate of maxilla 1 with 2 setae 2

—— Inner plate of maxilla 1 with 5+ setae 4

2. Antenna 1 with tooth (teeth) ....*Ichnopus*

—— Antenna 1 lacking tooth 3

3. Only pereopod 5 indentured ....*Glycerina*

—— Pereopods 5-7 indentured ....*Lucayarina*

4. Mandible lacking molar, pereopods 3-4 especially prehensile ....*Scopelocheiropsis*

—— Mandible with molar, pereopods 3-4 not prehensile 5

5. Gnathopod 2 minutely chelate 6

—— Gnathopod 2 subchelate 7

6. Coxae 1-4 densely setose, outer plate of maxilla 2 broadest ....*Aroui*

—— Coxae 1-4 barely setose, inner plate of maxilla 2 broadest ....*Scopelocheirus*

7. Article 2 of gnathopod 1 swollen, coxa 1 slightly reduced ....*Eucallisoma*

—— Article 2 of gnathopod 1 ordinary, coxa 1 not reduced 8

8. Inner plate of maxilla 1 lacking basal setae, dactyl of gnathopod 1 not easily visible .... *Paracallisomopsis*

—— Inner plate of maxilla 1 with basal setae, dactyl of gnathopod 1 easily visible .... *Paracallisoma*

Key J

(Mandibular palp set proximal to molar)

1. If gnathopod 1 chelate return to Key C, if telson entire return to Key G .... Keys C and G

—— Otherwise continue to 2

2. Gnathopod 1 simple .... (Lysianassins) Key K

—— Gnathopod 1 subchelate 3

3. Coxa 1 slightly reduced and tapering .... *Gronella*

—— Coxa 1 ordinary 4

4. Gnathopod 1 significantly enlarged 5

—— Gnathopod 1 ordinary 8

5. Inner ramus of uropod 2 incised .... *Pseudokoroga*

—— Inner ramus of uropod 2 simple 6

6. Carpus of gnathopod 1 eusirid and with thin lobe .... *Normanion*

—— Carpus of gnathopod 1 ordinary, lobe if present not embraced by gaps on sides 7

7. Head with broadly subcircular lateral lobes, telson emarginate, labrum dominant, epimeron 3 unserrate .... *Koroga*

—— Head ordinary, telson cleft, epistome dominant, epimeron 3 serrate .... (terminal male) *Rimakoroga*

8. Inner ramus of uropod 2 with notch(es) 9

—— Inner ramus of uropod 2 simple 10

9. Labrum dominant, outer ramus of uropod 3 with 2 articles, article 4 of male antenna 2 greatly inflated but article 5 slender .... *Lysianella*

—— Epistome dominant, outer ramus of uropod 3 with 1 article, article 4 of male antenna 2 not greatly inflated nor different from article 5 .... *Pseudambasia*

10. Article 6 of gnathopod 1 greatly elongate and slender, uropod 2 superspinose .... *Pseudorchomene*

—— Article 6 of gnathopod 1 ordinary, uropod 2 ordinary 11

11. Antenna 1 and body grossly cristate or carinate .... *Lepidepecreum*

—— Antenna 1 and body not cristate 12

12. Mandibular palp almost opposite molar .... (see *Douniaella* below) *Paralibrotus*

—— Mandibular palp strongly proximal to molar 13

13. Flagellum of young male antenna 2 conical, base conjoint, terminal male with article 5 of peduncle inflated .... *Microlysias*

—— Flagellum and peduncle of male antenna 2 ordinary 14

14. Upper lip and epistome separate .... *Rimakoroga, Orchomene*

—— Upper lip and epistome fused together 15

15. Gnathopod 1 poorly subchelate, outer plate of maxilliped ordinary .... *Falklandia*

—— Gnathopod 1 well subchelate, outer plate of maxilliped almost naked .... *Douniaella*

Key K

(Lysianassins, gnathopod 1 simple, mandibular palp proximal)

1. Telson cleft 2

—— Telson entire or emarginate 8

2. Inner ramus of uropod 2 with notch 3

—— Inner ramus of uropod 2 simple 4

3. Outer plate of maxilliped rounded apically .... *Concarnes*

—— Outer plate of maxilliped pointed apically .... *Socarnoides*

4. Antenna 1 with tooth .... *Socarnella*

—— Antenna 1 lacking tooth 5

5. Peduncle of uropod 3 expanded .... *Septcarnes*

—— Peduncle of uropod 3 not expanded 6

6. Gills not pleated .... *Waldeckia*

—— Gills pleated 7

7. Pereopod 6 equals 7, pereopod 5 shorter .... *Socarnopsis*

—— Pereopod 6 smaller than 7 .... *Socarnes*

8. Antenna 1 with tooth 9

—— Antenna 1 lacking tooth 14

9. Uropods 1 or 2 setose 10

—— Uropods 1-2 not setose 12

10. Epistome produced, outer plate of maxilla 2 broadest .... *Bonassa*

—— Epistome not produced, inner plate of maxilla 2 broadest 11

11. Outer plate of maxilla 2 geniculate .... *Phoxostoma*

—— Outer plate of maxilla 2 ordinary .... *Dartenassa*

12. Outer ramus of uropod 3 2-articulate .... *Lysianassa*

—— Outer ramus of uropod 3 1-articulate 13

13. Telson notched .... *Socarnella*

—— Telson entire .... *Lysianassa*

14. Epistome and upper lip mostly fused, poorly separated, lacking deep notch, or upper lip not distinctly produced 15

—— Epistome and upper lip separated by deep notch, at least upper lip strongly produced, occasionally epistome also produced alongside upper lip 19

15. Urosomites 2-3 coalesced .... *Pseudambasia*

—— Urosomites 2-3 separate 16

16. Outer ramus of uropod 3 1-articulate .... *Parambasia* and *Pronannonyx*

—— Outer ramus of uropod 3 2-articulate 17

17. Article 2 of pereopod 6 with large anterior and posterior lobes .... *Rhinolabia*

—— Article 2 of pereopod 6 ordinary 18

18. Inner ramus of uropod 3 two thirds of outer ramus, article 2 of outer ramus elongate .... *Kakanui*

—— Inner ramus of uropod 3 one third of outer ramus, article 2 of outer ramus short .... *Parawaldeckia*

19. Epistome produced alongside upper lip 20

—— Epistome not produced 21

20. Outer ramus of uropod 3 2-articulate .... *Dissiminassa*

—— Outer ramus of uropod 3 1-articulate .... *Macronassa*

21. Peduncle of uropod 3 long and not expanded 22

—— Peduncle of uropod 3 short and expanded 23

22. Gills not pleated .... possibly some species of *Lysianassa*

—— Gills pleated .... *Lysianassa*

23. Gnathopod 1 enlarged and falcate .... *Falcanassa*

—— Gnathopod 1 ordinary and simple 24

24. Outer ramus of uropod 3 2-articulate 25

—— Outer ramus of uropod 3 1-articulate 26

25. Male antenna 2 elongate .... *Aruga*

—— Male antenna 2 short, like female .... *Lysianopsis*

26. Outer plate of maxilla 1 with 1 set of spines .... *Shoemakerella*

—— Outer plate of maxilla 1 with 2 sets of spines .... *Arugella*

Special Key L

(Telson entire, gnathopod 1 simple, mandibular palp distal)

1. Pereopod 3 subchelate 2

—— Pereopod 3 simple 3

2. Dactyl of maxilliped unguiform, inner plate of maxilla 2 reduced .... *Ensayara*

—— Dactyl of maxilliped bulbous, inner plate of maxilla 2 ordinary .... *Endevoura*

3. Inner ramus of uropod 3 reduced .... *Clepidecrella*

—— Inner ramus of uropod 3 ordinary 4

4. Prebuccal mass sharply produced anteriorly .... *Paralysianopsis*

—— Prebuccal mass blunt anteriorly 5

5. Article 3 of gnathopod 1 slightly elongate .... *Parambasia*

—— Article 3 of gnathopod 1 not elongate 6

6. Inner ramus of uropod 2 incised .... female *Pseudambasia*

—— Inner ramus of uropod 2 simple 7

7. Carpus of gnathopod 1 lobate .... *Paralibrotus*

—— Carpus of gnathopod 1 not lobate .... *Menigrates*

Key M

(Inner plate of maxilla 1 multisetose)

1. Pereopod 5 indentured .... *Podoprion*

—— Pereopod 5 with small serrations on article 2 2

2. Incisor dentate in middle 3

—— Incisor smooth in middle 5

3. Gnathopod 1 chelate, inner ramus of uropod 2 weakly incised, outer plate of maxilliped with sharp cusp apically .... *Valettia*

—— Gnathopod 1 not chelate, inner ramus of uropod 2 simple, outer plate of maxilliped rounded apically 4

4. Coxa 1 reduced, urosome with strong acute tooth .... *Valettiopsis*

—— Coxa 1 ordinary, urosome without acute tooth .... *Valettietta*

5. Telson with broad apices bearing 7-9 spines, uropod 2 setose .... *Paratryphosites*

—— Telson with narrow apices bearing 0-3 spines, uropod 2 not setose 6

6. Prebuccal mass sharp anteriorly .... *Parschisturella*

—— Prebuccal mass blunt anteriorly 7

7. Article 3 of gnathopod 1 not elongate, coxa 1 slightly reduced 8

—— Article 3 of gnathopod 1 elongate, coxa 1 ordinary 9

8. Epistome dominant, telson elongate .... *Eurythenes*

—— Upper lip dominant, telson short .... *Aristias*

9. Gnathopod 1 simple .... *Alicella*

—— Gnathopod 1 subchelate .... *Paralicella*

Key N

(Gnathopod 1 simple, mandibular palp opposite molar, telson cleft)

1. Coxa 1 reduced and tapering 2

—— Coxa 1 ordinary 7

2. Dactyl of maxilliped vestigial 3

—— Dactyl of maxilliped ordinary 5

3. Epistome not dominant, molar simple but large .... *Centromedon*

—— Epistome dominant, molar evanescent 4

4. Palp of maxilliped narrow .... *Ambasia*

—— Palp of maxilliped as broad as outer plate .... *Ambasiella*

5. Inner ramus of uropod 2 not strongly incised .... *Ambasiopsis*

—— Inner ramus of uropod 2 strongly incised 6

6. Outer plate of maxilliped with 2+ apical spines, gnathopod 1 subchelate though often poorly .... *Schisturella*

— Outer plate of maxilliped lacking significant apical spines, gnathopod 1 simple .... *Metambasia*

7. Dactyl of gnathopod 1 shrouded in setae, of scopelocheirin form .... Key I

— Gnathopod 1 ordinary 8

8. Article 2 of pereopods 6-7 indentured .... *Lucayarina*

— Article 2 of pereopods 6-7 with small serrations 9

9. Prebuccal mass sharp anteriorly .... *Parschisturella*

— Prebuccal mass blunt anteriorly 10

10. Inner ramus of uropod 2 incised .... *Ichnopus*, *Cicadosa*

— Inner ramus of uropod 2 simple 11

11. Maxillae 1-2 medially setose .... *Alicella*

— Maxillae 1-2 not medially setose 12

12. Telson short, cleft less than 40% .... *Menigrates*

— Telson long, cleft 50+% 13

13. Molar triturative, dactyl of gnathopod 1 large .... *Paracentromedon*

— Molar simple, dactyl of gnathopod 1 small .... *Ichnopus*, *Menigratopsis*

Key O

(To confirm telson cleft, mandibular palp near molar, gnathopod 1 subchelate, not scopelocheirin, maxillae not medially setose, maxillipeds normal)

1. Articles 5-6 of gnathopod 1 together very elongate .... *Pseudorchomene*

— Articles 5-6 of gnathopod 1 not greatly elongate 2

2. Coxa 1 reduced or tapering strongly 3

— Coxa 1 ordinary 15

3. Inner plate of maxilla 1 with 5+ setae .... *Eurythenes*

— Inner plate of maxilla 1 with 0-3 setae 4

4. Head very broadly rounded anteriorly, inner plate of adult maxilla 1 with 1-2 huge falcate setae .... *Hirondellea*

— Head ordinary, setae on inner plate of maxilla 1 ordinary 5

5. Epistome dominant 6

—— Epistome not dominant 8

6. Telson cleft less than halfway, prebuccal mass very long anteriorly .... *Aristiopsis*

—— Telson cleft more than halfway, prebuccal mass of ordinary length dorsoventrally 7

7. Inner ramus of uropod 2 incised .... *Gronella*

—— Inner ramus of uropod 2 simple .... *Uristes, Tryphosella*

8. Prebuccal mass elongate dorsoventrally .... *Aristiopsis*

—— Prebuccal mass ordinary 9

9. Dactyl of maxilliped small .... *Centromedon*

—— Dactyl of maxilliped ordinary 10

10. Inner ramus of uropod 2 incised .... *Schisturella*

—— Inner ramus of uropod 2 simple 11

11. Telson cleft one eighth .... *Ventiella*

—— Telson cleft one half or more 12

12. Gnathopod 1 greatly enlarged .... *Coximedon*

—— Gnathopod 1 ordinary 13

13. Inner plate of maxilla 2 with dominant medial seta most ventrad, outer plate of maxilliped with 2 apical spines .... *Cedrosella*

—— Inner plate of maxilla 2 with ventrad seta not dominant, outer plate of maxilliped lacking apical spines 14

14. Article 3 of gnathopod 1 not elongate .... *Ambasiopsis*

—— Article 3 of gnathopod 1 elongate .... *Tmetonyx*

15. Prebuccal mass sharp anteriorly 16

—— Prebuccal mass blunt anteriorly 17

16. Only epistome pointed .... *Tryphosites*

—— Only upper lip pointed .... *Parschisturella*

17. Article 3 of gnathopod 1 elongate 18

—— Article 3 of gnathopod 1 not elongate 19

18. Inner ramus of uropod 2 simple .... *Tmetonyx*

—— Inner ramus of uropod 2 incised .... *Cicadosa*

19. Dactyl of maxilliped reduced .... *Douniaella, Rifcus, Martensia*

—— Dactyl of maxilliped ordinary 20

20. Urosomite 1 with deep dorsal notch .... *Cheirimedon* and *Tryphsoides*

—— Urosomite 1 with weak notch or only tooth 21

21. Pereopod 5 with spur(s) .... *Lepidepecreoides*

—— Pereopod 5 lacking spurs 22

22. Head large 23

—— Head small 27

23. Inner ramus of uropod 2 simple 24

—— Inner ramus of uropod 2 incised 25

24. Gnathopod 1 simple, head eyeless .... *Menigratopsis*

—— Gnathopod 1 subchelate, head oculate .... *Anonyx*

—— Gnathopod 1 subchelate, head anoculate .... *Caeconyx, Martensia*

25. Outer plate of maxilliped with large medial and apical spines .... *Bruunosa*

—— Outer plate of maxilliped with small or no medial spines 26

26. Gnathopod 1 subchelate, molar simple .... *Anonyx*

—— Gnathopod 1 barely subchelate, molar triturative .... *Paronesimus*

27. Mandibular palp article 3 short 28

—— Mandibular palp article 3 elongate 29

28. Telson cleft halfway .... *Douniaella, Elimedon*

—— Telson cleft three fourths .... *Paracentromedon, Martensia*

29. Molar conicolaminate .... *Uristes, Martensia*

—— Molar triturative 30

30. Telson short, cleft less than halfway, each lobe with 7-9 apical spines .... *Paratryphosites*

—— Telson long, cleft less than halfway, each lobe with 1-2 spines .... *Douniaella, Cheirimedon*

—— Telson long, cleft more than halfway, each lobe with 1-5 apical spines 31

31. Flagellum of antenna 1 with callynophore .... *Hippomedon*

—— Flagellum of antenna 1 without callynophore 32

32. Articles 2-3 of antenna 1 each longer than article 1 of flagellum, pereopod 5 shorter (25%) than pereopods 6-7, pereopod 7 longest .... *Psammonyx*

—— Articles 2-3 of antenna 1 each shorter than article 1 of flagellum, pereopod 5 slightly shorter than pereopod 6, latter longest .... *Wecomedon*

Special Groups and Keys

Conicostomatin Group

See Lowry & Stoddart (1983a).

Body robust, coxae deep, legs stocky, urosome small and compact. Head small, often concealed by coxa 1 and pereonite 1. Mouthparts forming conical group. Antennae short, calceoli absent. Incisor smooth or tapering to sharp point; molar small or absent. Outer plate of maxilliped large and dominating mouthparts, dactyl small or absent. Posteroventral lobe of coxa 4 large. Gnathopod 1 simple.

Socarnoides included by Lowry & Stoddart (1983a) but we include it here only provisionally and without conviction.

Key to the Genera of Conicostomatins

1. Uropod 3 biramous 2

—— Uropod 3 without rami or rami vestigial 6

2. Antenna 1, accessory flagellum nearly as long as primary flagellum; mandibular palp attached just proximal to molar 3

—— Antenna 1, accessory flagellum half or less than half length of primary flagellum; mandibular palp attached extremely proximally 5

3. Epistome strongly produced; mandible with small accessory spines .... *Socarnoides*

—— Epistome not strongly produced; mandible without accessory spines 4

4. Maxilla 1, palp well developed, 2-articulate .... *Shackletonia*

—— Maxilla 1, palp small, 1-articulate .... *Acidostoma*

5. Urosome not compressed; uropods 1-3, rami subequal in length; maxillipedal palp 4-articulate .... *Phoxostoma*

—— Urosome compressed; uropods 1-3, inner ramus reduced; maxillipedal palp 3-articulate .... *Conicostoma*

6. Maxilliped, inner plate elongate, styliform or substyliform 7

—— Maxilliped, inner plate short, subquadrate 8

7. Most of head visible; inner ramus of uropods 1 and 2 reduced or absent; telson flat .... *Ocosingo*

—— Head completely concealed by pereonite 1 and coxa 1; rami of uropods 1 and 2 subequal in length; telson hemiacetabulate .... *Stomacontion*

8. Head concealed by pereonite 1 and coxa 1; outer plate of maxilliped with smooth cutting edge .... *Acontiostoma*

—— Most of head visible; outer plate of maxilliped serrate distomedially .... *Scolopostoma*

Cyphocarin Group

This group of pelagic Lysianassidae is characterised very loosely by the small size of both coxae 1 and 2 (occasionally 3) and the large size of coxa 4 (usually 3 also), but one genus, *Metacyclocaris* has only coxa 1 reduced and it therefore bridges over to other lysianassid groups. *Cyphocaris* itself has coxae 1 to 3 reduced. Most cyphocarins, except *Cyphocaris* itself, are also recognisable from the prehensility of pereopods 3 and 4 (and often 5, rarely 6 or 7), this grasping condition being reflected in the swollen and spiny propodus of the affected pereopods. Most of the cyphocarins also have grotesque heads, tall and anteroposteriorly compressed, often with strange lobations; however, such taxa as *Crybelocephalus* and *Metacyphocaris* have hooded heads which are less grotesque and might not be recognisable as of cyphocarin proportions. The group is therefore not totally discrete from other lysianassids.

Four of the genera have callynophores on antenna 1 and at least two genera have strong calceoli but, strangely, most of the genera lack these devices which would seem to be so well adapted to errant pelagonts. Most of the taxa are assumed to be associated with hosts because of prehensile pereopods, and may be so sedentary that navigational devices are unnecessary; however, there is no observational evidence of this possibility.

The evolutionary trends proceed from triturative molar (*Cyphocaris*) to its reduction in *Cyclocaris* and loss elsewhere; from rakers (*Cyphocaris*) to reduction and loss elsewhere; from mandibular palp (several genera) to loss; from callynophore on antenna 1 plus accessory flagellum to loss of callynophore (*Cyphocaris*, *Cyclocaris*, etc.) and reduction or loss of accessory flagellum (most genera); from strongly setose maxillae (*Cyclocaris*) to poorly setose maxillae; from expanded bases of pereopods 5-7 to loss of expansion in such genera as *Cyphocarioides*; from elongate cleft telsons to short uncleft telsons; from aequiramous uropod 3 to parviramous states; even one genus, *Crybelocyphocaris*, has urosomites 2 to 3 fused together; several, like *Mesocyclocaris* have the inner plate of the maxilliped reduced.

Many cyphocarins have 1 to 3 medium-sized notches on the inner ramus of uropod 3. Because these do not appear to have much taxonomic value, the normal reference to these in the diagnoses of cyphocarins is omitted.

Bathyamaryllis has most of the aspects of cyphocarins but maxilla 1 lacks the palp, and article 2 of antenna 1 is elongate.

Key 1 to the Genera of the Cyphocarins

1. Most of uropod 3, telson and most of maxillipedal palp absent 2

—— Most of uropod 3, telson and most of maxillipedal palp present (go also to key 2) 4

2. Inner rami of uropods 1-2 as long as outer, coxae 3-7 small and discontiguous, inner plates of maxillae 1-2 with thick setae .... *Thoriella*

—— Inner rami of uropods 1-2 short or vestigial, coxae 3-7 large and overlapping, inner plates of maxillae 1-2 with thin setae 3

3. Pereonites not hugely swollen, articles in flagella of antennae bead-like, outer ramus of uropods 1-2 flabellate .... *Chevreuxiella*

—— Pereonites 3-6 hugely swollen, articles in flagella of antennae rectangular, outer ramus of uropods 1-2 lanceolate .... *Danaella*

4. Article 2 of antenna 1 elongate and palp of maxilla 1 absent .... *Bathyamaryllis*

—— Article 2 of antenna 1 not elongate and maxilla 1 with palp 5

5. Base of primary flagellum on antenna 1 with callynophore 6

—— Base of primary flagellum on antenna 1 without callynophore 10

6. Coxa 3 short like coxae 1-2 and mostly covered by coxa 4 .... *Cyphocaris*

—— Coxa 3 large 7

7. Mandibular palp absent .... *Mesocyclocaris*

—— Mandibular palp present 8

8. Coxae 1-2 small 9

—— Only coxa 1 small .... *Metacyclocaris*

9. Inner plate of maxilla 1 strongly setose, mandibular palp opposite molar .... *Cyclocaris*

—— Inner plate of maxilla 1 naked, mandibular palp attached proximally (molar may be absent) .... *Lepidepecreella*

10. Coxa 3 as small as and as hidden as coxae 1-2 .... *Pseudocyphocaris*

—— Coxa 3 large and not hidden 11

11. Telson cleft 12

—— Telson entire 16

12. Telson deeply cleft (five eights+) 13

—— Telson weakly cleft (one third-) 14

13. Head ordinary, molar present, pereopods simple .... *Procyphocaris*

—— Head grotesque, molar absent, pereopods 3-6 prehensile .... *Paracyphocaris*

14. Article 2 of pereopods 5-7 well expanded, coxae 3-6 large 15

—— Article 2 of pereopods 5-7 unexpanded, coxae 1-7 all tiny .... *Cyphocarioides*

15. Mandibular palp and rakers absent, telson elongate .... *Metacyphocaris*

—— Mandibular palp and rakers present, telson short .... *Mesocyphocaris*

16. Rami of uropod 3 subequally extended, (article 2 of pereopod 5 thin and distinct from pereopods 6-7), mandibular palp absent .... *Crybelocephalus*

—— Uropod 3 parviramous, inner ramus thus short, (article 2 of pereopod 5 like that of pereopods 6-7 or not), mandibular palp 3-articulate 17

17. Urosomites 2-3 separate, article 2 of pereopods 5-7 rectangular .... *Cebocaris*

—— Urosomites 2-3 fused together, article 2 of pereopods 5-7 ovate .... *Crybelocyphocaris*

Key 2 to the Genera of Cyphocarins

1. Urosomites 2 and 3 coalesced .... *Crybelocyphocaris*

— Urosomites 2 and 3 separate 2

2. Mandible lacking palp 3

— Mandible bearing palp 5

3. Pereopods 4-5 prehensile, article 6 of gnathopod 1 shorter than article 5 .... *Mesocyclocaris*

— Pereopods 4-5 not prehensile, articles 5 and 6 of gnathopod 1 subequal 4

4. Telson entire .... *Crybelocephalus*

— Telson cleft .... *Metacyphocaris*

5. Uropod 3 inner ramus strongly reduced or absent 6

— Uropod 3 rami subequal to each other, well developed 8

6. Pereopods simple .... *Lepidepecreella*

— Pereopods prehensile 7

7. Telson cleft .... *Mesocyphocaris*

— Telson entire .... *Cebocaris*

8. Coxa 2 much larger than 1 and covering it but coxae 3-4 small, not covering anterior coxae .... *Metacyclocaris*

— Some of coxae 1-2 or 1-3 covered either by 3 or 4, coxa 4 large 9

9. Coxae 1-3 all small and hidden by coxa 4 10

— Coxa 3 large and freely visible 11

10. Article 2 of pereopod 3 large, deeply indentured or with very long, simple posterodistal tooth .... *Cyphocaris*

— Article 2 of pereopod 3 not deeply indentured, thin, linear, not ornamented .... *Pseudocyphocaris*

11. Some pereopods prehensile .... *Paracyphocaris*

— Pereopods simple 12

12. Mandible bearing triturative molar .... *Procyphocaris*

— Mandible lacking distinct molar or with conicolaminate and unridged molar 13

13. Article 3 of gnathopod 1 elongate, maxillae 1-2 strongly setose medially, article 2 of antenna 1 very short .... *Cyclocaris*

— Article 3 of gnathopod 1 not elongate, maxillae 1-2 not medially setose, article 2 of antenna 1 elongate .... *Bathyamaryllis*

Lysianassin Group

This set of keys includes many non-lysianassin genera which have general similarities but usually possess one or more characters not typical of lysianassins, such as deeply cleft telson; the characters of lysianassins include large mouthparts arranged in a quadrate bundle, prebuccal mass with large lobe on upper lip seen from lateral view (the epistome may or may not also have a large lobe), simple gnathopod 1, proximally situated palp of mandible, unreduced coxa 1, and uncleft telson.

Basic Key to the Genera of Lysianassins and Analogues

A. Inner ramus of uropod 3 very short, or in male both rami very short .... *Parawaldeckia*

—— Inner ramus of uropod 3 not greatly shortened .... B

B. Epistome and upper lip together or separately forming sharp process C

—— Prebuccal mass not anteriorly sharp .... D

C. Telson emarginate .... *Paralysianopsis*

—— Telson deeply cleft .... *Parschisturella*

D. Epistome fully dominating upper lip .... E

—— Epistome not dominant .... F

E. Dactyl of maxilliped ordinary, urosomites 2-3 coalesced .... (?*Parambasia*) *Pseudambasia*

—— Dactyl of maxilliped vestigial, urosomites separate .... *Nannonyx*

F. Article 2 of pereopod 6 lobate anteriorly and posteriorly, dactyls of pereopods 6-7 elongate .... *Rhinolabia*

—— Article 2 of pereopod 6 not grossly lobate, dactyl of pereopods 6-7 not elongate .... Keys 1, 2, 3

Key 1 to the Genera of Lysianassins

1. Telson cleft one third or more 2

—— Telson cleft one fourth or less 7

2. Upper lip projecting much farther than epistome .... *Socarnes*

—— Upper lip and epistome projecting forward equally 3

3. Inner ramus of uropod 2 with notch 4

—— Inner ramus of uropod 2 without notch 5

4. Palp of maxilliped not exceeding outer plate, mouthparts arranged in conical group .... *Socarnoides*

—— Palp of maxilliped exceeding outer plate, mouthparts arranged in quadrate group .... *Concarnes*

5. Base of primary flagellum on antenna 1 without callynophore .... *Septcarnes*

— Base of primary flagellum on antenna 1 with callynophore, thus elongate 6

6. Carpus and propodus of gnathopod 1 subequally long .... *Socarnopsis*

— Carpus of gnathopod 1 much shorter than propodus .... *Waldeckia*

7. Outer ramus of uropod 3 with 2 articles 8

— Outer ramus of uropod 3 with 1 article 11

8. Peduncle of uropod 3 flat but not laterally plate-like, inner ramus about two thirds as long as outer ramus, prebuccal parts apparently not divided .... *Kakanui*

— Peduncle of uropod 3 plate-like (Fig.93C) inner ramus three-fourths or more as long as outer ramus, prebuccal parts divided 9

9. Epistome projecting as far as upper lip .... *Dissiminassa*

— Upper lip projecting much farther than epistome 10

10. Antenna 2 of male elongate .... *Aruga*

— Antenna 2 of male not elongate .... *Lysianopsis*

11. Uropod 1 densely setose 12

— Uropod 1 not setose 13

12. Epistome produced as far as upper lip, outer plate of maxilla 2 dominant .... *Bonassa*

— Upper lip strongly exceeding epistome, inner plate of maxilla 2 dominant .... *Dartenassa*

13. Inner ramus of uropod 2 simple .... *Pronannonyx*

— Inner ramus of uropod 2 with notch 14

14. Gnathopod 1 large and falcate or gnathopod 1 with palm 15

— Gnathopod 1 ordinary and simple 16

15. Prebuccal parts small, barely separate, epistome greatly dominating upper lip .... male *Pseudambasia*

— Prebuccal parts large, upper lip dominant .... *Falcanassa*

16. Article 3 of gnathopod 1 slightly elongate .... *Parambasia*

— Article 3 of gnathopod 1 not elongate 17

17. Small prebuccal mass with epistome fully dominant and over-riding tiny upper lip .... *Pseudambasia*

— Large prebuccal mass with upper lip dominant or upper lip and epistome equally dominant 18

18. Epistome extending as far as upper lip 19

—— Upper lip dominant 20

19. Article 1 of antenna 1 with tooth .... *Socarnella, Lysianassina*

—— Article 1 of antenna 1 lacking tooth .... *Macronassa*

20. Article 1 of antenna 1 lacking tooth .... *Shoemakerella, Arugella*

—— Article 1 of antenna 1 with tooth .... *Lysianassa*

Key 2 to the Genera of Lysianassins

1. Inner ramus of uropod 2 lacking notch 2

—— Inner ramus of uropod 2 with notch 9

2. Outer plate of maxilla 2 geniculate, mouthparts in conical bundle .... *Phoxostoma*

—— Maxilla 2 normal, mouthparts in quadrate bundle 3

3. Uropods 1-2 setose, antenna 1 with tooth 4

—— Uropods 1-2 not setose, antenna 1 without tooth 5

4. Epistome not produced, outer plate of maxilla 2 narrow .... *Dartenassa*

—— Epistome produced, outer plate of maxilla 2 broad .... *Bonassa*

5. Telson cleft one half+ 6

—— Telson entire 8

6. Epistome not produced, article 2 of palp on maxilliped reaching apex of outer plate, base on flagellum of antenna 1 without callynophore .... *Socarnes*

—— Epistome produced, article 2 of palp on maxilliped barely reaching apex of outer plate or less, (base on flagellum of antenna 1 with or without callynophore) 7

7. Primary flagellum of antenna 1 with callynophore, outer plate of maxilliped exceeding article 2 of palp .... *Waldeckia, Socarnopsis*

—— Primary flagellum of antenna 1 without callynophore, outer plate of maxilliped barely exceeding article 2 of palp .... *Septcarnes*

8. Palp of maxilliped short, uropod 3 short .... *Pronannonyx*

—— Palp of maxilliped long, uropod 3 long .... *Parambasia*

9. Peduncle of uropod 3 elongate, not expanded 10

—— Peduncle of uropod 3 short and/or plate-like 16

10. Antenna 1 with tooth 11

—— Antenna 1 without tooth 13

11. Telson with small notch .... *Socarnella*

—— Telson entire 12

12. Epistome extending as far as upper lip .... *Lysianassina*

—— Upper lip dominant .... *Lysianassa*

13. Dominant epistome lobulate over tiny upper lip, male gnathopod 1 subchelate, female simple, urosomites 2-3 coalesced .... *Pseudambasia*

—— Upper lip large, epistome not dominant, male gnathopod 1 not subchelate, female simple, urosomites 2-3 separate 14

14. Epistome produced as far as upper lip 15

—— Epistome not produced, (palp of maxilliped long, telson entire) .... *Arugella*

15. Palp of maxilliped very short, telson cleft one third .... *Socarnoides*

—— Palp of maxilliped ordinary, telson entire .... *Dissiminassa*

16. Outer ramus of uropod 3 2-articulate 17

—— Outer ramus of uropod 3 1-articulate 20

17. Epistome produced as far as upper lip 18

—— Epistome not produced 19

18. Telson cleft one third+ .... *Concarnes*

—— Telson entire .... *Dissiminassa, Kakanui*

19. Male antenna 2 elongate .... *Aruga*

—— Male antenna 2 not elongate .... *Lysianopsis*

20. Epistome produced, inner ramus of uropod 3 often small .... *Macronassa*

—— Epistome not produced, inner ramus of uropod 3 large 21

21. Plates of maxilla 2 equally broad, gnathopod 1 falcate .... *Falcanassa*

—— Inner plate of maxilla 2 broader than outer plate, gnathopod 1 not falcate 22

22. Article 1 of antenna 1 with tooth .... *Lysianassa*

—— Article 1 of antenna 1 without tooth 23

23. Uropod 3 of male with notch on peduncle .... *Shoemakerella*

—— Uropod 3 of male ordinary .... *Arugella*

Key 3 to the Genera of Lysianassins

1. Antenna 1 with tooth 2
—— Antenna 1 without tooth 7
2. Uropods 1-2 not densely setose 3
—— Uropods 1-2 densely setose 5
3. Telson with notch .... *Socarnella*
—— Telson entire 4
4. Epistome slightly to strongly produced .... *Lysianassina*
—— Epistome unproduced .... *Lysianassa*
5. Outer plate of maxilla 2 geniculate, mouthparts arranged in conical bundle .... *Phoxostoma*
—— Outer plate of maxilla 2 not geniculate, mouthparts arranged inquadrate bundle 6
6. Outer plate of maxilla 2 thin, epistome not produced .... *Dartenassa*
—— Outer plate of maxilla 2 broad, epistome produced .... *Bonassa*
7. Uropod 1 setose .... *Phoxostoma*
—— Uropod 1 not setose 8
8. Inner ramus of uropod 2 without notch, telson uncleft 9
—— Inner ramus of uropod 2 without notch, telson deeply cleft 10
—— Inner ramus of uropod 2 with incision, telson poorly cleft or entire 12
9. Palp of maxilliped short, uropod 3 short .... *Pronannonyx*
—— Palp of maxilliped long, uropod 3 long .... *Parambasia*
10. Primary flagellum without callynophore, outer plate of maxilliped almost reaching end of palp article 2, epistome as long as upper lip .... *Septcarnes*
—— Primary flagellum with callynophore, outer plate of maxilliped exceeding article 2 of palp, epistome produced 11
—— Primary flagellum 1 without callynophore, outer plate of maxilliped not exceeding article 2 of palp, epistome not produced .... *Socarnes*
11. Gills pleated, carpus of gnathopod 1 as long as propodus .... *Socarnopsis*
—— Gills not pleated, carpus of gnathopod 1 much shorter than propodus .... *Waldeckia*

12. Peduncle of uropod 3 unexpanded 13

—— Peduncle of uropod 3 expanded and plate-like 15

13. Epistome much more dominant than tiny upper lip, urosomites 2-3 coalesced .... *(?Parambasia) Pseudambasia*

—— Upper lip large, not dominated by epistome 14

14. Peduncle of uropod 3 short, epistome produced .... *Kakanui, Dissiminassa*

—— Peduncle of uropod 3 long, epistome not produced .... *Arugella*

15. Outer ramus of uropod 3 2-articulate 16

—— Outer ramus of uropod 3 1-articulate 19

16. Epistome produced 17

—— Epistome not produced 18

17. Outer plate of maxilliped rounded, palp long .... *Concarnes*

—— Outer plate of maxilliped pointed, palp short .... *Socarnoides*

18. Male antenna 2 elongate .... *Aruga*

—— Male antenna 2 not elongate .... *Lysianopsis*

19. Epistome produced .... *Macronassa*

—— Epistome not produced 20

20. Gnathopod 1 falcate .... *Falcanassa*

—— Gnathopod 1 not falcate 21

21. Inner plate of maxilla 2 wide, outer plate of maxilla 1 with 7 + ?0 spines, peduncle of terminal male uropod 3 with deep notch .... *Shoemakerella*

—— Inner plate of maxilla 2 very wide, outer plate maxilla 1 with 7 + 4 spines, uropod 3 of male without large peduncular notch .... *Arugella*

Pachynin Group

Lysianassidae with enlarged gnathopod 1 bearing compressed article 5 (carpus) and enlarged article 6 (propodus); body vermiform; antennae very short and stout, flagella with few articles; calceoli absent.

Key to the Genera of Pachynins

1. Maxilla 1, outer plate with most spine-teeth sculptured; maxilla 2 long, thin, tapering distally 2

—— Maxilla 1, outer plate with spine-teeth smooth; maxilla 2 short, plates usually subquadrate, occasionally tapering 4

2. Maxilla 1, palp 1-2 articulate, with several terminal setae; uropod 3 uniramous .... *Sheardella*

—— Maxilla 1, palp absent or vestigial; uropod 3 biramous, inner ramus may be vestigial 3

3. Mandible, serrate blade present; palp of maxilliped 4-articulate .... *Drummondia*

—— Mandible, serrate blade absent; palp of maxilliped 3-articulate .... *Prachynella*

4. Gnathopod 1 with simple or complex spine defining palm 5

—— Gnathopod 1 with produced tooth or nothing defining palm 7

5. Maxilla 1, palp present; maxilliped, inner plates present 6

—— Maxilla 1, palp absent; maxilliped, inner plates absent .... *Ekelofia*

6. Antenna 1, flagellum without fused proximal articles bearing aesthetascs; maxilla 1, outer plate with 10 spine-teeth, palp with terminal setae; gnathopod 1, palm defined by simple spine .... *Figorella*

—— Antenna 1, flagellum with fused proximal articles bearing aesthetascs; maxilla 1, outer plate with 7-8 spine-teeth, palp with terminal spines; gnathopod 1, palm defined by complex spine .... *Pachynus*

7. Maxilla 1, palp absent; maxilliped, inner plates absent; coxa 4, posteroventral lobe absent .... *Pachychelium*

—— Maxilla 1, palp present; maxilliped, inner plates present; coxa 4, posteroventral lobe well developed .... *Acheronia*

Scopelocheirins

Lysianassids with gnathopod 1 of form in Figure 90J in which apex of article 6 and dactyl are shrouded by setae arising from either article; does not include a few genera in which this condition is primitive or vestigial, such as *Lucayarina*.

Key to the Genera of Scopelocheirins

1. Gnathopod 1 stout and minutely and transversely subchelate or chelate, palp article 4 of maxilliped stout and subclavate .... *Pseudoanonyx*

—— Gnathopod 1 slender and simple, or palm very oblique, palp article 4 of maxilliped slender and claw-like 2

2. Antenna 1 peduncle with 1+ teeth, inner ramus of uropod 2 with constriction .... *Ichnopus*

—— Antenna 1 peduncle untoothed, inner ramus of uropod 2 simple 3

3. Mandible lacking molar, article 6 of pereopods 3-4 slightly longer than articles 4 and 5 combined and slightly prehensile .... *Scopelocheiropsis*

—— Mandible bearing molar, article 6 of pereopods 3-4 shorter than or equal to articles 4 and 5 combined 4

4. Gnathopod 2 minutely chelate 5

—— Gnathopod 2 subchelate 6

5. Coxae 1-4 densely setose below, palp of maxilla 1 with stiff plumose seta apically amidst spines, outer plate of maxilla 2 wide and truncate .... *Aroui*

—— Coxae 1-4 not densely setose below, palp of maxilla 1 without special seta, outer plate of maxilla 2 narrow and rounded .... (= *Bathycallisoma*) *Scopelocheirus*

6. Article 2 of gnathopod 1 swollen, glandular, antenna 1 evenly coniform to apex .... *Eucallisoma*

—— Article 2 of gnathopod 1 linear, not glandular, antenna 1 unevenly articulate 7

7. Inner plate of maxilla 1 setose only terminally and subterminally, dactyl of gnathopod 1 not distinct from cirri, outer plate of maxilla 1 with 4 spines .... *Paracallisomopsis*

—— Inner plate of maxilla 1 setose medially, dactyl of gnathopod 1 distinct from cirri, outer plate of maxilla 1 with 9-11 spines .... *Paracallisoma*

Acheronia Lowry

Acheronia Lowry, 1984b: 92.

Type species. *Acheronia pegasus* Lowry, 1984b, original designation.

Diagnosis. Of pachynin form. Mouthparts forming conical bundle. Labrum and epistome continuous, not differentially produced. Incisor ordinary, molar absent; palp attached slightly proximal. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible. Gnathopod 1 strongly enlarged, poorly chelate, article 5 very short to absent, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus strongly shortened, outer ramus 2-articulate. Telson short, entire.

Additional characters. Base of flagellum on antenna 1 articular; mandible with rakers, toothed blade absent, lacinia mobilis absent; spines on outer plate of maxilla 1 simple, 6; palp with apical setae; coxa 4 with well-developed posteroventral lobe; gnathopod 1 palm defined by projecting tooth (chelate); pereonite 5 [? with dorsal tooth].

Relationship. Differing from *Figorella* in the absence of lacinia mobilis, reduced spine formula on outer plate of maxilla 1, and lacking a spine defining the palm of gnathopod 1.

Species. *Acheronia pegasus* Lowry, 1984b [776].

Habitat and distribution. Marine, Stewart Island, New Zealand, 42 m, 1 species.

Acidostoma Liljeborg

Figs 86F, 89P, 90E, 91B, 94A, 95S

Acidostoma Liljeborg, 1865: 34.–Liljeborg, 1865a: 24.–Dahl, 1964: 49.–Lincoln, 1979: 56–Lowry & Stoddart, 1983a: 283.

Type species. *Anonyx obesus* Bate, 1862, monotypy.

Diagnosis. Of conicostomin form. Mouthparts forming conical bundle, styliform. Labrum and epistome continuous, not differentially produced, coalesced. Incisor of ordinary width but minutely toothed, molar simple, small or absent (type); palp attached proximal to molar. Inner plate of maxilla 1 weakly (2 setules) setose; palp 1-articulate, obsolescent. Inner poorly and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl vestigial. Coxa 1 large and visible, not tapering. Gnathopod 1 nearly simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, both elongate, propodus with transverse palm but article 7 absent or vestigial. Inner ramus of uropod 2 without notch. Uropod 3 short,

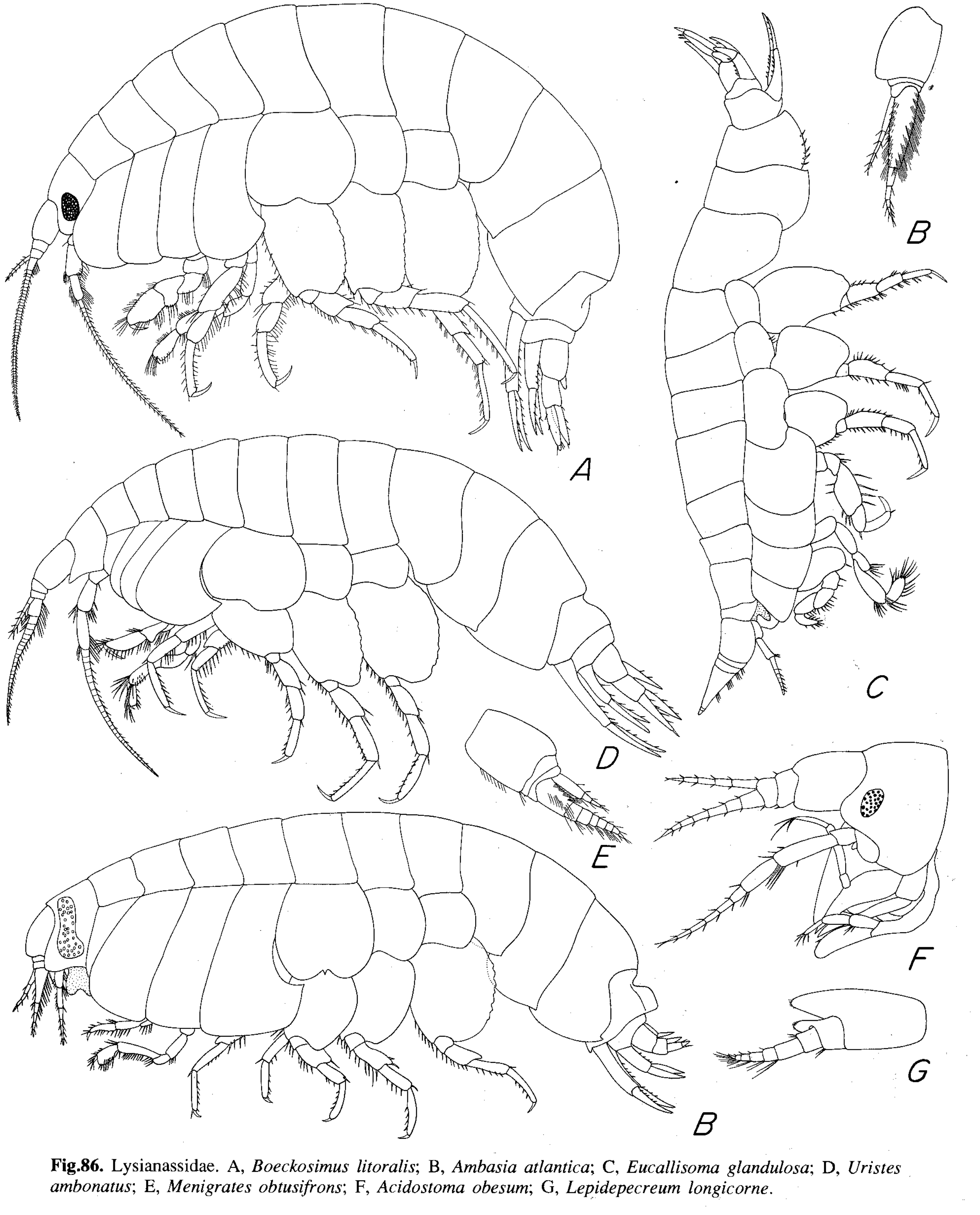


Fig.86. Lysianassidae. A, *Boeckosimus litoralis*; B, *Ambasia atlantica*; C, *Eucallisoma glandulosa*; D, *Uristes ambonatus*; E, *Menigrates obtusifrons*; F, *Acidostoma obesum*; G, *Lepidepecreum longicorne*.

peduncle ordinary, inner ramus slightly shortened, outer ramus 1 to 2-articulate. Telson short, cleft or emarginate.

Additional characters. Head visible; antenna 1 very stout in male, article 1 of primary flagellum with callynophore; accessory flagellum well developed; mandible lacking rakers; spines on outer plate of maxilla 1 fused and hook-like; outer plate of maxilliped folded around other mouthparts; article 4 of pereopods 5-7 strongly expanded posteriorly; gill of pereopod 7 absent; peduncle of uropod 2 expanded and platelike; telson flat.

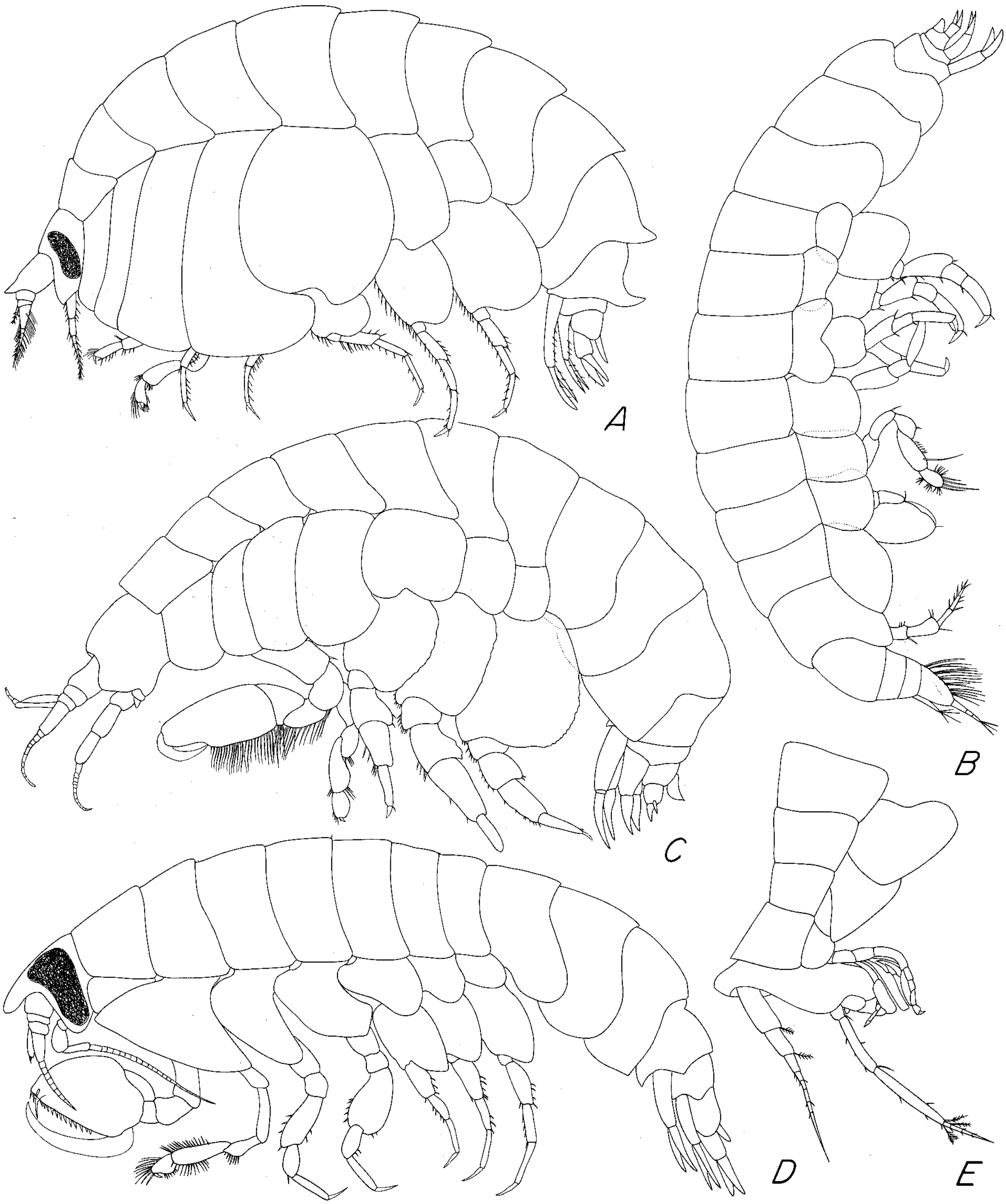


Fig.87. Lysianassidae. A, *Lepidepecreum umbo*; B, *Pachychelium davidis*; C, *Onesimoides chelatus*; D, *Trischizostoma nicaeense*; E, *Crybelocyphocaris tattersalli*.

Sexual dimorphism. Male primary flagellum with callynophore; flagellum of antenna 2 not elongate.

Variables. Incisor deeply toothed in juvenile (*A. ortum*); outer plate of maxilliped incised (*A. neglectum*), not incised (*A. laticorne*, etc.); peduncle of uropod 2 castellate (*A. pectinata*); peduncle of uropod 3 plate-like (*A. hancocki*); telson and rami of uropod 3 very short (*A. molariferum*); telson cleft (*A. obesum*, etc.) or emarginate (*A. laticorne*, etc.).

Relationship. A primitive conicostomatid. Differing from *Shackletonia* in the small, 1-articulate palp of maxilla 1 and the uncleft telson. From *Socarnoides* in the unproduced epistome and lack of rakers on the mandible.

Species. See Dahl (1964); Gurjanova (1951); Ledoyer (1977); Stephensen (1923a, 1935a, 1944a); *A. hancocki* Hurley, 1963 (J.L. Barnard, 1966a,b) [379 + B]; *A. laticorne* (*A. laticornis*) Sars, 1879, 1885 (Shoemaker, 1930b) (Dahl, 1964) [354 + B]; *A. molariferum* (*A. molarifera*) Margulis, 1963 [282]; *A. nodiferum* Stephensen, 1923b (Dahl, 1964) (Vader, 1967) (Bellan-Santini, 1984) [355 + B + I]; *A. obesum* (*A. obesus*) (Bate, 1862) (= *A. neglectum* Dahl, 1964) (= *A. laticorne* identification of Della Valle, 1893) (Chevreux & Fage, 1925, and *A. laticorne*) (Lincoln, 1979a) [355]; *A. o. ortum* J.L. Barnard, 1967a [309A]; *A. pectinata* Gurjanova, 1962 [280 + B]; *A. sarsi* Lincoln, 1979a (= *A. obesum* identification of Sars, 1895, Reid, 1959) [427].

Habitat and distribution. Marine, cold water arctic, boreal, warm-temperate to West African tropics, 0-2398 m, often associated with sea anemones, 7 species.

Acontiostoma Stebbing

Fig.95G

Acontiostoma Stebbing, 1888: 709.–Lowry & Stoddart, 1983a: 283.

Type species. *Acontiostoma marionis* Stebbing, 1888, original designation.

Diagnosis. Of conicostomin form. Mouthparts forming conical bundle, styliform. Labrum and epistome differentially produced, separate, labrum strongly dominant in projection and sharp. Incisor ordinary, molar absent; palp attached strongly proximal. Inner plate of maxilla 1 weakly (1) setose; palp 1-articulate, large or small. Inner poorly and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl vestigial. Coxa 1 large and visible, not tapering. Gnathopod 1 simple, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, hand minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, 1 tiny ramus present or absent (type). Telson hemiacetabulate, weakly cleft or emarginate or entire.

Additional characters. Head concealed by pereonite 1 and coxa 1; antenna 1 narrow; accessory flagellum 2-articulate; flagellum of antenna 2 short; rakers present; spines on outer plate of maxilla 1 reduced to about 4; inner plate of maxilliped short and quadrate (versus *Stomacontion*), with apical cusp, outer plate with large apical cutting edge; coxa 1 huge and hiding small head; dactyl of gnathopod 1 with inner denticles; palm of gnathopod 2 hollowed; article 4 of pereopods 5-7 strongly expanded posteriorly, article 5 very short; inner rami of uropods 1-2 slightly shortened; telson strongly spinose.

Sexual dimorphism. Protandrous hermaphrodites; adult female with oostegites and penes; secondary males rare, eyes enlarged, primary flagellum with callynophore but no calceoli; mouthparts degenerate.

Variables. Body smooth (*A. marionis*), tuberculate (*A. tuberculata*); palp of maxilla 1 elongate (*A. marionis*), short (*A. tuberculata*); outer plate of maxilliped tapering (type), rounded (*A. tuberculata*); urosomite 1 with boss rounded (type), acute (*A. tuberculata*).

Relationship. "The most apomorphic conicostomatid" (Lowry & Stoddart, 1983a), with the most modified mouthparts, concealed head, large coxae, loss of rami on uropod 3 and shape of telson.

Closest to *Stomacontion*, but differing in concealed head, non-styliform inner plate of maxilliped and oddly hollowed palm of gnathopod 2.

Species. *Acontiostoma marionis* Stebbing, 1888 (= *A. magellanicum* Stebbing, 1888) (Schellenberg, 1931) (K.H. Barnard, 1932) (Nicholls, 1938) (Bellan-Santini & Ledoyer, 1974) [835]; *A. tuberculata* Lowry & Stoddart, 1983a [775];

Habitat and distribution. Marine, austral, 0-183 m, often associated with sponges, 3 species.

Adeliella Nicholls

Fig.91E

Adeliella Nicholls, 1938: 12.–De Broyer, 1975b: 73.

Type species. *Adeliella laticornis* Nicholls, 1938, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, neither strongly dominant in size nor projection, blunt. Incisor ordinary, molar triturative, small; palp attached proximal to molar. Inner plate of maxilla 1 naked; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl small, subunguiform, with 2 subapical setae. Coxa 1 scarcely shortened and slightly covered by coxa 2, scarcely tapering. Gnathopod 1 short, strongly subchelate, palm oblique, article 5 slightly shorter than 6, weakly lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, article 6 very thin, palm chelate, dactyl large and overlapping palm. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary,

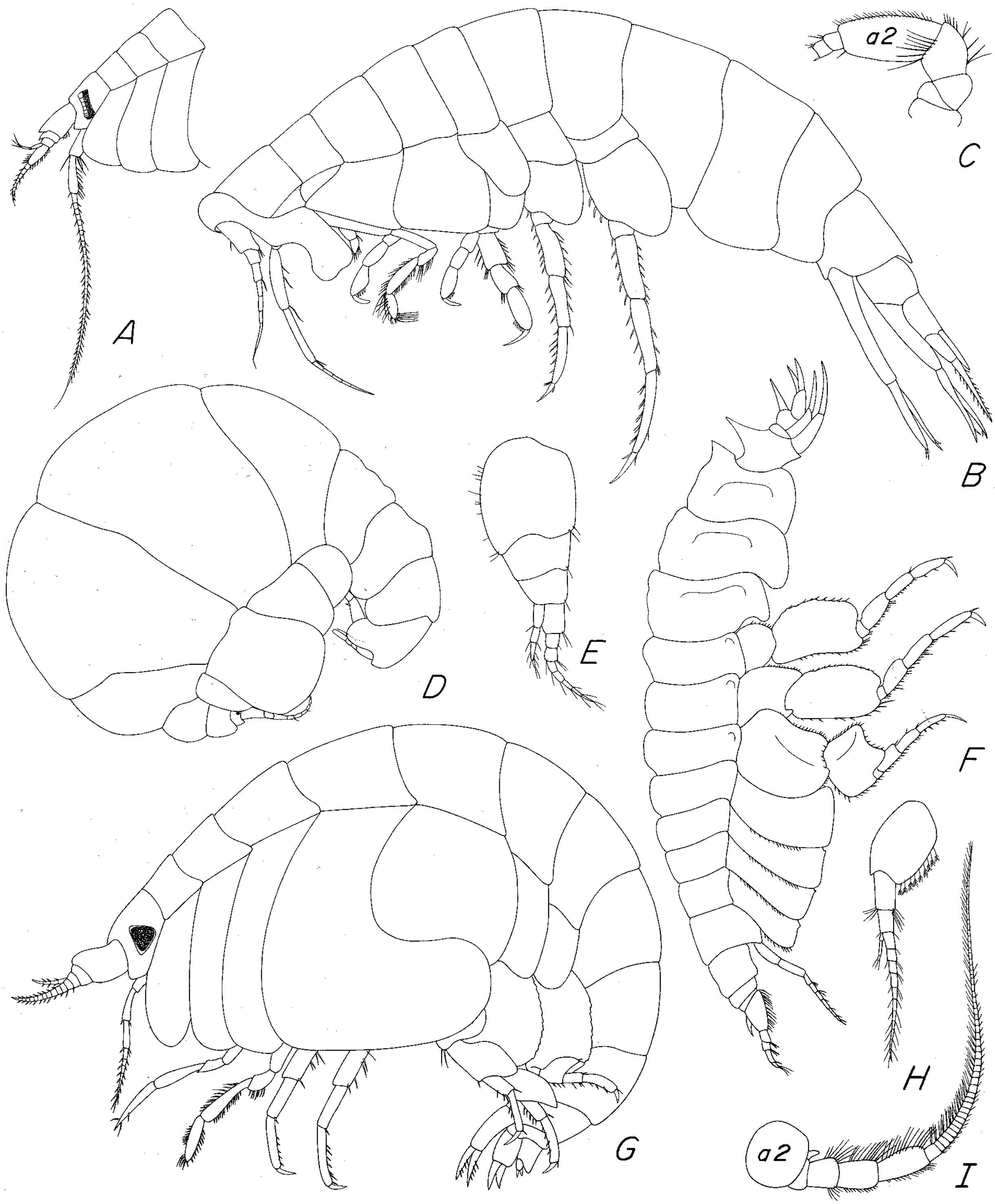


Fig.88. Lysianassidae. A, *Hippomedon denticulatus*; B, *Metacyphocaris helgae*; C, *Parawaldeckia kidderi*; D, *Danaella mimonectes*; E, *Socarnoides kerqueleni*; F, *Lepidepecreoides xenopus*; G, *Kerguelenia borealis*; H, *Lysianassa plumosa*; I, *Eurythenes gryllus*.

inner ramus strongly shortened, outer ramus 2-articulate. Telson short, weakly to deeply cleft.

Additional characters. Antennae very short; outer plate of maxilla 1 with 6 spines; maxilla 2 feeble, inner plate pointed, with 1 apical seta, outer plate tapering, with 3 apical setae; palm of gnathopod 2 short, transverse, but dactyl stout and strongly overlapping palm; rami of uropod 1 much shorter than peduncle; rami of uropod 3 not longer than peduncle.

Variables. Epistome protruding beyond upper lip (especially *A. takoradia*); carpus of gnathopod 2 with posterodistal pellucid lobe (*A. laticornis, A. takoradia*), lobe absent (*A. olivieri*); article 2 on outer ramus of uropod 3 tiny and spine-like (*A. takoradia*); telson cleft 40% (*A. takoradia*), 20% (type).

Relationship. Characterised by the naked or poorly setose inner plate of maxilla 1 and the plates of maxilla 2, with 6 or fewer spines on the outer plate of maxilla 1; the elongate or overlapping dactyl of gnathopod 2; also the rami of uropod 3 are exceptionally short and thus differ from *Boeckosimus, Lepidepecreopsis, Uristes, Tryphosella, Hippomedon, Aristiopsis, Paronesimus* and *Ambasiopsis*.

Because of the weakly reduced coxa 1 and barely proximal mandibular palp this genus terminates in Keys J, L, M, O, P, Q of J.L. Barnard (1969c).

Close to *Orchomene* in terms of palpable characters but differing in the reduction or size or setosity of the inner plate of maxilla 1, plates of maxilla 2, slight taper of coxa 1, weaker posteroventral lobe on coxa 4 but contrary to De Broyer, gnathopod 2 quite similar to *Orchomene* (see Sars, 1895: pl.22, *O. batei*); though dactyl of *Adeliella* enlarged (an apomorph), outer plate of maxilla 1 with only 6 spines.

Differing from *Tryphosoides* in the 2-articulate outer ramus of uropod 3 and more proximal mandibular palp. From *Hippomedon* and relatives furthermore in the very short antennae, small posteroventral lobe on coxa 4, short rami of uropod 1, shorter rami of uropod 3, stubby dactyl on the maxillipedal palp and the unproduced epimeron 3.

Pseudorchomene has elongate articles 3, 5 and 6 on gnathopod 1.

Pseudokoroga has very poorly developed armament on the inner plate of maxilla 1 and maxilla 2 but differs from *Adeliella* in the short dactyl of gnathopod 2, larger gnathopod 1 with shorter carpus bearing a larger lobe, and the inner ramus of uropod 2 is notched.

Paronesimus furthermore has a non-triturative molar and apically expanded coxa 1. *Aristiopsis* furthermore differs from *Adeliella* in the much smaller coxa 1 and weakly chelate gnathopod 1. *Ambasiopsis* (= *Neoambasia*) furthermore has a more strongly tapering coxa 1.

Species. See De Broyer (1975b, all species); *A. laticornis* Nicholls (1938) [870B = 805-808]; *A. olivieri* De Broyer, 1975b (Andres, 1979b, 1983) [870B]; *A. takoradia* (J.L. Barnard, 1961a) [408A].

Habitat and distribution. Marine, Antarctica and abyss off Liberia, Africa, thus in frigid waters and tropically submergent, 200-5160 m, 3 species.

Alicella Chevreux

Fig.90K

Alicella Chevreux, 1899a: 154.–Stebbing, 1906: 63.

Type species. *Alicella gigantea* Chevreux, 1899a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome not prominent, separate, neither dominant in projection, blunt. Incisor ordinary, but with few inner corner teeth, and one middle tooth, molar simple, large, conicolaminate, setulose; palp attached strongly distal to molar. Inner plate of maxilla 1 strongly setose medially; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, weakly tapering. Gnathopod 1 short, simple, article 5 longer than 6, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, both very elongate and linear, hand minutely subchelate, article 7 strongly overlapping obsolescent palm. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, outer ramus minutely 2-articulate. Telson elongate, deeply cleft.

Additional characters. Peduncle of antenna 2 very short, article 1 strongly swollen; rakers absent; maxilla 2 with medial facial row of setae; article 3 of gnathopod 1 elongate; dactyls of pereopods 3-7 very short.

Relationship. Differing from *Paralicella* in the simple gnathopod 1 and equal rami of uropods 1-2, probably in the short pereopodal dactyls, and the much shorter article 2 of the outer ramus on uropod 3. From *Eurythenes* in the simple gnathopod 1, elongate article 3 of gnathopod 1, larger coxa 1, and recognisable by the broader article 2 and narrower article 4 of pereopods 5-7.

Species. *Alicella gigantea* Chevreux, 1899a, 1935 (Barnard & Ingram, 1986) [304A].

Habitat and distribution. Marine, North Atlantic and Pacific [0] 1720-5865 m; up to 320 mm in length; 1 species.

Amaryllis Haswell

Amaryllis Haswell, 1879a: 253.–Haswell, 1880c: 32.–Stebbing, 1906: 32.

Type species. *Amaryllis macrophthalmus* Haswell, 1879a, selected by Pirlot, 1933b.

Diagnosis. Mouthparts forming conical bundle but scarcely styliform. Labrum and epistome continuous, not differentially produced, coalesced. Incisor weakly and minutely toothed; molar simple, small, bulbous, setulose, palp attached slightly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 1-articulate, obsolescent. Plates of maxilla 2 with oblique apices setose apicomedially. Inner and outer plates of maxilliped well

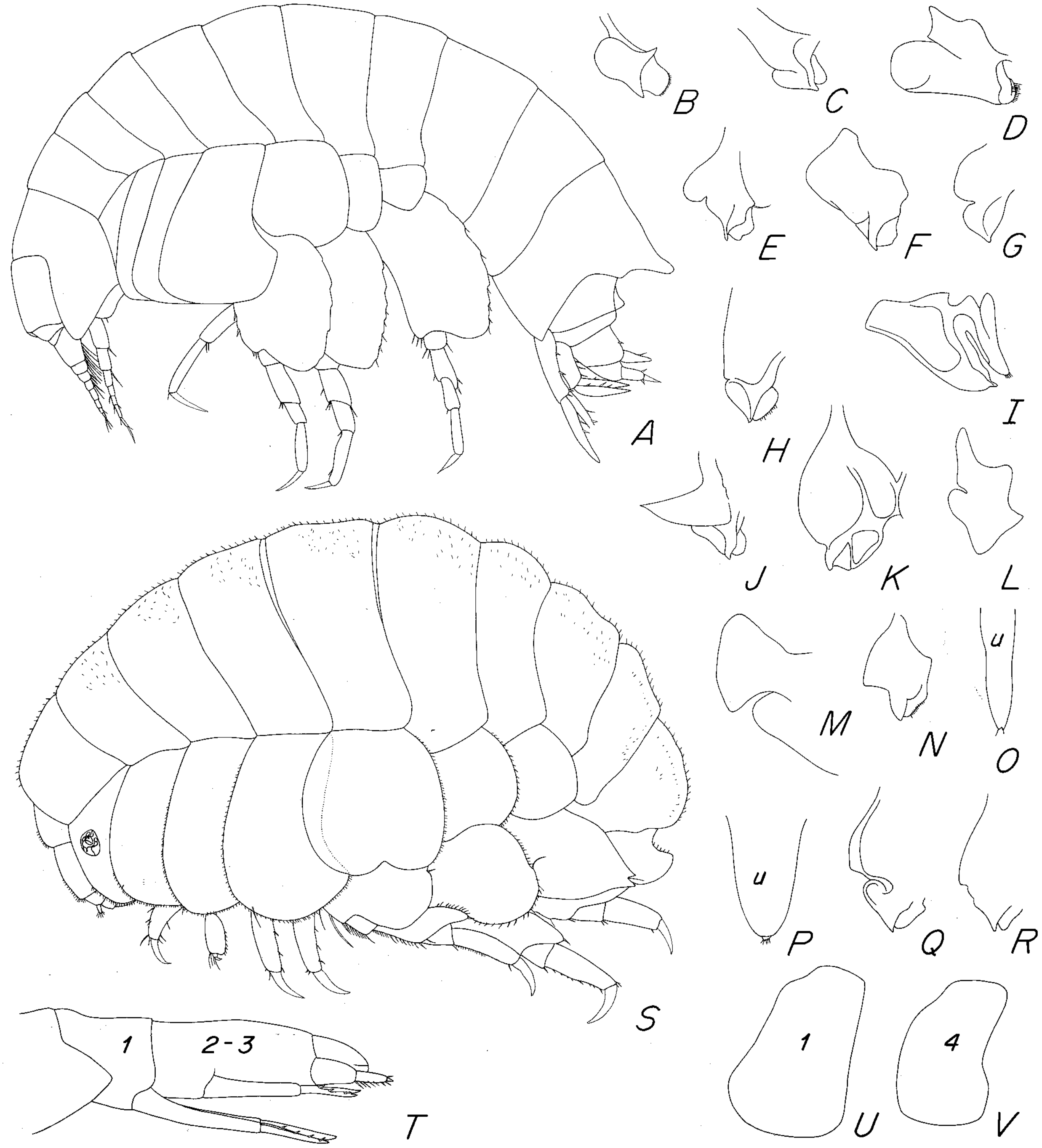


Fig.89. Lysianassidae. Bodies and lateral prebuccal; coxae (c);upper lip (u). A, *Tryphosella coxalis*; B, *Hippomedon denticulatus*; C, *Orchomene obtusa*; D, *Lysianassa plumosa*; E, *Orchomene batei*; F, *Lepidepecreum longicorne*; G, *Scopelocheirus crenatus*; H, *Orchomene amblyops*; I, *Menigrates obtusifrons*; J, *Tryphosites longipes*; K, *Eurythenes gryllus*; L, *Ichnopus spinicornis*; M, *Socarnoides kerqueleni*; N, *Ambasia atlantica*; O, *Trischizostoma nicaeense*; P, *Acidostoma obesum*; Q, *Orchomene minuta*; R, *Nannonyx goesi*; S, *Stomacontion pepinii*; T, *Crybelocyphocaris tattersalli*; U, *Anonyx nugax*; V, *Paralibrotus setosus*.

developed, pointed and striated; palp scarcely exceeding outer plate, dactyl vestigial. Coxa 1 strongly shortened and partly covered by coxa 2, latter also slightly reduced and tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 with large notch. Uropod 3 aequiramous, ordinary, peduncle slightly elongate, outer ramus 1-articulate. Telson ordinary, moderately cleft.

Additional characters. Article 1 of antenna 1 toothed, article 2 half as long as article 1 (*Bathyamaryllis*); anteroventral corner of coxa 4 rounded (*Vijaya*); article 3 of gnathopod 1 scarcely elongate.

Variables. Inner spines on outer plate of maxilla 1 short (*A. macrophthalmus* of Madagascar, *A. bathycephalus*); posteroventral margin of coxa 4 rounded (*A. bathycephalus*); posteroventral lobe of coxae 5-6 attenuated (*A. bathycephalus*); dactyls of pereopods 3-4 elongate (*A. bathycephalus*); outer ramus of uropod 3 with apical element (*A. macrophthalmus* of Madagascar).

Relationship. See 'Additional characters'.

Species. *Amaryllis bathycephalus* Stebbing, 1888, 1906, 1910a [785]; *A. macrophthalmus* Haswell, 1879a (= *A. brevicornis* Haswell, 1879a, 1882) (?= *A. affinis* Chilton, 1885, see also *Glycerina*) (Stebbing, 1888) (Schellenberg, 1931) (J.L. Barnard, 1972a) (Ledoyer, 1979a) [700 + 835 + B]; species (*A. macrophthalma* identification of Ledoyer, 1986) [698].

Habitat and distribution. Marine, southern Australia, Magellan, Madagascar and austral islands, 0-221 m, 2 species.

Ambasia Boeck

Figs 86B, 89N, 91N

Ambasia Boeck, 1871b: 97.–Stebbing, 1906: 51.–Lincoln, 1979a: 62.

Type species. *Gammarus atlanticus* Milne Edwards, 1830, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, but differentially produced, prominent, coalesced, epistome dominant in projection and subsharp. Incisor ordinary, molar absent; palp attached strongly proximal. Inner plate of maxilla 1 weakly (2) setose; outer plate with 6 spines; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl vestigial. Coxa 1 slightly shortened and partly covered by coxa 2. Gnathopod 1 short, simple, articles 5 and 6 subequal, elongate; dactyl small; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus strongly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Flagella of antennae 1-2 short, article1 of primary flagellum on antenna 1 as long as peduncle. Palp article 2 of maxilliped half or less as broad as outer plate (versus *Ambasiella*).

Relationship. See 'Additional characters'. Characterised by the reduced dactyl of the maxillipedal palp. Differing from *Ambasiopsis* in the simple gnathopod 1, the non-dominant upper lip in the prebuccal protrusion, and the maxillipedal dactyl.

Differing from *Centromedon* in the coalesced prebuccal mass and the absence of a molar.

Species. *Ambasia atlantica* (Milne Edwards, 1830, 1840) (= *A. marina* Bate, 1857d) (= *A. danielssenii* Boeck, 1871b, 1876, Sars, 1895) (Stephensen, 1935a, 1940b) (Gurjanova, 1951) (Lincoln, 1979a) [216I + B].

Habitat and distribution. Marine, boreal east Atlantic and arctic, often on starfishes, 20-1400 m, 1 species.

Ambasiella Schellenberg

Ambasiella Schellenberg, 1935b: 15.

Type species. *Ambasia murmanica* Bruggen, 1906, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous but differentially produced, prominent, coalesced, epistomal part strongly dominant in size and projection, blunt. Incisor ordinary, molar absent; palp attached strongly proximal. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl vestigial. Coxa 1 strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, simple, article 5 longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, deeply cleft.

Additional characters. Antenna 1 dorsally carinate on article 1; midpalp of maxilliped as broad as outer plate; urosomite 1 with blunt dorsal process.

Relationship. Differing from *Ambasia* in equality of breadth between outer plate and article 2 of palp on maxilliped. From *Menigrates* in the short articles 2-3 of the peduncle on antenna 1, the deeper cleft of the telson and the vestigial dactyl of the maxilliped. From *Nannonyx* in the broad maxillae 1-2 and maxilliped, deeply cleft telson, and long rami of uropod 3 (though reduced). From *Orchomene* in the vestigial dactyl of the maxilliped, fused prebuccal mass, lack of molar, and reduced coxa 1.

Species. *Ambasiella murmanica* (Bruggen, 1906)

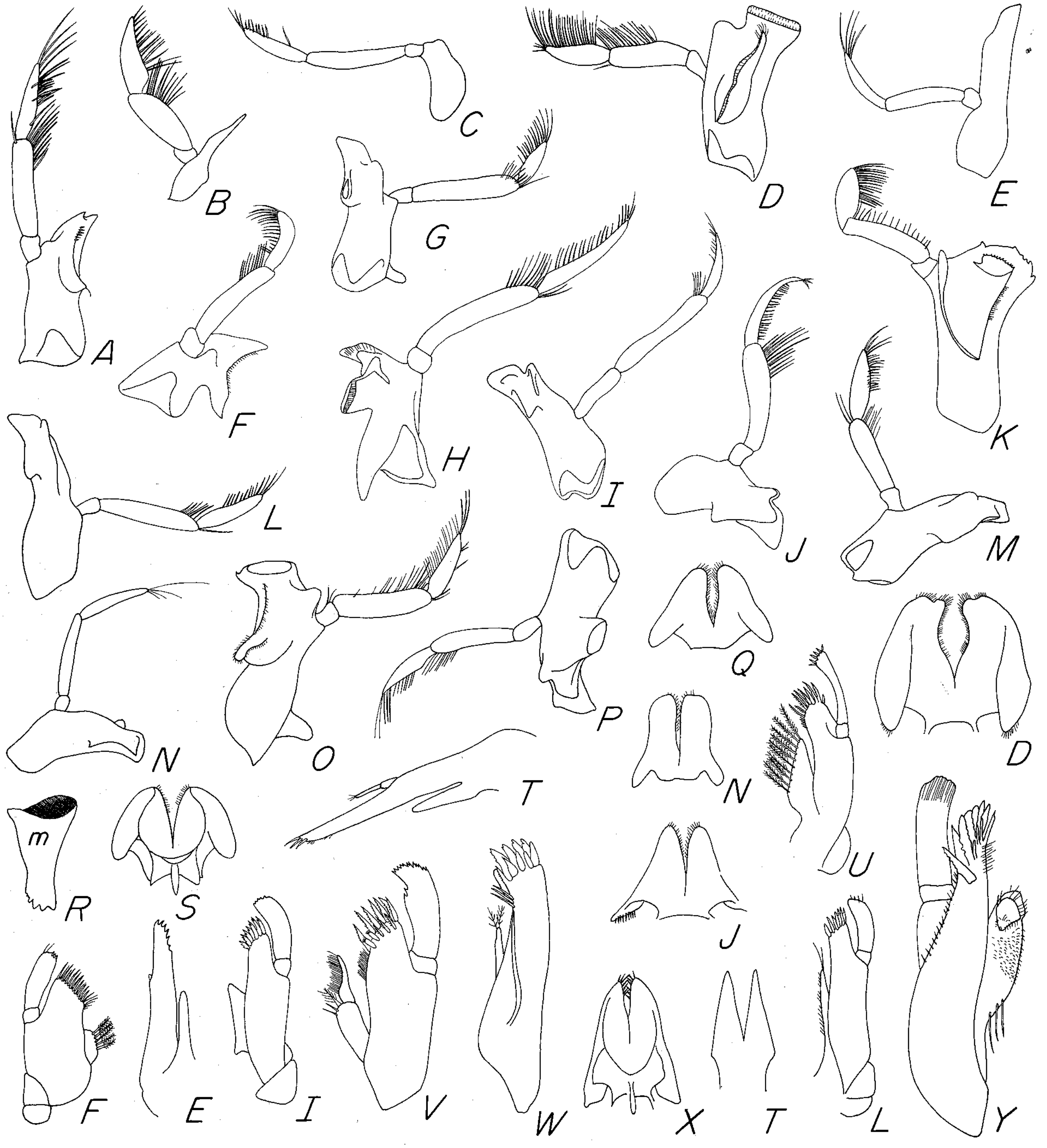


Fig.90. Lysianassidae. A, *Centromedon pumilus*; B, *Trischizostoma nicaeense*; C, *Kerguelenia borealis*; D, *Eurythenes gryllus*; E, *Acidostoma obesum*; F, *Aristias neglectus*; G, *Tryphosella sarsi*; H, *Hippomedon denticulatus*; I, *Lysianassa plumosa*; J, *Ichnopus spinicornis*; K, *Alicella gigantea*; L, *Orchomene batei*; M, *Menigrates obtusifrons*; N, *Normanion sarsi*; O, *Anonyx nugax*; P, *Boeckosimus edwardsi*; Q, *Opisa eschrichti*; R, *Valettiopsis multidentata*; S, *Paracentromedon crenulatus*; T, *Trischizostoma nicaeense*; U, *Scopelocheirus crenatus*; V, *Hirondellea trioculata*; W, *Bathyamaryllis perezii*; X, *Nannonyx goesi;* Y, *Arugella heterodonta.*

(Schellenberg, 1935b) (Stephensen, 1935a, 1944a) (Gurjanova, 1951) [216 + B].

Habitat and distribution. Marine, north-east Atlantic across Arctic Siberia, 4-1026 m, 1 species.

Ambasiopsis K.H. Barnard

Fig.92N

Ambasiopsis K.H. Barnard, 1931a: 425.–K.H. Barnard, 1932: 44.–De Broyer, 1977b: 679.
Neoambasia Dahl, 1959: 218 (*Ambasiopsis tumicornis* Nicholls, 1938, monotypy).

Type species. *Ambasiopsis georgiensis* K.H. Barnard, 1932, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in projection and blunt. Incisor ordinary, molar weakly triturative, also setulose, large; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose, outer plate with 7 spines; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, poorly subchelate, palm oblique, articles 5 and 6 subequal, or 5 longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, hand subchelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Dorsal carina present on article 1 of antenna 1 (type, etc.); outer plate of maxilla 1 with 7 or fewer spines (versus *Cedrosella*); largest medial seta on inner plate of maxilla 2 not basalmost; dactyl of gnathopod 1 with inner tooth; urosomite 1 with dorsal process.

Variables. Spination variable on outer plate of maxilliped, for example *A. tumicornis* with medial spination continuing onto apex.

Relationship. Differing from *Tryphosella* in the poorly spinose outer plate of maxilla 1. From *Schisturella* in the absence of a notch on the inner ramus of uropod 2, the more deeply cleft telson and the poorly spinose outer plate of maxilla 1. From *Aristias* in the poorly setose inner plate of maxilla 1 and the subchelate gnathopod 1. From *Metambasia* in the non-tumid male article 3 of antenna 2, the subchelate gnathopod 1 and the lack of notch on the inner ramus of uropod 2.

See *Cedrosella* and *Ventiella*.

Removal. *Ambasiopsis fomes* J.L. Barnard, 1967a, to *Cedrosella*.

Species. See De Broyer (1977); *A. brevipes* Ledoyer, 1986 [618A]; *A. georgiensis* K.H. Barnard, 1931a, 1932 (De Broyer, 1977b) [833]; *A. tumicornis* (Nicholls, 1938) (Bellan-Santini, 1972b) [870+B]; *A. uncinata* K.H. Barnard, 1932 (De Broyer, 1977b) [870B].

Habitat and distribution. Marine, mostly Antarctic and South Georgia, near Madagascar, 5-2500 m, 4 species.

Anonyx Krøyer

Figs 89U, 90O, 93I

Anonyx Krøyer, 1838a: 256.–Krøyer, 1838b: 243.–Gurjanova, 1962: 207 (key).–Steele & Brunel, 1967: 949 (key).–Lincoln, 1979a: 76.
Chironesimus Sars, 1895: 108 (*Anonyx debruynii* Hoek, 1882, monotypy).
Lakota Holmes, 1908: 498 (*Lakota carinata* Holmes, 1908, original designation).

Type species. *Lysianassa lagena* Krøyer, 1838b, selected by Boeck, 1876.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome produced, prominent, separate, either dominant in size and projection, blunt. Incisor ordinary, molar simple, large, conicolaminate or subconical, setulose, palp attached slightly distal to or opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 subchelate, palm transverse, article 5 usually shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 often with notch (adults). Uropod 3 almost aequiramous, ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, deeply cleft.

Additional character. Gills often plaited.

Sexual dimorphism. Male antennae 1-2 more strongly armed, flagellum of antenna 2 elongate and proliferate, calceoli often present; eyes enlarged; notch on inner ramus of uropod 2 occasionally reduced; rami of uropod 3 slightly enlarged and more strongly setose.

Variables. Article 1 on primary flagellum of antenna 1 scarcely elongate (*A. sculptifer*); accessory flagellum reduced to 2 articles (*A. minimus*); epistome produced (*A.

epistomicus, etc.); spines on outer plate of maxilla 1 oddly shaped and positioned, or reduced in number (*A. minimus*, *A. oculatus*, etc.); articles 5 and 6 subequally long (*A. lilljeborgi*, *A. bispinosus*); palm of gnathopod 1 very short (*A. compactus, A. simplex*); propodus of gnathopod 2 especially broadened and palm deeply excavate (*A. debruynii, A. knipowitschi*) and intermediated to normal condition by (*A. orientalis*, *A. birulai*, *A. eous*, etc.); rami of uropods 1-2 aspinose (*A. minimus*); inner ramus of uropod 2 with notch reduced (*A. laticoxae*, etc.).

Relationship. Differing from *Hippomedon* in the larger head, weaker mandibular molar, pleated gills, and usually with the carpus shorter than the propodus on gnathopod 1. From *Koroga* in the small propodus of gnathopod 1, small head, and deeply cleft telson. From *Boeckosimus* (= '*Onisimus*') and *Onisimus* (= *Pseudalibrotus*) in the cleft telson. From *Paronesimus* in the pleated gills.

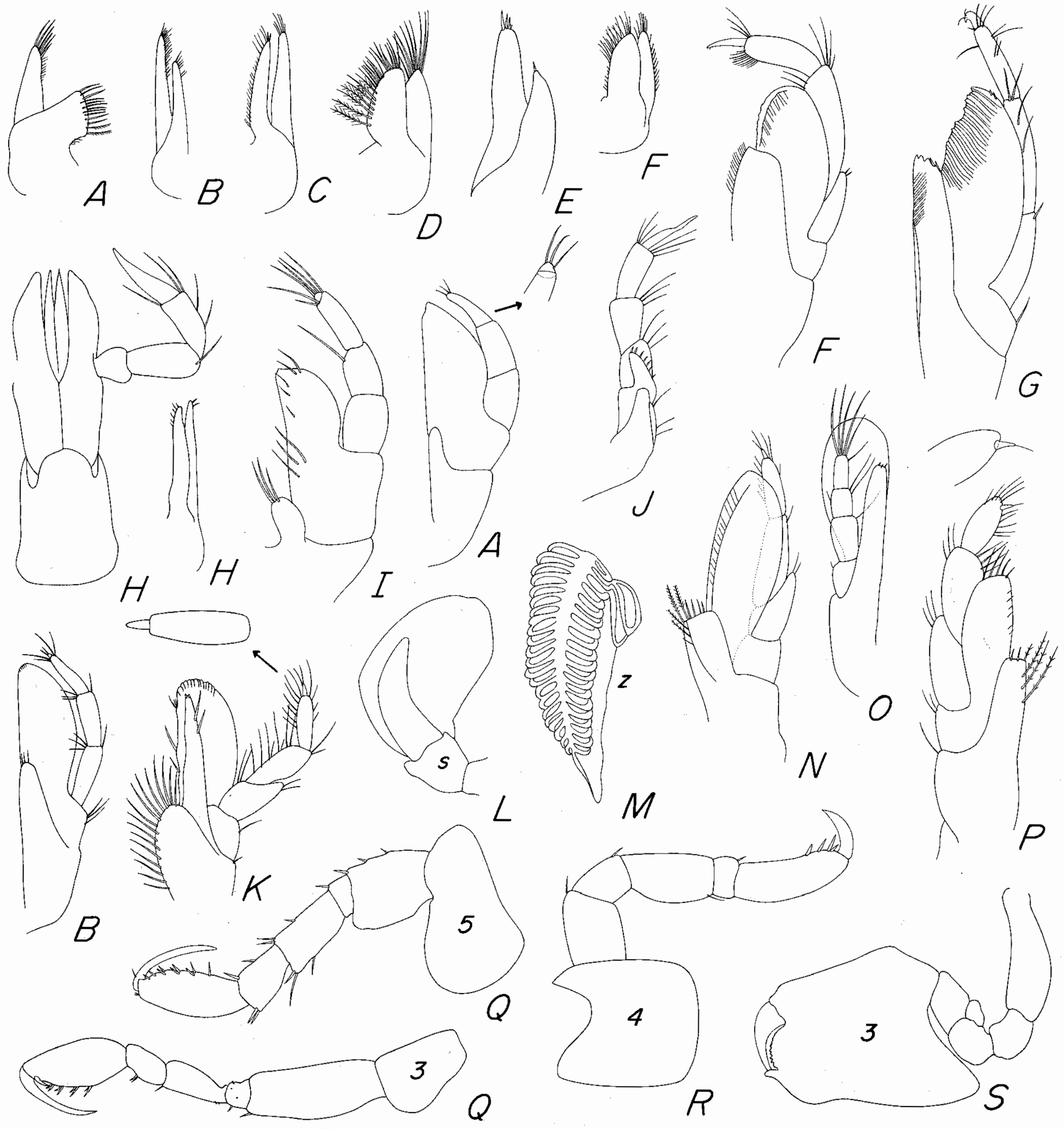


Fig.91. Lysianassidae. A, *Perrierella audoviniana*; B, *Acidostoma obesum*; C, *Orchomene batei*; D, *Scopelocheirus crenatus*; E, *Adeliella laticornis*; F, *Lysianassa plumosa*; G, *Arugella heterodonta*; H, *Trischizostoma nicaeense*; I, *Pachynus chelatum*; J, *Kerguelenia borealis*; K, *Nannonyx goesi*; L, *Danaella mimonectes*; M, *Ichnopus spinicornis*; N, *Ambasia atlantica*; O, *Normanion sarsi*; P, *Centromedon pumilus*; Q, *Paracyphocaris praedator*; R, *Scopelocheiropsis abyssalis*; S, *Endevoura mirabilis*.

See *Cicadosa*, *Pseudoanonyx*, *Tmetonyx* and *Tryphosoides*.

Removal. *Anonyx kurilicus* Gurjanova, 1962, to *Psammonyx*.

Species. See Bryazgin (1974a); Gurjanova (1951 part, not *A. affinis*), 1962); Hurley (1963); Kudrjaschov (1972, but not *A. affinis*); Steele (1967b, 1969, 1979b, 1982); Steele & Brunel (1968); Stephensen (1935a, 1944a); depth distributions poorly documented by major authors; *A. adoxus* Hurley, 1963 (J.L. Barnard, 1966b, 1971b) [369]; *A. affinis* Ohlin, 1895b (Just, 1980, 1983a) (= *A. japonicus* Gurjanova, 1962, Kudrjaschov, 1972) (Steele, 1986) [210 + I]; [*A. albus* Gosse, 1855 (not seen, dubious) (Stebbing, 1906) [239]]; ?*A. amaurus* Giles, 1888 [closer to *Valettia* and *Sophrosyne*, etc.] [609A]; *A. anivae* Gurjanova, 1962 (Steele, 1982) [230]; *A. barrowensis* Steele, 1982 [267]; *A. beringi* Steele, 1982 [270]; [*A. bidentatus* Stuxberg, 1880 [*nomen nudum*]]; *A. birulai* Gurjanova, 1962 [280 + B]; *A. bispinosus* Steele, 1967b [298]; [*A. brocchii* Catta, 1875 [dubious] [348]]; *A. comecrudus* J.L. Barnard, 1971b (Steele, 1982) [268]; *A. compactus* Gurjanova, 1962 (Steele & Brunel, 1968) [200 + B]; *A. dalli* Steele, 1983 [270]; *A. debruynii* Hoek, 1882 (Sars, 1895, as *Chironesimus*) (Steele & Brunel, 1968) [200]; *A. derjugini* Gurjanova, 1962 (= *A. ampulloides* identification of Gurjanova, 1951) [391BA]; [*A. elegans* Thompson, 1847a [dubious] [239]]; *A. eous* Gurjanova, 1962 [280 + B]; *A. epistomicus* Kudrjaschov, 1965a (Steele, 1982) [282]; *A. gurjanovae* Steele, 1986 [275]; *A. hayashii* Sekiguchi & Yamaguchi, 1983 [322B]; *A. hurleyi* Steele, 1986 [270]; *A. knipowitschi* Gurjanova, 1962 (Steele, 1969: 685; 1982) [290B]; *A. laticoxae* Gurjanova, 1962 (Steele & Brunel, 1968) (Steele, 1986) [210]; *A. lebedi* Gurjanova, 1962 (Steele & Brunel, 1968) (Steele, 1986) [200B]; *A. lilljeborgi* Boeck, 1871b (= *A. carinata* Holmes, 1908) (Sars, 1895) (Steele & Brunel, 1968) (Bousfield, 1973) (Lincoln, 1979a) [200 + B]; *A. magnus* Gurjanova, 1962 (Steele, 1986) [280]; *A. makarovi* Gurjanova,1962 (= *A. pacificus* identifications at least of Just, 1970 and Steele & Brunel, 1968) (Steele, 1982) [200]; *A. minimus* Gurjanova, 1962 [280]; *A. multiarticulatus* (Pearse, 1913b) (Gurjanova, 1962) (Steele, 1986) [230]; *A. nugax* (Phipps, 1774) (= *A. lagena* Krøyer, 1838b) (= *A. appendiculosa* Krøyer, 1838b) (= *A. appendiculata* Milne Edwards, 1840, *lapsus*) (= *A. ampulla* Krøyer, 1845) (= *A. ampulloides* Bate, 1862) (= *A. fisheri* Lockington, 1877) (= *A. kukenthali* Vosseler, 1889) (= *A. chelata* Chevreux, 1926a) (= *A. kurilicus* Gurjanova, 1962) (Gurjanova, 1962) (Steele, 1969, 1979a) [200 + B]; *A. ochoticus* Gurjanova, 1962 (Steele & Brunel, 1968) [200 + B]; *A. oculatus* Gurjanova, 1962 [286 + B]; *A. orientalis* Gurjanova, 1962 (not *A. debruynii*) (Steele, 1969, 1986) [210]; *A. pacificus* Gurjanova, 1962 (Steele, 1982) [280]; [*A. pallidus* Stimpson, 1853, dubious and *nomen oblitum*, probably = *A. sarsi* (see Steele & Brunel, 1968) [254]]; *A. pavlovskii* Gurjanova, 1962 [286]; *A. petersoni* Steele, 1986 [230]; [*A. politus* Stimpson, 1853, dubious, (? = *Tmetonyx nobilis*, see Steele & Brunel, 1968) [254]]; *A. robustus* Gurjanova, 1962 [280]; *A. sarsi* Steele & Brunel, 1968 (= *A. nugax* identification of Sars, 1895) (Bousfield, 1973) (Lincoln, 1979a) [200]; *A. schefferi* Steele, 1986 [280]; *A. schokalsii* Gurjanova, 1962 (Steele, 1980) [280]; *A. sculptifer* Gurjanova, 1962 (Steele, 1986) [230]; *A. shoemakeri* Steele, 1983 [273]; *A. simplex* Hirayama, 1895c [391]; *A. stegnegeri* Steele, 1986 [281]; *A. validus* Gurjanova, 1962 (Steele, 1983) [280]; *A. volkovi* Kudrjaschov, 1965a (Steele, 1986) [282]; *A. wolfendeni* Tattersall, 1090 [dubious] [304B]; species, (= *A. affinis* identification of Gurjanova, 1951, 1962, see Kudrjaschov, 1972, Just, 1980) [283]; species, (= *A. ampulloides* identifications of Stebbing, 1888, Nagata, 1960, Gurjanova, 1962) [280+B].

Habitat and distribution. Marine, coldwater northern Hemisphere, 0-3000 m (mostly to 300 m), common as skeletoniser in traps and boxes, occasionally as inquiline in clams, 45 species.

Aristias Boeck

Figs 90F, 92X, 95I

Aristias Boeck, 1871b: 106.–Stebbing, 1906: 49.–Hurley, 1963: 40 (+ key).–Lincoln, 1979a: 60.

Type species. *Anonyx tumidus* Krøyer, 1846b, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, coalesced, projection sharp. Incisor ordinary, molar simple, large, conicolaminate, or subconical, setulose, palp attached opposite molar. Inner plate of maxilla 1 strongly (3-5) setose medially; palp 2-articulate, large. Plates of maxilla 2 divergent, inner strongly setose medially. Inner poorly and outer plates of maxilliped well developed, *outer plate poorly armed*; palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2. Gnathopod 1 short, strongly subchelate (in type), simple in other species, palm transverse, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with small notch(es) bearing spine(s). Uropod 3 aequiramous, ordinary, peduncle ordinary, outer ramus 2-articulate. Telson short to ordinary, deeply cleft.

Variables. Eyes present or absent; accessory flagellum 2-articulate and shorter than article 1 of primary flagellum (*A. microps*, *A. megalops*); prebuccal margin with notch, elements blunt (*A. expers*); same but upper lip subsharp (*A. collinus*); gnathopod 1 almost simple (*A. madagascarensis*, *A. neglectus*); gnathopod 2 not chelate, only subchelate (*A. falcatus*, etc.); peduncle of uropods 1-3 expanded and plate-like (*A. madagascarensis*); inner ramus of uropod 3 shortened (*A. megalops*, *A. microps*).

Relationship. Differing from *Eurythenes* by the shorter telson, broader inner plate of maxilla 2, narrow mandibular molar, and longer article 2 of pereopod 5. From *Tryphosella* in the medially setose maxillae 1-2. From *Centromedon* and *Ambasia* in the well-developed dactyl of the maxilliped. From *Paralicella* in the non-elongate article 3 of gnathopod 1.

See *Perrierella*.

Species. See Gurjanova, 1951, 1962; Stephensen, 1935a, 1944a; *A. adrogans* J.L. Barnard, 1964e [228B]; *A. antarcticus* Walker, 1906b, 1907 (Schellenberg, 1926a,

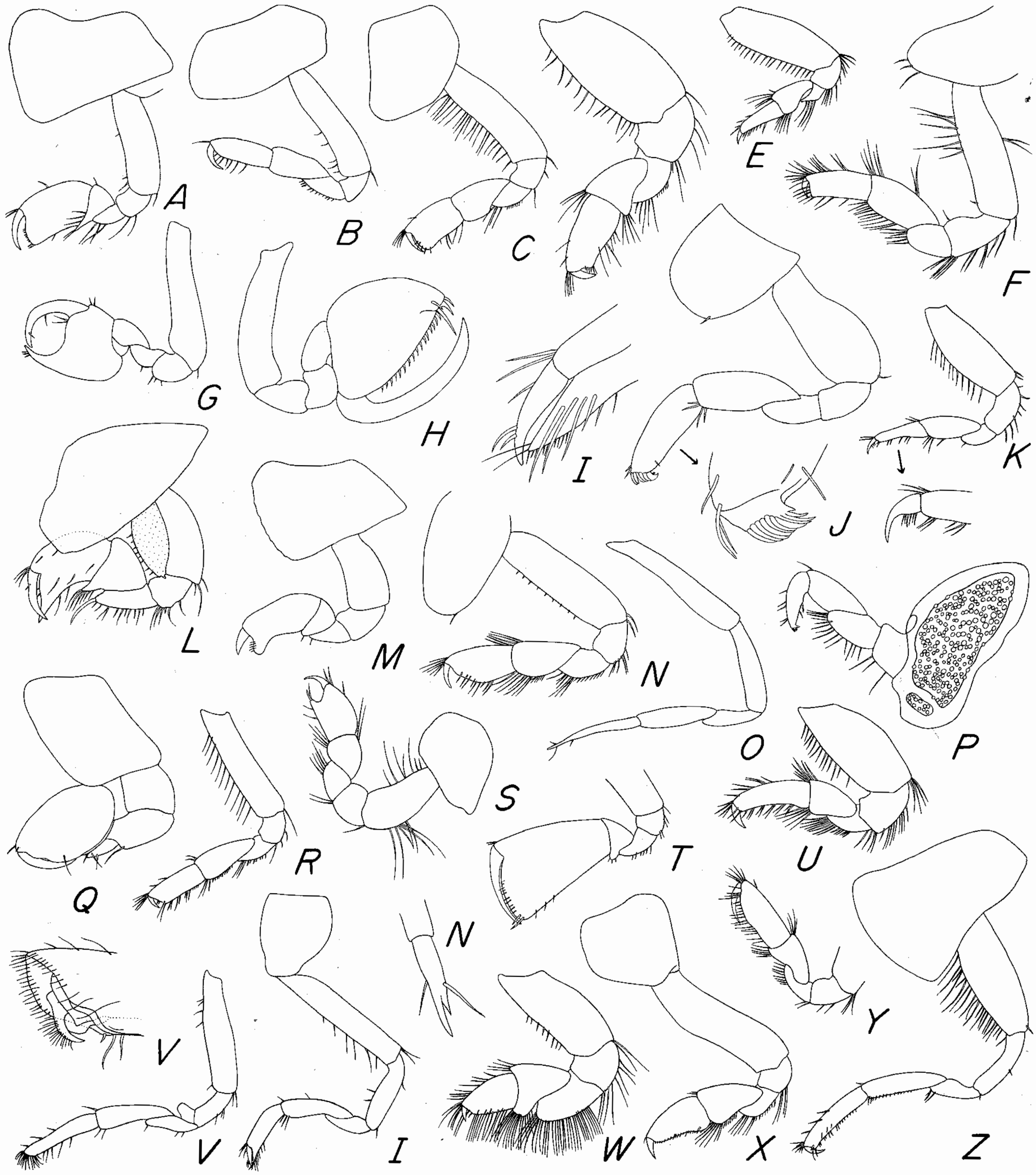


Fig.92. Lysianassidae, gnathopod 1. A, *Koroga megalops*; B, *Paracentromedon crenulatus*; C, *Schisturella abyssi*; D, *Orchomene batei*; F, *Valettiopsis dentatus*; G, *Opisa eschrichti*; H, *Trischizostoma nicaeense*; I, *Euonyx chelatus*; J, *Paracallisomopsis beljaevi*; K, *Ichnopus spinicornis*; L, *Sophrosyne robertsoni*; M, *Gainella chelata*; N, *Ambasiopsis tumicornis*; O, *Kerguelenia borealis*; P, *Eucallisoma glandulosa*; Q, *Pachychelium davidis*; R, *Tryphosella sarsi*; S, *Valettia coheres*; T, *Cheirimedon latimanus*; U, *Menigrates obtusifrons*; V, *Scopelocheirus crenatus*; W, *Nannonyx goesi*; X, *Aristias neglectus*; Y, *Uristes umbonatus*; Z, *Pseudorchomene coatsi*.

1931) (K.H. Barnard, 1930, 1932) (Nicholls, 1938) (Bellan-Santini & Ledoyer, 1974) [800 + B]; *A. collinus* K.H. Barnard, 1932 [871B]; *A. commensalis* Bonnier, 1896 (Chevreux, 1935) (Vader, 1978) [303BI]; *A. curtipes* Gurjanova, 1962 [322B]; *A. expers* J.L. Barnard, 1967a [309A]; *A. falcatus* Stephensen, 1923b [209B]; *A. japonicus* Gurjanova, 1962 [391B]; *A. madagascarensis* Ledoyer, 1972c, 1986 [698]; *A. megalops* Sars, 1895 (Gurjanova, 1951) (Vader, 1985) [238 + B]; *A. microps* Sars, 1895 (Shoemaker, 1930b) (Gurjanova, 1951) [250 + B]; *A. neglectus* Hansen, 1888 (= *A. ciliata* Grube, 1861, 1866) (= *A. audouinianus* identification of Sars, 1895, not Bate, 1857d) (Chevreux & Fage, 1925) (Vader, 1969a) (Karaman, 1973b) (Ledoyer, 1977) (Lincoln, 1979a) [355I + B]; *A. nonspinus* Hirayama, 1985c [391]; *A. pacificus* Schellenberg, 1936b (Nagata, 1965a) (Gurjanova, 1962) [510]; *A. spinipes* Gurjanova, 1962 [?231B]; *A. stenopodus* Ledoyer, 1986 [618A]; *A. symbioticus* K.H. Barnard, 1916 (Schellenberg, 1953) (Ledoyer, 1979a, 1986) [745 + I]; *A. topsenti* Chevreux, 1900a (Bryazgin, 1974a) [216B]; *A. tropicus* Schellenberg, 1938a [595]; *A. tumidus* (Krøyer, 1846a,b) (= *A. arcticus* Schneider, 1884) (Sars, 1895) (Shoemaker, 1955a) [200 + B]; *A. veleronis* Hurley, 1963 [269]; species, K.H. Barnard, 1937 [667(B)].

Habitat and distribution. Marine, cosmopolitan, rarely warm shallows, associated with sponges and tunicates, echinoderms and anemones, occasionally with brachiopods (Vader, 1969a), possibly microphagous inquilinous (Vader, 1985), 0-3716 m, 21 species.

Aristiopsis J.L. Barnard

Aristiopsis J.L. Barnard, 1961a: 30.

Type species. *Aristiopsis tacitus* J.L. Barnard, 1961a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome almost continuous, each part with weak blunt projection. Incisor ordinary, molar triturative, medium, palp attached slightly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2. Gnathopod 1 strongly subchelate, palm transverse, parachelate, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 slightly to greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, weakly cleft.

Sexual dimorphism. [Unknown].

Relationship. Differing from *Aristias* in the ordinary maxilla 2, ridged molar and form of inner plate on maxilla 1. From *Ambasiella* in the narrow article 2 of the maxillipedal palp. From *Schisturella* in the non-dominance of the upper lip in lateral aspect, lack of medial setae on the inner plate of maxilla 2 and the presence of a lobe on the carpus of gnathopod 2.

See *Coximedon*.

Species. *Aristiopsis parachelata* (Ledoyer, 1986) (as *Schisturella*) [618A]; *A. tacita* J.L. Barnard, 1961a, 1964a, 1967a [420AB].

Habitat and distribution. Marine, Indo-Pacific, 842-3950 m, 2 species.

Aroui Chevreux

Aroui Chevreux, 1911d: 169.

Type species. *Aroui setosus* Chevreux, 1911d, original designation.

Diagnosis. Of scopelocheirin form. Mouthparts forming quadrate bundle. Labrum and epistome not differentially produced, separate, epistome dominant in size, with notch above labrum. Incisor ordinary, molar triturative, small; palp attached slightly proximal to molar. Inner plate of maxilla 1 strongly setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, expanded apically. Gnathopod 1 poorly subchelate, palm almost transverse, articles 5 and 6 subequal, dactyl vestigial, shrouded in setae; article 6 of gnathopod 2 slightly longer than article 5, propodus minutely subchelate (versus *Paracallisoma*). Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Epistome flat anteriorly (versus *Scopelocheirus*); outer plate of maxilla 1 with thick plumose apical seta besides articulated spines; plates of maxilla 2 broad, outer shortened but much broader than inner plate, some setae awned or hooked; ventral margins of coxae 1-4 very densely setose.

See *Scopelocheirus*

Relationship. See 'Additional characters'. Differing from *Bathycallisoma* in the lack of medial gap on the lower lip. From *Paracalliosoma*, *Paracallisomopsis*, and *Eucallisoma* in the chelate gnathopod 2. From *Scopelocheiropsis* in the well-developed maxillipedal dactyl.

Species. *Aroui setosus* Chevreux, 1911 (Stroobants, 1976) (Vader, 1978) [340I].

Habitat and distribution. Marine, Mediterranean, 34-65 m, 1 species.

Aruga Holmes

Aruga Holmes, 1908: 504.

Type species. *Aruga oculata* Holmes, 1908, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, conicolaminate, subconical, setulose, palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp article 2 scarcely exceeding outer plate, dactyl small. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 short, peduncle expanded, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, entire.

Additional character. Male antenna 2 elongate (versus *Lysianopsis*)

Sexual dimorphism. Male eyes enlarged; antenna 2 elongate, articles 4-5 expanded, with male tufts; uropod 3 setose.

Relationship. Differing from *Lysianopsis* in elongate male antenna 2.

Removal. *Aruga subantarctica* Schellenberg, 1931, to *Lysianopsis*.

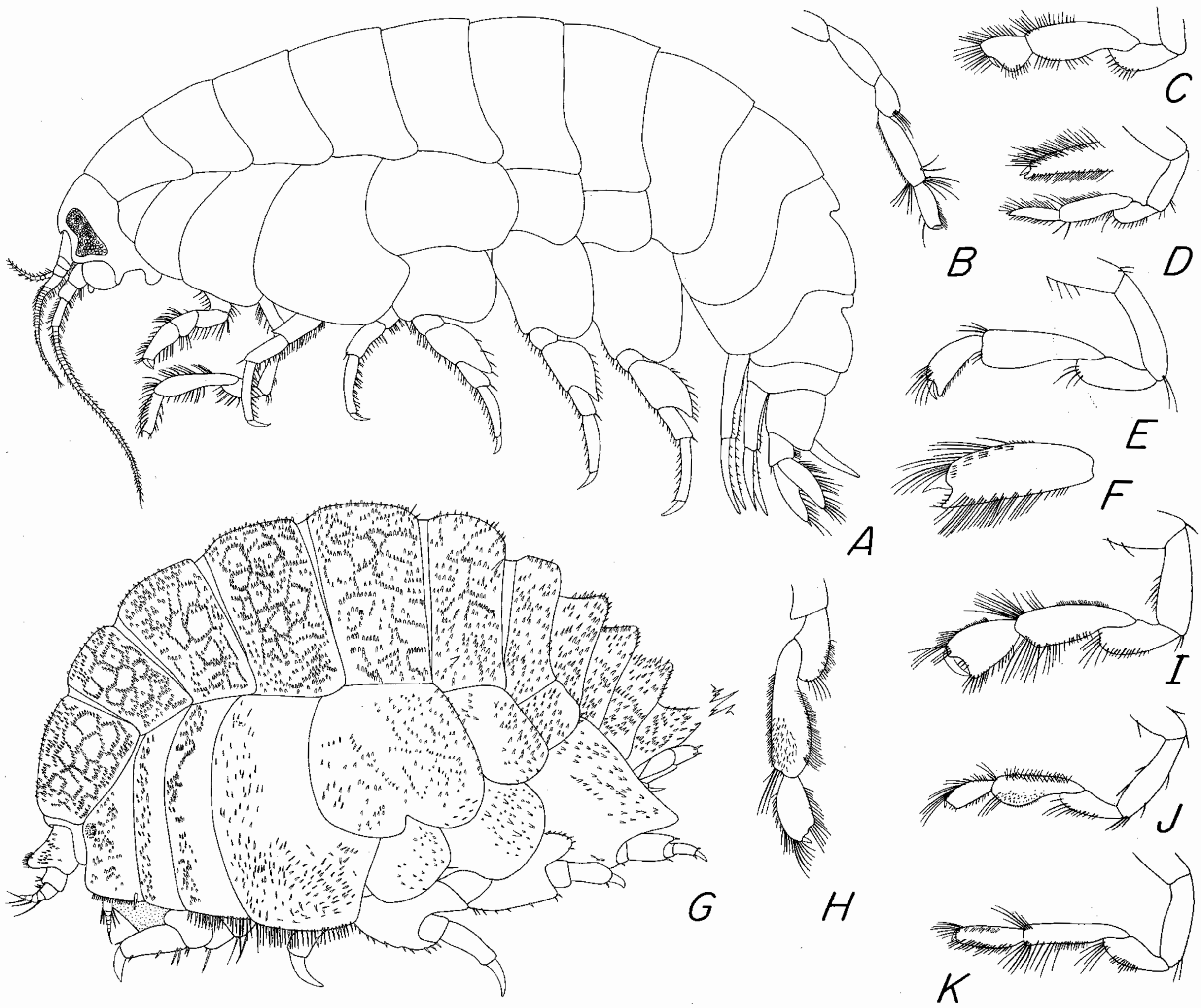


Fig.93. Lysianassidae. A, *Eurythenes gryllus*; B, *Hirondellea brevicaudata*; C, *Trischizostoma nicaeense*; D, *Gainella chelata*; E, *Lepidepecreum longicorne*; F, *Scopelocheirus crenatus*; G, *Ocosingo borlus*; H, *Hippomedon denticulatus*; I, *Anonyx debruynii*; J, *Lysianassa plumosa*; K, *Tryphosites longipes*.

Species. *Aruga falklandica* (K.H. Barnard, 1932) (Pirlot, 1936b) [831]; *A. holmesi* J.L. Barnard, 1955b, 1979b (Hurley, 1963) [369]; *A. oculata* Holmes, 1908 (Hurley, 1963) [370 + B].

Habitat and distribution. Marine, east warm-temperate Pacific, Falkland Islands and Magellanica, 0-457 m, 3 species.

Arugella Pirlot

Figs 90T, 91G, 95R

Arugella Pirlot, 1936b: 259.

Type species. *Arugella heterodonta* Pirlot, 1936b, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small, conicolaminate to subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 moderately setulose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp article 2 not exceeding outer plate, dactyl small. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 6 longer than 5, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 short, peduncle short, expanded, inner ramus slightly shortened, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Outer plate of maxilla 1 with 7 thick, large and 4 thin, small spines in 2 groups; inner plate of maxilla 2 much broader than outer.

Relationship. This genus and *Shoemakerella* Pirlot, 1936b (described by Pirlot on a later page, thus possible synonym) are so close as to be indistinguishable, but future study may find their distinctions; for the moment we keep them separated and assign them to the Caribbean *Shoemakerella* and Indo-Pacific *Arugella* regions with similar species separated on regional basis.

The type species of *Arugella* has a reduced dactyl of the maxilliped and the assumed (or model) type species of *Shoemakerella* has pleated gills, thus indicating other differences may be found; *Shoemakerella* may or may not lack the extra small inner spines seen in *Arugella* on the outer plate of maxilla 1 but this is unconfirmed.

Differing from *Aruga* and *Lysianopsis* in the 1-articulate outer ramus of uropod 3 and the broadened inner plate of maxilla 2. From *Lysianassa* in the short, expanded peduncle of uropod 3.

Species. *Arugella coelochir* (Walker, 1904) (Nayar, 1967) [660]; *A. ewa* (J.L. Barnard, 1970a) (Ledoyer, 1972c, 1973a, 1978b, 1979a, 1986) [600]; *A. heterodonta* Pirlot, 1936b [597]; *A. indica* Rabindranath, 1971c [665]; *A. insperata* (Lincoln, 1979a) [242]; species, (= *A. cinghalensis* identification of Ledoyer, 1986) [698].

Habitat and distribution. Marine, Indo-Pacific from Hawaii to Madagascar; also at Channel Islands, English Channel, 4-160 m, 5 species.

Azotostoma J.L. Barnard

Azotostoma J.L. Barnard, 1965a

Type species. *Azotostoma fusta* J.L. Barnard, 1965a, original designation.

Diagnosis. Of conicostomin form. Mouthparts forming conical bundle, styliform. Labrum and epistome [?continuous, not differentially produced, prominent, coalesced, separate, ?labrum epistome slightly strongly dominant in size, projection blunt. sharp]. Incisor ordinary, smooth, molar absent; palp attached strongly proximal on mandible. Inner plate of maxilla 1 weakly setose apically; palp 2-articulate, large, geniculate apically. Inner poorly and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, article 2 produced, article 3 attached to 2 in geniculate fashion, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 flagellate, simple, article 5 much shorter than 6, dactyl long, serrate; article 6 of gnathopod 2 shorter than article 5, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, aequiramous, peduncle elongate, outer ramus 1-articulate. Telson ordinary, entire.

Additional character. Pair of maxilla 2 formed so as to enclose imaginary hemispherical channel, inner plate medially expanded, pubescent, with only 3 apical spines, outer plate much more slender. See description of maxilla 1 and maxillipeds.

Relationship. This genus belongs with the *Acidostoma-Trischizostoma* group bearing styliform mouthparts formed into a conical bundle; differing from *Stomacontion* and *Acontiostoma* in the biramous uropod 3; from *Phoxostoma* in the well-developed dactyl of the maxillipedal palp; from *Trischizostoma* in the simple, flagellate gnathopod 1; from *Acidostoma* by the large palp of maxilla 1; from *Shackletonia*, a close analogue, by the uncleft telson.

Species. *Azotostoma fusta* J.L. Barnard, 1965a (Ledoyer, 1986) [591, 698].

Habitat and distribution. Marine, Ifaluk (Ifalik)

Atoll, Caroline Islands, Madagascar, littoral-10 m, 1 species.

Bathyamaryllis Pirlot

Figs 90W, 94E

Bathyamaryllis Pirlot, 1933a: 123.
Not *Vijaya* Walker, 1904 (which see).

Type species. *Bathyamaryllis perezii* Pirlot, 1933a, original designation.

Diagnosis. Of cyphocarin form, head weakly grotesque or strongly so, rostrum large; coxae 1-2 shortened and partly covered by coxa 3, larger than 1, coxa 1 subrectangular or subquadrate, coxae 3-4 long, coxae 5-7 short. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not differentially produced, not prominent, coalesced, not strongly projecting, blunt. Incisor ordinary, molar simple, large to small, conicolaminate to subconical, setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed, small. Gnathopod 1 short, simple, articles 5 and 6 subequal or either shorter than other, dactyl small, occasionally shrouded in setae; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 aequiramous, ordinary, peduncle elongate, outer ramus 1-articulate. Telson ordinary to elongate, deeply cleft.

Additional characters. Rostrum well marked (versus *Amaryllis*); article 2 of antenna 1 elongate (versus *Amaryllis*), primary flagellum of antenna 1 without callynophore, accessory flagellum elongate; antenna 2 long and thin; article 5 of antenna 2 much shorter than article 4; palp of maxilla 1 absent.

Variables. Head deformed, bevelled ventrally (*B. conocephala*); article 2 of antenna 1 shorter than article 1 (*B. haswelli*), longer than article 1 (*B. perezii*), article 1 with long apical tooth (*B. haswelli*); dactyl of maxilliped reduced (*B. conocephala*); coxa 2 larger than coxa 1 (type), not (*B. conocephala*); carpus of gnathopod 1 longer than propodus (*B. conocephala*); outer ramus of uropod 2 shortened (*B. haswelli*); cleft of telson only one third (*B. haswelli* of Chevreux, 1935).

Relationship. Like *Amaryllis* but rostrum well marked and article 2 of antenna 1 elongate.

Differing from *Procyphocaris* in the elongate article 2 of antenna 1, the large rostrum, smaller molar and incised inner ramus of uropod 2. From *Cyclocaris* in the better defined and lobate head, elongate article 2 of antenna 1, weakly setose maxillae 1-2 medially, and in the short article 3 of gnathopod 1.

Species. *Bathyamaryllis conocephala* (K.H. Barnard, 1926) (Griffiths, 1977b) [701B]; *B. haswelli* (Stebbing, 1888) (= *B. pulchellus* Bonnier, 1896, Stephensen, 1923b) (Chevreux, 1927, 1935) [355B]; *B. perezii* Pirlot, 1933a [640B + I]; *B. rostrata* Chevreux, 1911a, 1935 [303A].

Habitat and distribution. Marine, probably cosmopolitan, mostly deep bathyal, 120-2320 m, 4 species.

Boeckosimus J.L. Barnard
(= *Onisimus* Boeck, auct.)

Figs 86A, 90P, 95N,T

Boeckosimus J.L. Barnard, 1969c: 330.

Type species. *Anonyx edwardsii* Krøyer, 1846b, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome not differentially produced, separate, blunt. Incisor ordinary, molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Both plates of maxilla 2 with apicomedial setae (apices oblique). Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, subchelate, palm oblique, articles 5 and 6 subequal or 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson short, weakly cleft (type).

Variables. Article 1 on primary flagellum of antenna 1 long (*B. normani*) short (type); eyes absent (*B. sextoni*, etc.); outer ramus of uropod 3 lacking article 2 (*B. derjugini*); palm of gnathopod 2 not chelate, = oblique (*B. turgidus*); molar poorly triturative (*B. dubius*).

Relationship. See *Onisimus* (= *Pseudalibrotus*).

See J.L. Barnard (1969c: 331) showing various quotes in literature: Sars (1895) distinguishing *Onisimus* (= *Pseudalibrotus*) from *Boeckosimus* on more powerful gnathopod 1 and uropod 3 and longer antennae; Gurjanova (1962) distinguishing them on absence of bent spines on apices of outer plates on maxillipeds; most species of *Boeckosimus* with slightly cleft telsons and lack of epistomal dominance in prebuccal complex.

Species. See Bruggen (1909); Gurjanova (1951, 1962);

Stephensen (1923b, 1935a, 1940b, 1944a); Shoemaker (1930a,b); *B. abyssi* (Oldevig, 1959) [202A]; [*B. abyssicola* (Stuxberg, 1880, *nomen nudum*), 1887]; *B. affinis* (Hansen, 1887) (Dunbar, 1954) (Shoemaker, 1955a) (Bushueva, 1977) [220]; *B. botkini* (Birula,1897) (Bruggen, 1909) (Shoemaker, 1920a) (? = *B. affinis*) [220]; *B. brevicaudatus* (Hansen, 1887) (Just, 1970) [220]; *B. caricus* (Hansen, 1887) (Bruggen, 1909) (Bushueva, 1977) [220]; *B. crassini* (Gorbunov, 1946) (= *B. krassini* Gurjanova, 1951, 1962) [280]; *B. derjugini* (Gurjanova, 1929a) (Bushueva, 1977) [220]; *B. dubius* (Schellenberg, 1935b) (Gurjanova, 1951) [220]; *B. edwardsii* (Krøyer, 1846a,b) (Sars, 1895) (Schellenberg, 1927) (Shoemaker, 1930a) [216 + B]; *B. leucopis* (Sars, 1879, 1885, 1886) (Gurjanova, 1951) [280B

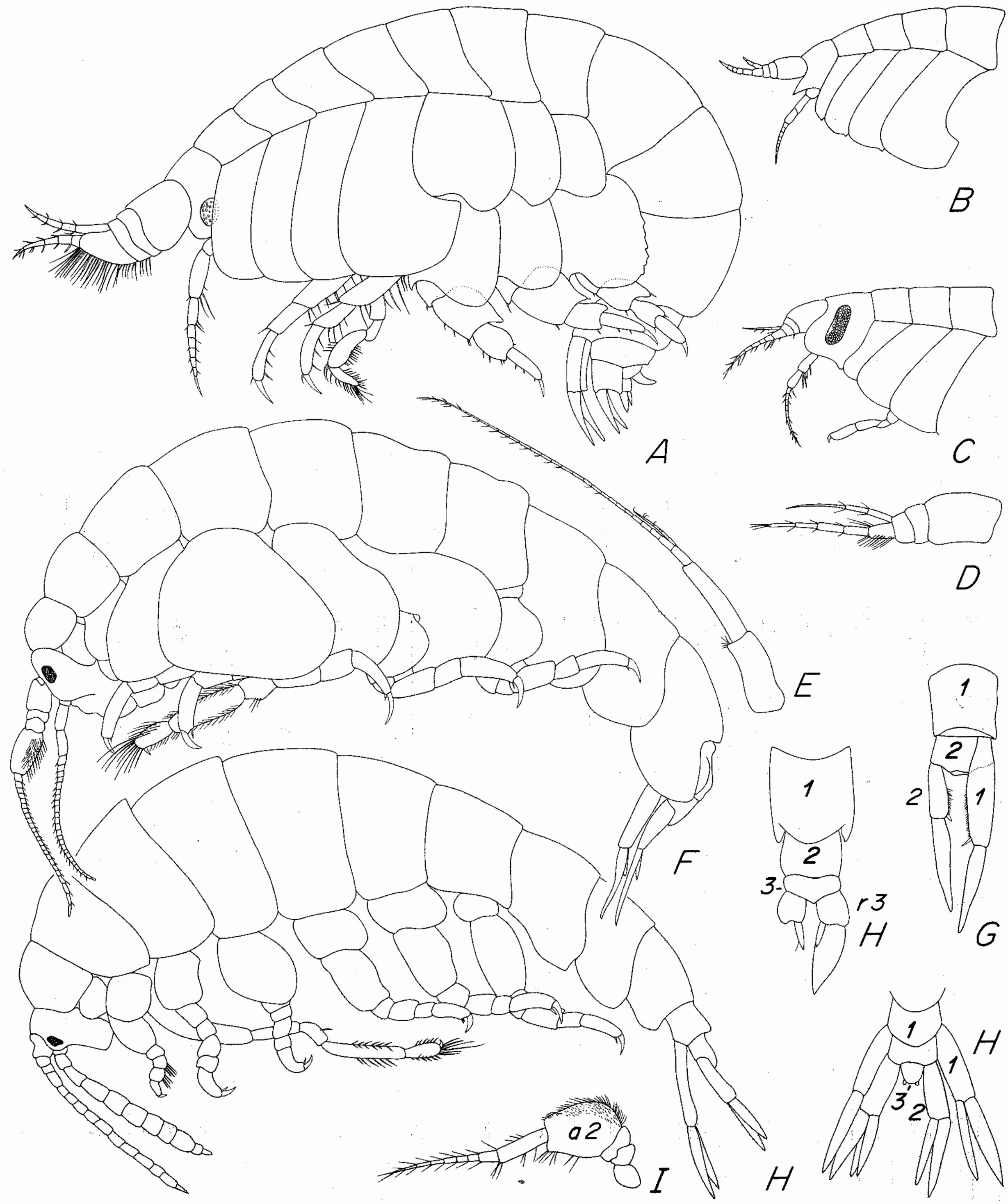


Fig.94. Lysianassidae. A, *Acidostoma obesum*; B, *Centromedon pumilus*; C, *Tryphosella sarsi*; D, *Normanion sarsi*; E,*Bathyamaryllis perezii*; F, *Chevreuxiella metopoides*; G, *Danaella mimonectes*; H, *Thoriella islandica*; I, *Lysianella petalocera*.

+ 218B]; *B. normani* (Sars, 1895) (Shoemaker, 1930b) (Vader, 1967) [200 + BI]; *B. plautus* (Krøyer, 1845, 1846a,b) (Sars, 1895) (Schellenberg, 1927) (Shoemaker, 1930b) (Dunbar, 1954) [200 + B]; *B. punctatus* (Bate, 1862) (Stebbing, 1906) [267]; *B. sextoni (ae)* (Chevreux, 1926a, 1935) (Stephensen, 1935a) [218B]; *B. sibiricus* (Bruggen, 1909) (Gurjanova, 1962) [220, especially 292]; *B. simus* (Gurjanova, 1962) [284]; *B. turgidus* (Sars, 1879, 1885, 1886) (Gurjanova, 1951) [220ABI]; [*B. vorax* (Stuxberg, 1880, *nomen nudum*)]; [*B. zebra* (Stuxberg, 1880, *nomen nudum*)].

Habitat and distribution. Marine, arctic, weakly boreal, 0-3220 m, occasionally inquilinous on actinians, 17 species.

Bonassa n.gen.

Type species. *Lysianassa bonairensis* Stephensen, 1933d, original designation.

Etymology. Named for the type species.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome both produced, prominent, separate, blunt. Incisor ordinary, molar simple, small; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl small. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 almost aequiramous, ordinary, peduncle elongate, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Antenna 1 with teeth; maxilla 1 outer plate with at least 7 spines; outer plate of maxilla 2 broadest; uropods 1-2 setose; gills pleated.

Sexual dimorphism. Male antenna 2 elongate and calceoliferous.

Relationship. Differing from *Phoxostomaa* in the nonconical mouthpart field, the produced epistome, broad non-geniculate outer plate of maxilla 2, and the presence of a tooth on article 2 of antenna 1. From *Socarnella* in the setose uropods 1-2.

Species. *Bonassa bonairensis* (Stephensen, 1933d, 1947b) [462J].

Habitat and distribution. Anchialine, Bonaire, in small cistern 1-10‰ salinity, 1 species.

Bruunosa Barnard & Karaman

Bruunosa Barnard & Karaman, 1987: 864.

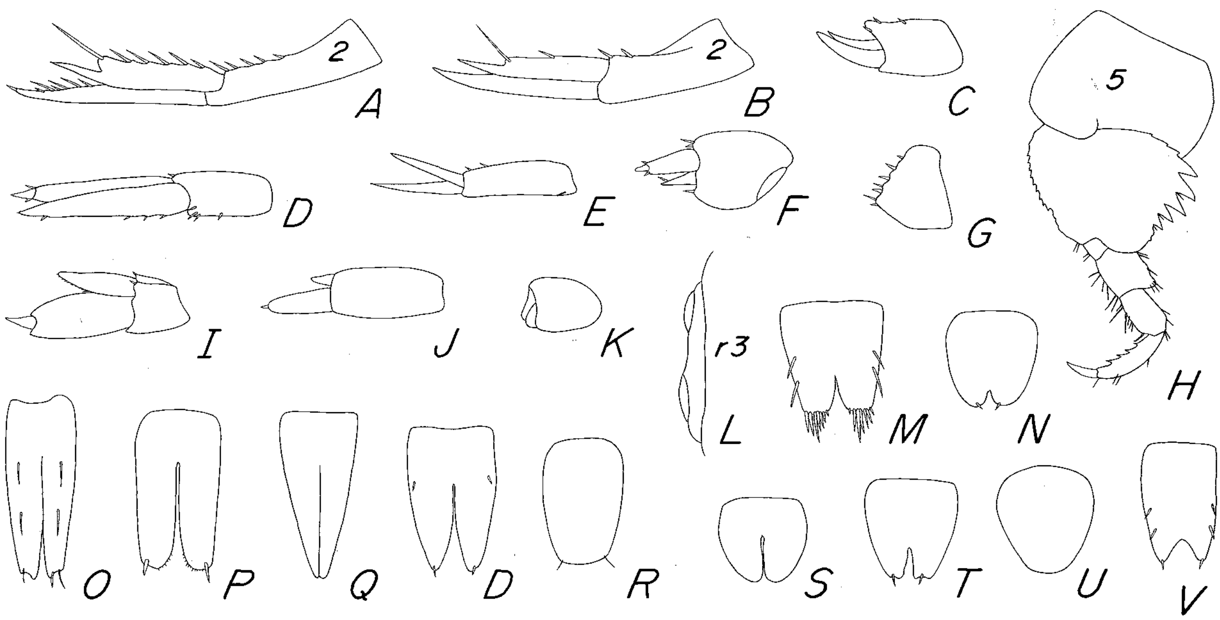


Fig.95. Lysianassidae. A, *Tryphosites longipes*; B, *Gronella groenlandica*; C, *Lysianopsis alba*; D, *Hippomedon denticulatus*; E, *Lysianassa plumosa*; F, *Nannonyx goesi*; G, *Acontiostoma marionis*; H, *Glycerina tenuicornis*; I, *Aristias tumidus*; J, *Lepidepecreella ctenophora*; K, *Stomacontion pepinii*; L, *Danaella mimonectes*; M, *Paratryphosites abysissi*; N, *Boeckosimus edwardsi*; O, *Opisa eschrichti*; P, *Ichnopus spinicornis*; Q, *Eurythenes gryllus*; R, *Arugella heterodonta*; S, *Acidostoma obesum*; T, *Boeckosimus nornani*; U, *Trischizostoma nicaeense*; V, *Orchomene batei*.

Type species. *Tryphosa bruuni* Dahl, 1959, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, not prominent, separate, labrum slightly dominant in size and projection, blunt. Incisor ordinary, molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, slightly tapering or rounded below. Gnathopod 1 short, subchelate, palm oblique, article 5 slightly longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate, dactyl thick and stubby. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle elongate, inner ramus strongly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Article 1 of accessory flagellum elongate and flattened; outer plate of maxilla 2 much broader than inner; outer plate of maxilliped with large articulate spines (versus *Cicadosa* and *Anonyx*); coxa 4 posteroventral lobe weak and blunt (versus *Anonyx* and *Cicadosa*); dactyl of gnathopod 2 especially thick; telson with dorsal spines but none terminal.

Relationship. Differing from *Cicadosa* in the large articulate spines on outer plate of maxilliped, subchelate gnathopod 1, and slightly rounded, not expanded coxa 1. From *Anonyx* in large spines on outer plate of maxilliped, slightly rounded, not expanded coxa 1, incised inner ramus of uropod 2, and dorsal spines on telson. From *Tryphosella* in triturative molar, slightly dominant labrum, and dorsal, not terminal, telsonic spines. From *Ambasiopsis, Cedrosella, Galathella*, and *Schisturella* in non-reduced coxa 1, and from the middle two genera in the incised inner ramus of uropod 2.

Species. *Bruunosa bruuni* (Dahl, 1959) [714A].

Habitat and distribution. Marine, Kermadec Trench, 6660-6770 m, 1 species.

Caeconyx n.gen.

Type species. *Hoplonyx caeculus* Sars, 1895, original designation.

Etymology. Combination of roots in *Hoplonyx* and *caeculus*.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome not differentially produced, separate. *Following parts unknown*: [?Incisor ordinary, widely minutely toothed, molar weakly triturative, simple, large, small; obsolescent; absent; conicolaminate, subconical, setulose, smooth; palp attached strongly slightly distal proximal to opposite molar. Inner plate of maxilla 1 strongly moderately weakly ( ) setose; palp 1 2-articulate, large. small. absent. Inner poorly and outer plates of maxilliped stongly poorly developed, palp scarcely slightly strongly exceeding outer plate, dactyl well developed. small. vestigial. absent]. Coxa 1 large and visible, not tapering. Gnathopod 1 short, strongly subchelate, palm oblique, propodus rectangular, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary; propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2- articulate. Telson elongate, deeply cleft.

Additional characters. Head 'larger than in *Hippomedon* but smaller than in *Orchomene*'. Article 1 of primary flagellum of antenna 1 nearly as long as peduncular article 1 in male, accessory flagellum longer.

Relationship. Differing from *Tmetonyx* in the sharp ocular lobe, the short article 3 of gnathopod 1, and the equally extending rami of uropod 3 with article 2 on the outer ramus being longer. From *Hippomedon* in the large head and rectangular propodus of gnathopod 1 with well-developed palm. Differing from *Orchomene* in the elongate, nonlobate carpus of gnathopod 1. Differing from *Pseudorchomene* in the short article 3 of gnathopod 1.

Species. *Caeconynx caecula* (Sars, 1895) (was *Tmetonyx*) (Stephensen, 1935d) (Gurjanova, 1951) [240B].

Habitat and distribution. Marine, Iceland to Trondjheim fjord, 150-660 m, 1 species.

Cebocaris J.L. Barnard

Cebocaris J.L. Barnard, 1964a: 4.

Type species. *Cebocaris grutesca* J.L. Barnard, 1964a, original designation.

Diagnosis. Of cyphocarin form, head tall, horizontally short, grotesque, flagella of antennae short (1) or vestigial (2), accessory flagellum 1-articulate, vestigial. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not differentially produced, coalesced, epistome dominant in size. Incisor ordinary, rakers present; molar absent; palp attached slightly proximal to middle. Inner plate of maxilla 1 weakly (1) setose; palp 2-articulate, large. Plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. All coxae short but coxae 1-2 together slightly shorter than coxae 3-4, only coxa 2 slightly covered by coxa 3, coxa 4 scarcely excavate posteriorly, coxa 5 largest. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, linear, simple, article 7 tiny, somewhat concealed by setae. Uropod 3 ordinary in size, parviramous, peduncle ordinary, inner ramus slightly shortened, outer ramus [?2-articulate]. Telson ordinary, entire.

Additional characters. Pereopods 3-5 [?6,7] prehensile or subchelate, propodi thickened and spiny; article 2 of pereopods 5-7 poorly expanded but weakly lobate.

Relationship. *Cebocaris* is characterised by the rectangular but slightly expanded article 2 of pereopods 5-7 combined with the uncleft telson.

Differing from *Mesocyphocaris* by the uncleft telson, the more strongly reduced accessory flagellum and flagellum of antenna 2, shorter uropod 3 with shortened inner ramus and the stouter gnathopod 1 with longer dactyl.

See *Crybelocephalus*.

Species. *Cebocaris grutesca* J.L. Barnard, 1964a [404A].

Habitat and distribution. Marine, north of Puerto Rico Trench, '5419-5451' m, 1 species.

Cedrosella Barnard & Karaman

Cedrosella Barnard & Karaman, 1987: 865.

Type species. *Ambasiopsis* (?) *fomes* J.L. Barnard, 1967a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, not prominent, separate, labrum slightly dominant in size and projection, blunt. Incisor ordinary, molar weakly triturative, large, also setulose, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, strongly subchelate, palm transverse, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, short, deeply cleft.

Additional characters. Head lacking sinus for antenna 2; antennae very short; basalmost inner seta of maxilla 2 largest; apex of outer plate on maxilliped with 2 thick spines; dactyl of gnathopod 1 lacking inner tooth; pereopods 5-7 very short.

Relationship. Differing from *Ambasiopsis* in lack of carina on article 1 of peduncle on antenna 1; D-setae occupying less than half of mandibular palp article 3 (but also true of *Ambasiopsis tumicornis*); 10 spines on outer plate of maxilla 1; apex of outer plate on maxilliped with strong apical spines (but also weakly true in *Ambasiopsis tumicornis*); article 5 of gnathopod 1 shorter than article 6, dactyl without inner tooth, palm transverse; no process on urosomite 1.

From *Ventiella* in deeply cleft telson; different molar, not distally ridged, less than half of palp article 3 edge with D-setae; inner plate of maxilliped broader, with smaller, well-distributed apical spines, no lateral acclivities; narrower palp of maxilla 1, with few larger teeth and spines; 2 locking spines on pereopods 3-7; very short articles 3-7 on pereopods 5-7; longer carpus of gnathopod 1; weak uropods 1-2; short antennae 1-2; and no process on urosomite 1.

From *Schisturella* in lack of notch on inner ramus of uropod 2, small antennae, weaker molar, small head with sinus for antenna 2 and short pereopods 5-7. From *Galathella* in the slightly reduced and setulose molar and narrow serrate apex of the palp on maxilla 1 (versus broad and with bead-like spines).

Species. *Cedrosella fomes* (J.L. Barnard, 1967a) [309A].

Habitat and distribution. Marine, Cedros Trench, Pacific Mexico, 3705-3745 m, 1 species.

Centromedon Sars

Figs 90A, 91P, 94B

Centromedon Sars, 1895: 99.–Olerod, 1980: 35.

Type species. *Anonyx pumilus* Liljeborg, 1865a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in projection, blunt. Incisor ordinary, molar simple, large, subconical, setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl small, vestigial. Coxa 1 slightly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, nearly simple, palm oblique, articles 5 and 6 subequal, dactyl large, article 6 of gnathopod 2 greatly shorter than article 5, both elongate, propodus minutely subchelate, article 7 short

Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Variables. Inner plate of maxilla 1 with 1 seta (*C. pavor*); gnathopod 2 stout (*C. pavor*); dactyls of pereopods 3-4 elongate (*C. pavor*).

Relationship. Characterised by the reduced maxillipedal palp but differing from *Menigratopsis* in the slightly subchelate gnathopod 1, broader coxa 1 with less taper and the poorly developed dactyl of the maxilliped.

Differing from *Pseudoanonyx* in the sloping palm of gnathopod 1, tapering coxa 1 and smaller dactyl of the maxilliped (in *Pseudoanonyx* it is tumid).

Otherwise close to *Anonyx, Hippomedon, Boeckosimus, Paronesimus, Tmetonyx*, and similar genera.

Species. See Stephensen 1935a, 1944a); Olerod (1980, all species); *C. calcaratus* (Sars, 1879, 1885) (Stephensen, 1935a) [210 + BA]; *C. pavor* J.L. Barnard, 1966b, 1971b [270]; *C. productus* (Goes, 1866) (= *C. rusanovi* Gurjanova, 1933b, 1951, Bryazgin, 1974a) [210 + B]; *C. pumilus* (Liljeborg, 1865a) (Sars, 1895) (Gurjanova, 1951) [210 + B]; *C. typhlops* (Sars, 1879, 1885) (= *C. caecus* Vosseler, 1889, but = *Lysianassa martensi* by Olerod 1980, now see *Martensia*) (Gurjanova, 1951) [210BA].

Habitat and distribution. Marine, arctic, boreal, submerging to cold water in lower latitudes, 4-3699 m, 5 species.

Cheirimedon Stebbing

Fig.92T

Cheirimedon Stebbing, 1888: 638.–Stebbing, 1906: 66.

Type species. *Cheirimedon crenatipalmatus* Stebbing, 1888, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [type unknown], differentially produced, not prominent, labrum slightly dominant in projection and blunt. Incisor ordinary, molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 slightly to strongly enlarged, subchelate, palm oblique or transverse, article 5 much shorter than 6 and weakly lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus strongly to slightly shortened, outer ramus 2-articulate. Telson elongate, deeply to weakly cleft.

Variables. Ocular lobe of head blunt (*C. fougneri, C. similis*); article 1 of primary flagellum on antenna 1 elongate (type), short in female (*C. fougneri*); molar occasionally poorly ridged and sublaminate; dactyl of maxilliped lacking nails (*C. fougneri, C. similis*); article 6 of gnathopod 1 well expanded (type), poorly so in most other species, occasionally slightly chelate; accessory coxal gill on coxae 5-6 (*C. femoratus*, K.H. Barnard, 1932); rami of uropods 1-2 especially short (*C. fougneri, C. similis*); cleft of telson reduced (*C. fougneri*).

Relationship. Characterised by the very short and lobate carpus of gnathopod 1. Like *Orchomene* but mandibular palp opposite molar.

Differing from *Anonyx* in the unpleated gills, smaller molar and slightly to greatly expanded article 6 of gnathopod 1. From *Boeckosimus* and *Onisimus* (= *Pseudalibrotus*) in the deeply cleft telson. From *Schisturella* in the short carpus of gnathopod 1 and the unreduced coxa 1. From *Tryphosella* in the nontapering coxa 1, and on gnathopod 1 the short and lobate carpus and slightly expanded propodus. From *Uristes* and *Pseudotryphosa* in the unreduced coxa 1.

See *Douniaella*.

Removals. *Cheirimedon latimanus* Sars, 1883, to *Coximedon*; *C. pectinipalma* K.H. Barnard, 1926, to *Coximedon*.

Species. See K.H. Barnard, 1932; Bellan-Santini, 1972a; Bellan-Santini & Ledoyer, 1974; Stephensen, 1938c; *C. crenatipalmatus* Stebbing, 1888 (Schellenberg, 1926a) (= *C. hansoni* Walker, 1903, 1907) [870]; *C. femoratus* (Pfeffer, 1888) (= *C. dentimanus* Chevreux, 1905d, 1906c, 1912d) (Bellan-Santini, 1972a) (Bellan-Santini & Ledoyer, 1974) (Thurston, 1974a) (Andres, 1983) [870 + B]; *C. fougneri* Walker, 1903 (Bellan-Santini, 1972a) (Thurston, 1974a) [870]; *C. similis* Thurston, 1974a [870 + B]; *C. solidus* Andres, 1986 (= *C. similis* identification of Andres, 1983) [870].

Habitat and distribution. Marine, dominantly Antarctic, 0-385 m, 5 species.

Chevreuxiella Stephensen

Fig.94F

Chevreuxiella Stephensen, 1915: 40.

Type species. *Chevreuxiella metopoides* Stephensen, 1915, monotypy.

Diagnosis. Of cyphocarin proportions, thus head slightly grotesque; coxae 1-2 small and partly covered by coxa 3. Mouthparts forming quadrate bundle, but mostly reduced and styliform. Labrum and epistome continuous, prominent, coalesced, epistomal part slightly dominant in projection, blunt. Incisor ordinary, molar absent; palp absent. Inner plate of maxilla 1 moderately (4+) setose; palp 2-articulate, large. Inner and outer plates of maxilliped poorly developed, palp strongly exceeding outer plate, dactyl absent, palp debatable (see 'Additional characters'). Coxa 4 largest but coxae 5-6 also very large and as long as coxa 4. Gnathopod 1 short, simple, article 5 longer than 6, dactyl small, weakly shrouded in setae; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus simple. Inner ramus of uropod 2 without notch. Uropod 3 absent. Telson absent.

Additional characters. Head subglobular, rostrum absent, ventral margin poorly defined; article 1 of primary flagellum on male antenna 1 elongate and swollen, thus more massive than peduncle; flagella of antennae 1-2 with articles bead-like; accessory flagellum absent; rakers absent; outer plate of maxilla 1 with 5 spines; article 1 of palp on maxilla 1 elongate; outer plate of maxilla 2 thin, inner plate broad; maxilliped said to be composed of 2 thin subconical plates with palp composed of huge article 1 and tiny subtended article 2 (our interpretation is inner plate small and thin, outer plate huge, subtended piece = 1-articulate palp); coxa 4 adze-shaped, not excavate posteriorly, coxae 5 and 6 large, extending down as far as coxa 4 and broadly lobular, coxa 7 larger than coxae 1-2; article 2 of gnathopod 1 swollen; pereopods 3-7 weakly prehensile; urosome depressed and broadened, 2-segmented, uropod 3 and telson absent; inner rami of uropods 1-2 very short.

Variables. Body very swollen dorsally (*C. obensis*); palp of maxilliped with article 2 absent (*C. obensis*); coxa 7 very small (*C. obensis*); setae of gnathopod 1 reduced to 1 present on article 6 apex (*C. obensis*); inner rami of uropods 1-2 reduced to a spine (*C. obensis*).

Relationship. Differing from *Mesocyclocaris* especially, and all other cyphocarins, in the loss of urosomite 3, uropod 3 and telson.

Differing from *Thoriella* in the loss of uropod 3 and telson.

Species. *Chevreuxiella metopoides* Stephensen, 1915 (Gurjanova,1962) [221A]; *C. obensis* Birstein & Vinogradov, 1962b [807B].

Habitat and distribution. Marine, North Atlantic and Antarctica, bathyal and abyssal, probably pelagic, 1000-4000 m, 2 species.

Cicadosa Barnard & Karaman

Cicadosa Barnard & Karaman, 1987: 865.

Type species. *Anonyx cicadoides* Stebbing, 1888, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, differentially produced, labrum slightly dominant in size and projection, subsharp. Incisor ordinary, molar simple, large, weakly conicolaminate, subconical, setulose; palp attached strongly distal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 simple or poorly subchelate, palm oblique, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle slightly elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Sexual dimorphism. Male antennae 1-2 calceolate, flagellum of antenna 2 elongate, peduncle with anterior male tufts.

Relationship. Differing from *Anonyx* in the simple gnathopod 1, slightly elongate article 3 of gnathopod 1 and the slightly shorter palp of the maxilliped. From *Tryphosella* in the expanded coxa 1 and notched inner ramus of uropod 2. From *Tmetonyx* in the notched inner ramus of uropod 2 and weakness of elongation on article 3 of gnathopod 1. From *Tryphosites* in the dominant labrum.

See *Bruunosa*.

Species. *Cicadosa cicadoides* (Stebbing, 1888, as *Anonyx*) (Schellenberg, 1926a) (Bellan-Santini & Ledoyer, 1974) [851].

Habitat and distribution. Marine, Kerguelen Island, 3-228 m, 1 species.

Clepidecrella J.L. Barnard

Clepidecrella J.L. Barnard, 1962d: 24.

Type species. *Clepidecrella cabinda* J.L. Barnard, 1962d, original description.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?continuous, not differentially produced, not prominent, coalesced, blunt]. Incisor ordinary, molar simple, small to obsolescent; subconical, setulose, palp attached opposite molar. Inner plate of maxilla 1 weakly (1) setose; palp 2-articulate, large. Inner and outer plates of maxilliped poorly developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, but tapering. Gnathopod 1 short, nearly simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 very short, peduncle ordinary, inner ramus strongly shortened, outer ramus 2-articulate. Telson short, emarginate.

Additional characters. Head 'small'; antenna 1 slightly carinate dorsally; article 2 of mandibular palp very elongate (ratio of articles 1-3 = 45:195:100); outer plate of maxilla 1 with 6 small widely spaced spines; maxilla 2 short and stubby; plates of maxilliped small, palp immense; lobe of coxa 4 huge; article 2 of pereopod 5 slender, of pereopod 7 wide and shield-like.

Relationship. Differing from *Acidostoma*, *Acontiostoma* and *Stomacontion* in huge palp of maxilliped. From *Onesimoides* in short basal article of primary flagellum of antenna 1 and simple gnathopod 1. From *Paronesimoides* in presence of inner ramus of uropod 3 and simple gnathopod 1.

See *Kerguelenia* (very close).

Species. *Clepidecrella cabinda* J.L. Barnard, 1962d [705A].

Habitat and distribution. Marine, Argentine Basin, 5041 m, 1 species.

Concarnes n.gen.

Type species. *Socarnes concavus* Shoemaker, 1933a, original designation.

Etymology. Combining roots of *Socarnes* and *concavus*.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, both produced together, blunt. Incisor ordinary, molar simple, small; conicolaminate, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp [?slightly exceeding outer plate, dactyl well developed]. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 aequiramous, ordinary, peduncle elongate, outer ramus 2-articulate (minutely). Telson ordinary, weakly (40%) cleft.

Additional characters. Article 1 on primary flagellum of antenna 1 short, without callynophore; [maxilliped unknown]; peduncle of uropod 3 expanded and plate-like, article 2 of outer ramus vestigial; gills strongly pleated.

Relationship. Differing from *Socarnes* and *Socarnopsis* by incised inner ramus of uropod 2, short (less than half) cleft of telson, and plate-like peduncle of uropod 3. From *Septcarnes* in short telson with short cleft and weak article 2 on outer ramus of uropod 3. From *Aruga* and *Lysianopsis* in the significantly cleft telson and produced epistome. From *Arugella* and *Shoemakerella* in the 2-articulate outer ramus of uropod 3, cleft telson and produced epistome.

Species. *Concarnes concavus* Shoemaker, 1933a [478].

Habitat and distribution. Marine, Caribbean, Dry Tortugas, shallow, 1 species.

Conicostoma Lowry & Stoddart

Conicostoma Lowry & Stoddart, 1983a: 283, 394.

Type species. *Conicostoma karta* Lowry & Stoddart, 1983a, original designation.

Diagnosis. Of conicostomin form. Mouthparts forming conical bundle, some styliform. Labrum and epistome continuous, coalesced, blunt. Incisor ordinary, molar absent; palp attached strongly proximal. Inner plate of maxilla 1 not setose; palp 1-articulate, small. Inner poorly and outer plate of maxilliped well developed, palp not exceeding outer plate, dactyl absent. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 5 [?shorter than 6], dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus strongly shortened, outer ramus 1-articulate. Telson ordinary, longer than broad, emarginate.

Additional characters. Head visible; accessory flagellum 2-articulate; rakers present; plates of maxilla 2 slender; article 4 of pereopods 5-7 strongly expanded posteriorly; inner rami of uropods 1-2 reduced.

Relationship. Differing from *Ocosingo* in the dactylate gnathopod 2, the well-developed biramous uropod 3 and notched telson. From *Phoxostoma* in reduced inner ramus of uropod 3, loss of molar, vestigial palp of maxilla 1, and slender plates of maxilla 2.

Species. *Conicostoma karta* Lowry & Stoddart, 1983a, 1984b [785].

Habitat and distribution. Marine, Australia, Kangaroo Island to Carnac Island, 4-7 m.

Coximedon n.gen.

Type species. *Normania latimana* Sars, 1883, original designation.

Etymology. Combination of coxa, a side-plate, and root from *Hippomedon*.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, separate, labrum and epistome equally projecting and blunt. Incisor ordinary, molar almost simple, small; conicolaminate, setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened and partly covered by coxa 2, tapering. Gnathopod 1 strongly enlarged, strongly subchelate, palm transverse, almost chelate, article 5 much shorter than 6 and lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner strongly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Variables. Antenna 2 elongate (*C. pectinipalma*).

Relationship. Differing from *Cheirimedon* in tapering of coxa 1. From *Schisturella* in lack of notch on inner ramus of uropod 2 and short carpus of gnathopod 1. From *Uristes* and *Pseudotryphosa* in small molar and larger head. From *Aristiopsis* in absence of a notch on the inner ramus of uropod 2.

Species. *Coximedon latimanus* (Sars, 1883, 1895) (Stephensen, 1923b) (Gurjanova, 1951) [240B]; ?*C. pectinipalma* K.H. Barnard, 1926 [701B].

Habitat and distribution. Marine, arctic and South Africa, (?820 m), 1250-1505 m, 2 species.

Crybelocephalus Tattersall

Crybelocephalus Tattersall, 1906: 32.

Type species. *Crybelocephalus megalurus* Tattersall, 1906, original designation.

Diagnosis. Of cyphocarin form, head tall, horizontally short, grotesque, or hooded. Flagella of antennae long (4-5 articulate) or reduced on antenna 2; accessory flagellum absent. Mouthparts forming quadrate bundle. Labrum and epistome [?continuous, not differentially produced, sinuous, prominent, coalesced, blunt]. Incisor ordinary, molar absent; palp absent. Inner plate of maxilla 1 weakly (1) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxae 1-2 small, strongly shortened and partly covered by coxa 3, coxa 4 largest, lobate, excavation weak. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, propodus simple. Uropod 3 ordinary, peduncle ordinary, aequiramous, outer ramus 2-articulate. Telson ordinary, but broad basally, entire.

Additional characters. Pereopods 3-4 prehensile, hands slightly thickened and spiny, article 5 very short; article 2 of pereopod 5 unexpanded (versus *Metacyphocaris*), of pereopods 6-7 expanded.

Variables. Head hooded (*C. birsteini*); flagellum of antenna 2 2-articulate (*C. barnardi*); molar absent (*C. crassipes*); rakers present (*C. birsteini*); inner plate of maxilla 1 with 3 setae (*C. birsteini*); pereopod 5 slightly prehensile (*C. birsteini*); coxa 3 not expanded distally (*C. obensis*, etc.).

Relationship. *Crybelocephalus* differs from *Mesocyphocaris* in the uncleft telson, lack of mandibular palp, long inner ramus of uropod 3 and the unexpanded article 2 on pereopod 5. From *Cebocaris* and *Cyphocarioides* in the loss of mandibular palp, long inner ramus of uropod 3 and diversity of article 2 on pereopods 5-7. From *Metacyphocaris* in the unexpanded article 2 of pereopod 5, nonprehensile pereopod 5, much shorter article 5 of pereopods 3-4, and uncleft broad telson. From *Paracyphocaris* in the lack of mandibular palp, uncleft telson and unexpanded article 2 of pereopod 5.

Species. *Crybelocephalus barnardi* Birstein & Vinogradov, 1963 [601?A]; *C. birsteini* Thurston, 1976a,b [240B]; *C. crassipes* Birstein & Vinogradov, 1960 [527?A]; *C. megalurus* Tattersall, 1906 (Schellenberg, 1927) (Stephensen, 1933b) (Shoemaker, 1945a) (Birstein & Vinogradov, 1958) (Gurjanova, 1962) [420B]; *C. obensis* Birstein & Vinogradov, 1964 [613?B].

Habitat and distribution. Marine, cosmopolitan, bathy- and probably abyssopelagic, confirmed 700-1260 m, 5 species.

Crybelocyphocaris Shoemaker

Figs 87E, 89T

Crybelocyphocaris Shoemaker, 1945a: 189.

Type species. *Crybelocyphocaris tattersalli* Shoemaker, 1945a, original designation.

Diagnosis. Of cyphocarin form, head tall, horizontally short, grotesque. Flagella of antenna 2 short (3-articulate), accessory flagellum absent. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not differentially produced. Incisor ordinary; rakers absent, molar absent; palp attached slightly proximal on body of mandible. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxae 1-2 small, strongly shortened and partly covered by coxa 3, coxa 4 largest, lobate, strongly excavate. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, hand simple, dactyl well developed. Uropod 3 ordinary, peduncle elongate, parviramous, inner ramus strongly shortened, outer ramus 2-articulate. Telson thick and fleshy, entire.

Additional characters. Pereopods 3-4 strongly but pereopod 5 weakly prehensile, propodus slightly thickened and spiny, article 5 slightly shortened only on pereopods 3-4; urosomites 2-3 fused and together elongate.

Relationship. *Crybelocyphocaris* is characterised by fused urosomites 2-3 but otherwise is similar to *Mesocyphocaris*.

Species. *Crybelocyphocaris tattersalli* Shoemaker, 1945a (Gurjanova, 1962) [307B].

Habitat and distribution. Marine, off Bermuda, bathypelagic, 1098 m, 1 species.

Cyclocaris Stebbing

Cyclocaris Stebbing, 1888: 664.

Type species. *Cyclocaris tahitensis* Stebbing, 1888, monotypy.

Diagnosis. Of weak cyphocarin form, head tall, horizontally short, weakly grotesque. Flagella of antennae long, base of flagellum on antenna 1 with callynophore; accessory flagellum long. Mouthparts forming quadrate bundle. Labrum and epistome separate, labrum strongly dominant in projection, blunt. Incisor ordinary, rakers present; molar large, subconical, setulose; palp attached opposite molar. Inner plate of maxilla 1 strongly (8) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxae 1-2 small, strongly shortened and partly covered by coxa 3, latter long and visible, not tapering, coxa 4 large, lobate, excavate. Gnathopod 1 long, simple, articles 3, 5, 6 elongate, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, both very elongate and linear, propodus minutely subchelate. Uropod 3 elongate, peduncle elongate or not, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Note article 3 of gnathopod 1 elongate. Pereopods not distinctly prehensile, article 5 of pereopods 3-4 slightly shortened.

Relationship. The *Cyclocaris* group includes *Cyphocaris*, *Metacyclocaris* and *Mesocyclocaris* and is characterised by having more setose maxillae and better developed rakers than other cyphocarins, plus callynophore on primary flagellum on antenna 1. *Cyclocaris* is unusual in having a large mandibular molar, either vermiform or coniform. Except for *Mesocyclocaris*, a large and well-setose mandibular palp is present; the setosity is plesiomorphic in this group. *Metacyclocaris* is probably the most primitive of the group because only coxa 1 is reduced in that genus. *Cyclocaris* thus differs from *Metacyclocaris* in the further reduction of coxa 2 and the simple pereopods 3 to 4; an ancestor to these 2 genera would combine these characters. Except for *Mesocyclocaris*, the *Cyclocaris* group is also characterised by a long, though sparsely articulate, accessory flagellum, another plesiomorphic character in the group. See *Paracyphocaris* as a counter group.

Differing from *Lepidepecreella* in the strongly setose inner plate of maxilla 1 and the attachment of the mandibular palp opposite the molar.

Species. *Cyclocaris guilelmi* Chevreux, 1899b, 1935 (= *C. faeroensis* Norman, 1900a) (Sars, 1900) (Stephensen, 1933b, 1935a) (Schellenberg, 1927) (Birstein & Vinogradov, 1955, 1958) (Gurjanova, 1951, 1962) (J.L. Barnard, 1959e) [500B + 200B]; *C. tahitensis* Stebbing, 1888 (?Chevreux, 1903) (Gurjanova, 1962) [519B].

Habitat and distribution. Marine, probably cosmopolitan, meso-bathy-abysso pelagic, 200-2200 m, 2 species.

Cyphocarioides Birstein & Vinogradov

Cyphocarioides Birstein & Vinogradov, 1970: 403.

Type species. *Cyphocarioides elongatus* Birstein & Vinogradov, 1970, original designation.

Diagnosis. Of cyphocarin form, head tall, horizontally short, grotesque. Flagella of antennae long, accessory flagellum vestigial, 1-articulate. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not differentially produced, not prominent. Incisor ordinary, raker row present, molar absent; palp attached in middle, vestigial, 2-articulate. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped [?strongly poorly developed, palp scarcely slightly strongly exceeding outer plate, dactyl well developed. small. vestigial. absent]. All coxae very short and broad, coxa 1 even more strongly shortened but not covered by coxa 2, coxa 4 lobate and excavate even though short. Gnathopod 1 short, simple; articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 scarcely shorter than article 5, both elongate and linear, propodus simple. Uropod 3 elongate, peduncle elongate, dispariramous; inner ramus strongly shortened, outer ramus 2-articulate. Telson slightly elongate, weakly cleft.

Additional characters. Pereopods 3-4 prehensile, hands thickened and spiny, article 5 short, dactyls elongate and falcate; article 2 of pereopods 5-7 unexpanded, these legs very long and slender, articles 4-7 elongate.

Relationship. Like *Paracyphocaris* but coxae 1-7 tiny, telson poorly cleft and article 2 of pereopods 5-7 unexpanded.
See *Crybelocephalus*.

Species. *Cyphocarioides elongatus* Birstein & Vinogradov, 1970 [280B].

Habitat and distribution. Marine, Kurile-Kamchatka region, bathypelagic, 1000-1500 m, 1 species.

Cyphocaris Boeck

Cyphocaris Boeck, 1871b: 103.–Gurjanova, 1952a: 114 (key).

Type species. *Cyphocaris anonyx* Boeck, 1871b, monotypy.

Diagnosis. Of cyphocarin form, head tall, horizontally short, grotesque. Flagella of antennae long, base of flagellum on antenna 1 with callynophore, accessory flagellum large. Mouthparts forming quadrate bundle. Labrum and epistome separate, neither dominant in size nor projection. Incisor ordinary, molar triturative, large, quadrate, palp well setose, attached opposite molar. Inner plate of maxilla 1 strongly setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxae 1-3 small, strongly shortened and partly covered by coxa 4, latter large and visible, strongly lobate (spined) and excavate, coxa 5 usually large. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly to greatly shorter than article 5, often both very elongate and linear, propodus minutely subchelate. Uropod 3 ordinary to elongate, peduncle elongate, aequiramous, outer ramus 1 or 2-articulate. Telson elongate, deeply cleft.

Additional characters. Note callynophore on flagellum of antenna 1; calceoli present; article 4 of antenna 2 often swollen; pereopods 3-4 (occasionally 5) prehensile, hands swollen and spiny.

Variables. Pereonite 1 with large spike (*C. johnsoni*, etc.), or hump (*C. anonyx*, etc.), or not (*C. faurei*) (see Bowman & McCain, 1967, for cyphos index); pereopods 3-4 not distinctly prehensile (*C. cornuta*), article 2 of pereopod 5 with large spike (*C. bouvieri*, *C. johnsoni*), of pereopods 5-7 strongly toothed (*C. faurei*); coxa 5 much larger than coxa 4 (*C. cornuta*); outer ramus of uropod 3 2-articulate (*C. cornuta*); telson huge, almost as long as uropod 1, nearly twice as long as uropod 3 (*C. johnsoni*); ranging up to 40 mm in length.

Relationship. *Cyphocaris* and *Pseudocyphocaris* (see) are unique in the cyphocarins because coxa 3 is as small as coxae 1-2 and covered by coxa 4; in other cyphocarids coxa 3 is large, but *Cyphocaris* has the most plesiomorphic molar of the group. Most species of *Cyphocaris* are quickly recognised because they either have a hump or spike on pereonite 1 or a spike on article 2 of pereopod 5 or large teeth on article 2 of pereopods 5-7.
See *Pseudocyphocaris*.

Species. See J.L. Barnard (1961a); K.H. Barnard (1932, 1937, 1940b); Birstein & Vinogradov (1955, 1958, 1960, 1962b, 1964); Chevreux (1916, 1935); Gurjanova (1951, 1962); Hurley (1963); Schellenberg, 1926a,c 1927, 1929b); Shoemaker (1945a); Stephensen, 1923b, 1933b); *C. anonyx* Boeck, 1871b (= *C. micronyx* Stebbing, 1888) (Stebbing, 1904b) (Schellenberg, 1926c, 1927) (K.H. Barnard, 1932) (Stephensen, 1935a) (Shoemaker, 1945a) (Birstein & Vinogradov, 1955-1964) (Thurston, 1976a) [420B]; *C. bouvieri* Chevreux, 1916 (Stephensen, 1933b) (Gurjanova, 1962) [420B]; *C. challengeri* Stebbing, 1888 (= *C. alicei* Chevreux, 1905a, 1935) (= *C. kincaidi* Thorsteinson, 1941) (Bowman & McCain, 1967) (Thurston, 1976a) [420NBA]; *C. cornuta* Ledoyer, 1978a, 1986 [698B]; *C. faurei* K.H. Barnard, 1916, 1932, 1937 (Ledoyer, 1978a, 1986) (Andres, 1983) [420BA]; *C. geyserensis* Ledoyer, 1986 [618A]; *C. johnsoni* Shoemaker, 1934b (Gurjanova, 1962) [404B]; *C. polaris* Gurjanova, 1951, 1952a, 1962 [220?A]; *C. richardi* Chevreux, 1905e, 1935 (Stephensen, 1915) (Shoemaker, 1945a) (J.L. Barnard, 1954b) (Gurjanova, 1962) (Andres, 1983) [420NBA].

Habitat and distribution. Marine, cosmopolitan, epi- to abyssopelagic, 25-2800 m, 9 species.

Danaella Stephensen

Figs 88D, 91L, 94G, 95L

Danaella Stephensen, 1925b: 426.

Type species. *Danaella mimonectes* Stephensen, 1925b, original designation.

Diagnosis. Of cyphocarin form. Mouthparts forming globular bundle, some parts styliform. Labrum and epistome [?continuous, not prominent, coalesced, blunt]. Incisor ordinary, molar absent; palp absent. Inner plate of maxilla 1 weakly (2) setose; palp [?1 to 2-articulate], large. Inner well and outer plates of maxilliped hugely developed, palp absent. Gnathopod 1 short, simple, article 5 longer than 6, dactyl vestigial; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, latter elongate, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 vestigial. Telson absent.

Additional characters. Body globose, rolled into ball, pereonites 3-6 especially inflated; head tiny, concealed by coxae; antennae thin, article 3 of antenna 1 longer than article 2, flagellum without callynophore, accessory flagellum absent; outer plate of maxilla 1 with ?6-7 spines, one of these very disjunct basomedially; inner plate of maxilla 2 broader and longer than outer, weakly armed medially and apically; inner plate of maxilliped curved and tapering, outer large and helmet-shaped, both naked; coxae 3-6 very large; gnathopod 1 article 2 thick; pereopods 5-7 short, feeble, equal, article 2 narrow and linear, dactyls of pereopods 3-7 elongate, curved; uropods 1-2 with vestigial spike-like inner rami; urosomite 3 and uropod 3 vestigial; branchiae simple, sac-like.

Relationship. Differing from *Chevreuxiella* and *Thoriella* in the globose body; additionally from *Thoriella* in the short inner ramus of uropods 1-2, the strongly overlapping coxae, and weaker setation on inner plates of maxillae 1-2.

Additionally from *Chevreuxiella* in lack of weak maxillipedal palp. From *Mimonectes* in Hyperiidea by large mid-coxae, the globosity of the body being in the middle and not anteriorly, and the thoracic sternum being hollowed out.

Species. *Danaella mimonectes* Stephensen, 1925b (Andres, 1983) [420B].

Habitat and distribution. Marine, Davis Strait and Antarctica, thus presumably cosmopolitan, 1900-3200 m, 1 species.

Dartenassa n.gen.

Type species. *Lysianassa dartevillei* Ruffo, 1953e, original designation.

Etymology. Named for roots in *Lysianassa* and *dartevillei*.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in size, and projection, blunt. Incisor ordinary, molar simple, conicolaminate, subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 [strongly moderately weakly] setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle elongate, ordinary, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Antenna 1 with tooth; outer plate of maxilla 1 with 6 and 5 spines; inner plate of maxilla 2 broadest; uropods 1-2 strongly setose.

Relationship. Differing from *Phoxostoma* in the non-geniculate outer plate of maxilla 2 and the tooth on article 1 of antenna 1. From *Bonassa* in the narrow outer plate of maxilla 2, and unproduced epistome.

Species. *Dartenassa dartevillei* (Ruffo, 1953b) [447].

Habitat and distribution. Marine, Zaire, Moanda, near Congo River, depth unstated, 1 species.

Derjugiana Gurjanova

Derjugiana Gurjanova, 1962: 357.

Type species. *Derjugiana insolita* Gurjanova, 1962, original designation.

Diagnosis. Mouthparts forming conical bundle, styliform. Labrum and epistome [?continuous, not differentially produced, coalesced, blunt]. Incisor minutely toothed, molar absent; palp attached strongly proximal. Inner plate of maxilla 1 not setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp not exceeding outer plate, dactyl small, tumid. Coxa 1 large and visible, slightly tapering. Gnathopod 1 enlarged, strongly chelate, article 5 shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, hand minutely subchelate, article 7 vestigial. Inner ramus of uropod 2 with small notch. Uropod 3 reduced, rami absent. Telson short, entire.

Relationship. Characterised by the vestigial uropod 3 lacking rami and the chelate gnathopod 1, with short palp of the maxilliped and styliform mouthparts arranged in a conical bundle.

Differing from *Acontiostoma* and *Stomacontion* in the chelate gnathopod 1.

Species. *Derjugiana insolita* Gurjanova, 1962 [284].

Habitat and distribution. Marine, Sakhalin Island, 53 m, 1 species.

Dissiminassa n.gen.

Type species. *Aruga dissimilis* Stout, 1913, original designation.

Etymology. Named for roots in *Lysianassa* and *dissimilis.*

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome both strongly produced, prominent, separate, blunt. Incisor ordinary, molar simple, small, setulose, palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely ?subchelate. Inner ramus of uropod 2 with large notch. Uropod 3 short, ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, weakly emarginate.

Additional characters. Outer plate of maxilla 1 with 7 + 3+ spines.

Relationship. Differing from *Concarnes* in much weaker cleft of telson, larger article 2 on outer ramus of uropod 3 and unpleated gills. From *Macronassa* in presence of article 2 on outer ramus of uropod 3.

Species. *Dissiminassa dissimilis* (Stout, 1913) (Hurley, 1963) (J.L. Barnard, 1969a, 1979b) [369].

Habitat and distribution. Marine, Tomales Bay, California to the Galapagos Islands, 0-73 m, 1 species.

Douniaella Ledoyer

Douniaella Ledoyer, 1986: 742-744.

Type species. *Douniaella longichelata* Ledoyer, 1986, original designation.

Diagnosis. Mouthparts forming quadrate bundle, some weakly styliform. Labrum and epistome not prominent, weakly separate, blunt, labrum dominating epistome. Incisor ordinary, molar triturative, medium, columnar, palp attached moderately proximal to molar. Inner plate of maxilla 1 naked; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl small. Coxa 1 large and visible, not tapering. Gnathopod 1 short, subchelate, article 5 shorter than 6, weakly lobate, palm almost transverse, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 almost parviramous, peduncle weakly elongate, outer ramus 2-articulate. Telson short, cleft about 40%.

Additional characters. Head visible; rakers absent; plates of maxilla 2 narrow, inner short, armaments very weak.

Sexual dimorphism. Male unknown.

Relationship. Differing from *Rifcus* in the stouter gnathopod 1 with subtransverse palm and in the naked inner plate of maxilla 1. From *Phoxostoma* in the naked inner plate of maxilla 1, the subchelate gnathopod 1 and the 2-articulate outer ramus of uropod 3. From *Elimedon, Hippomedon, Orchomene* and *Paralibrotus* in the poorly armed outer plate and weak dactyl of the maxilliped, and the naked inner plate of maxilla 1. From *Falklandia* in the poorly developed dactyl of the maxilliped, well-subchelate gnathopod 1, shorter telson and poorly armed outer plate of the maxilliped. From *Cheirimedon* in the poorly armed outer plate and weak dactyl of the maxilliped and the short telson.

Species. *Douniaella longichelata* Ledoyer, 1986 [618B].

Habitat and distribution. Marine, east of Pamanzi Island, Comoros Islands, 1800 m, 1 species.

Drummondia Lowry

Drummondia Lowry, 1984b: 61.

Type species. *Drummondia corinellae* Lowry, 1984b, original description.

Diagnosis. Of pachynin form. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not differentially produced. Incisor ordinary, molar absent; palp attached strongly proximal. Inner plate of maxilla 1 weakly (1-3) setose; palp absent. Inner poorly and outer plates of maxilliped well developed, palp not exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 enlarged, strongly chelate, article 5 extremely short, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus strongly shortened, outer ramus 2-articulate. Telson short, entire.

Additional characters. Base of flagellum on antenna 1 with callynophore; mandible without rakers, toothed blade present, lacinia mobilis absent; spines on outer plate of maxilla 1, 11, sculptured; coxa 4 with well-developed posteroventral lobe; gnathopod 1 palm defined by complex spine; pereonite 5 with small dorsal tooth.

Variables. Setae of pereopods 3-7 encased in sheaths or not.

Relationship. Differing from other pachynins in the reduced inner ramus of uropod 3 and in having a lamina dentata on the mandibles.

Species. *Drummondia corinellae* Lowry, 1984b [782]; *D. parviramus* Lowry, 1984b [631]; species, Lowry, 1984b [785].

Habitat and distribution. Marine, south-east Australia from Queensland to South Australia, 5-16 m, 2 species.

Ekelofia Lowry

Ekelofia Lowry, 1984b: 97.

Type species. *Pachychelium oculatum* Schellenberg, 1931, original description.

Diagnosis. Of pachynin form. Mouthparts forming conical bundle. Labrum and epistome continuous, not prominent. Incisor ordinary, molar absent; palp attached slightly distal. Inner plate of maxilla 1 [? weakly setose]; palp absent. Inner absent and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 strongly enlarged, strongly chelate, article 5 very much shorter than 6, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson short, entire.

Additional characters. Base of flagellum on antenna 1 well developed callynophore; mandible with rakers, toothed blade absent, lacinia mobilis absent; spines on outer plate of maxilla 1 simple, 6 (in 4-2 arrangement); coxa 4 with well-developed posteroventral lobe; gnathopod 1 palm defined by simple spine; pereonite 5 [? without dorsal tooth].

Relationship. Differing from other pachynins in the 4-2 spine formula on the outer plate of maxilla 1. From *Pachychelium* in the presence of rakers, defining spine on gnathopod 1 palm, well-developed posteroventral lobe of coxa 4 and expanded article 4 on pereopods 5-6.

Species. *Ekelofia oculata* (Schellenberg, 1931) (Lowry, 1984b) [833].

Habitat and distribution. Marine, South Georgia, 24-52 m, 1 species.

Elimedon J.L. Barnard

Elimedon J.L. Barnard, 1962d: 24.

Type species. *Elimedon cristatus* J.L. Barnard, 1962d, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?not prominent, separate, labrum slightly dominant in projection, blunt]. Incisor ordinary, molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 moderately (3) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, strongly subchelate, palm oblique, article 5 longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 almost aequiramous, ordinary, peduncle ordinary, outer ramus 2-articulate. Telson elongate, cleft halfway.

Additional characters. Head 'small'; article 1 of flagellum on antenna 1 (much?) longer than articles 2-3 on peduncle combined; female antenna 2 about 1.5 times as long as antenna 1; mandibular palp article 3 half or less as long as article 2; article 2 of pereopods 5-6 narrowly rectangular (versus *Hippomedon*); pereopod 5 scarcely shortened; pereopod 7 longest; gill 7 [unknown].

Relationship. Differing from *Hippomedon*, *Psammonyx* and *Wecomedon* in the short article 3 of

the mandibular palp. From *Paracentromedon* in the telson being cleft half or less.
See *Douniaella*.

Species. *Elimedon brevicaudatus* (Ledoyer, 1986) [724A]; *E. cristatus* J.L. Barnard, 1962d [412A].

Habitat and distribution. Marine, Angola Basin, 8°28'E, 6°S, 3916 m, and basin south of Madagascar, 3923-3933 m, 2 species.

Endevoura Chilton

Fig.91S

Endevoura Chilton, 1921d: 44.

Type species. *Endevoura mirabilis* Chilton, 1921d, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [unknown, ?differentially produced, ?epistome slightly dominant in projection and blunt]. Incisor ordinary, molar weakly triturative, large, setulose, palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (1) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed, tumid. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl small, stubby; article 6 of gnathopod 2 greatly shorter than article 5, stout, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson short, entire.

Additional characters. Flagella of antennae 1-2 reduced. Pereopod 3 grossly chelate.

Variables. Lateral cephalic lobes sharp (Japan), blunter (Australia); carpus of pereopod 3 very small (Australia), larger (Japan), propodus broad (Australia), narrow (Japan).

Relationship. Characterised by the enlarged and prehensile pereopod 3; thus like *Ensayara*, but dactyl of maxilliped stubby, not unguiform.

Species. *Endevoura mirabilis* Chilton, 1921d (Nagata, 1965a) [783 + 395].

Habitat and distribution. Marine, southern Australia and Japan, 0-56 m, 1 species.

Ensayara J.L. Barnard

Ensayara J.L. Barnard, 1964e: 79.

Type species. *Ensayara ramonella* J.L. Barnard, 1964e, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, epistome weakly dominant in projection and blunt. Incisor weakly toothed at apposite edges; molar simple, large, palp attached opposite molar. Inner plate of maxilla 1 poorly setose (0-1); palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened and partly covered by coxa 2, scarcely tapering. Gnathopod 1 short, simple, article 6 longer than 5, dactyl small, article 6 of gnathopod 2 slightly shorter than article 5, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson short, entire.

Additional characters. Flagella of antennae poorly developed. Pereopod 3 strongly prehensile, propodus very broad and parachelate, with crenulate or spinose palm.

Variables. Peduncle of antenna 1 with 3 distinct articles (*E. iara*); coxa 1 large and ordinary (*E. dentarius*; dactyl of pereopod 7 slender and even (type), stunted (*E. carpinei*).

Relationship. Like *Endevoura* in the enlarged prehensile pereopod 3 but dactyl of maxilliped unguiform, not bulbous.

Species. *Ensayara angustipes* Ledoyer, 1978b, 1986 [693]; *E. carpinei* Bellan-Santini, 1974 [340B]; *E. dentarius* Hirayama, 1985c [391]; *E. iara* Lowry & Stoddart, 1983a [776s]; *E. microphthalma* Ledoyer, 1986 [698]; *E. ramonella* J.L. Barnard, 1964e [376].

Habitat and distribution. Marine, cosmopolitan in low latitudes, 1-1900 m, 6 species.

Eucallisoma J.L. Barnard

Figs 86C, 92P

Eucallisoma J.L. Barnard, 1961a: 32.

Type species. *Eucallisoma glandulosa* J.L. Barnard, 1961a, original designation.

Diagnosis. Of scopelocheirin form. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, conical, smooth; palp attached opposite molar. Inner plate of maxilla 1 strongly setose medially; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 5 longer than 6, dactyl vestigial, shrouded in setae; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Head very small, lacking lateral lobes, not deformed; antenna 1 huge, primary flagellum conical, 90% callynophore, with 2 apical articles; accessory flagellum similar, appressed to primary flagellum, 2-articulate; article 2 of gnathopod 1 sac-like, filled with dense globulose glandular tissue.

Relationship. Unique among scopelocheirins for the sac-like article 2 of gnathopod 1, conical antenna 1, small head, and reduction of setal shroud on gnathopod 1.

Species. *Eucallisoma glandulosa* J.L. Barnard, 1961a [412A].

Habitat and distribution. Marine, off Gabon, Atlantic Africa, 4°S, 4020 m, 1 species.

Euonyx Norman

Fig.92I

Euonyx Norman, 1867b: 202.–Lincoln, 1979a: 54.
Leptochela Boeck, 1876: 190 [homonym, Decapoda] (*Opis leptochela* Bate & Westwood, 1868, monotypy).

Type species. *Euonyx chelatus* Norman, 1867b, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome strongly dominant in size and projection, sharp or blunt. Incisor ordinary, molar of medium size, subconical, setulose, occasionally with weak apical triturative surface but considered as simple; palp attached strongly distal. Inner plate of maxilla 1 weakly (usually 3) setose; palp 2-articulate, large. Inner well and outer plate of maxilliped poorly developed (type only), palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 elongate, thin, strongly chelate, article 5 longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus strongly subchelate. Inner ramus of uropod 2 without notch or with weak notches. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary to elongate, deeply cleft.

Additional characters. Inner plate of maxilla 2 shorter than outer, lined with setae on apical half of medial margin; article 3 of gnathopod 1 elongate.

Variables. Body almost fully carinate (*E. scutatus*); article 1 of antenna 1 carinate (type, *E. coecus*), not carinate (*E. biscayensis, E. normani*, etc.); epistome produced (type), not produced (*E. pirloti*, etc.); molar present (*E. biscayensis*), conicosetulose (*E. normani*, etc.); spines on outer plate of maxilla 1 small (type), large (most other species); plates of maxilla 2 thin (*E. laqueus, E. talismani*); outer plate of maxilliped not larger than inner plate (type), much larger (most other species); plates of maxilliped thinner and more pointed (*E. talismani*); article 5 of gnathopod 1 much shorter than article 6, propodus sinuous (*E. normani*); propodus of gnathopod 2 powerful and palm excavate (type), feeble (*E. biscayensis, E. normani*); length of gnathopod 2 similar to gnathopod 1 (most species), gnathopod 2 much longer than gnathopod 1 (*E. talismani*).

Relationship. Differing from *Opisa* in the elongate, non-eusirid carpus of gnathopod 1 and the smaller outer plate of the maxilliped. From *Valettia* in the smooth incisor, non-acute outer plate of maxilliped, and the difference in size between coxae 1-2 (both small in *Valettia*). From *Aristiopsis* in the stronger chela of gnathopod 1, the long unlobate carpus, lack of molar, cristate antenna 1 and the weaker outer plate of the maxilliped. From *Cheirimedon* in the thin, elongate and chelate gnathopod 1 and the small outer plate of the maxilliped. From *Kyska* in the small coxa 1, thin gnathopod 1 and small outer plate of maxilliped.

Species. See Stephensen (1923b); *E. biscayensis* Chevreux, 1908a (Chevreux, 1935) (J.L. Barnard, 1961a) (Ledoyer, 1986) [426B, 619B]; *E. chelatus* Norman, 1867b (= *E. leptochela* Bate & Westwood, 1868) (Sars, 1895) (Gurjanova, 1951) (Lincoln, 1979a) [216I + B]; *E. coecus* Pirlot, 1933a [718B]; *E. conicurus* K.H. Barnard, 1955 (Griffiths, 1974c, 1975) [743]; *E. laqueus* J.L. Barnard, 1967a (Sekiguchi & Yamaguchi, 1983) [510BP]; *E. normani* Stebbing, 1888, 1906 [523B]; *E. pirloti* Sheard, 1938 (= *E. normani* identification of Chilton, 1921d) [780]; *E. scutatus* Griffiths, 1977a [701A]; *E. talismani* Chevreux, 1919-20 (Stephensen, 1923b) (Chevreux, 1927) [240B].

Habitat and distribution. Marine, cosmopolitan, descending into cold waters, demersal (coming to baited traps), occasionally associated with echinoderms and deep sea corals, rarely shallow in rock reefs (see 780 above), 1-2900 m, 9 species.

Eurythenes S.I. Smith

Figs 88I, 89K, 90D, 93A, 95Q

Eurytenes Liljeborg, 1865b: 6 (homonym, Hymenoptera) (*Gammarus gryllus* Lichtenstein, 1822, monotypy).

Eurythenes S.I. Smith, 1884a: 54 (new name).
Euryporeia Sars, 1895: 85 (new name, same type species).
Katius Chevreux, 1905b: 1 (*Katius obesus* Chevreux, 1905b, original designation).

Type species. *Gammarus gryllus* Lichtenstein, 1822, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, huge, conicolaminate, setulose; palp attached opposite molar. Inner plate of maxilla 1 strongly setose but only apically; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed but small. Coxa 1 strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, poorly subchelate, palm oblique, article 5 shorter than 6, scarcely lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate or subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Article 1 of antenna 2 swollen; both plates of maxilla 2 strongly setose medially.

Variables. Dactyls of pereopods short (*E. gryllus*), elongate (*E. obesus*); dorsal notching of pleonites 3-4 appearing late in life.

Relationship. Differing from *Alicella* and *Paralicella* in the short article 3 of gnathopod 1; *Alicella* and *Ambasia* have a simple gnathopod 1. From *Aristias* in the swollen article 1 of antenna 2, narrower inner plate of maxilla 2 and elongate telson. From *Hirondellea* in the well-setose inner plate of maxilla 1; *Hirondellea* has about 2 falcate setae only in adults, lacks ocular points on the head and has a shorter telson. From *Uristes* and *Tryphosella* in the immense molar, strongly setose inner plates of maxillae 1-2 and the swollen article 1 of antenna 2. From *Ambasiopsis* by the unproduced labrum and more strongly setose maxillae 1-2. From *Tryphosoides* in the 2-articulate outer ramus of uropod 3.

Adeliella has poorly developed and almost naked plates of maxillae 1-2 (except outer plate of maxilla 1), has a strange gnathopod 2 with slightly overlapping dactyl, and the rami of uropod 3 are not longer than the peduncle.

The following genera have a notch on the inner ramus of uropod 2: *Aristiopsis, Schisturella, Metambasia.*

Species. See J.L. Barnard, 1961a; *E. gryllus* (Lichtenstein, 1822) (= *E. magellanica* Milne Edwards, 1848) (Sars, 1895) (Bowman & Manning, 1972) (Rauschert, 1986) [420 + BA]; *E. obesus* (Chevreux, 1905b) (?= *E. scotiae* Chilton, 1912d) (Bellan-Santini & Ledoyer, 1974) (Barnard & Shulenberger, 1976) [420 + BA].

Habitat and distribution. Marine, cosmopolitan, demersal, widely distributed vertically, probable migrator, usually bathy- to abyssopelagic and epibenthic, 0-6500 m, widely eaten by seabirds such as petrels, shearwaters, albatrosses, coming to deep sea bait, up to 90 mm in length, 2 species.

Falcanassa n.gen.

Type species. *Lysianassa falcata* Stephensen, 1933a, original designation.

Etymology. Composed from roots in *Lysianassa* and *falcata*.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in size and projection, blunt. Incisor ordinary, molar simple; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp [?strongly] exceeding outer plate, dactyl [?well developed]. Coxa 1 large and visible, not tapering. Gnathopod 1 strongly enlarged, falcate, poorly subchelate, palm oblique, article 5 shorter than 6 and thick, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 almost aequiramous, short, peduncle expanded, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Gnathopod 1 enlarged, falcate.

Relationship. Like *Shoemakerella* and *Arugella* but male gnathopod 1 enlarged and falcate; and presumably inner plate of maxilla 2 not broadened.

Like *Aruga* and *Lysianopsis* but outer ramus of uropod 3 1-articulate.

Species. *Falcanassa falcata* (Stephensen, 1933a, 1947b) [462Q].

Habitat and distribution. Anchialine, saline, Curacao, 1 species.

Falklandia De Broyer

Falklandia De Broyer, 1985c: 303.

Type species. *Orchomenopsis reducta* Schellenberg, 1931, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome prominent, coalesced, blunt. Incisor ordinary, molar simple, smooth, small; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl moderately well developed, slightly stubby. Coxa 1 large and visible, not tapering. Gnathopod 1 short, poorly subchelate, article 5 much shorter than 6, weakly lobate, palm transverse, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, palm absent. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson slightly elongate, deeply cleft.

Additional characters. Apex of outer plate on maxilliped with 2 normal spines, medial margin with small nodular spines.

Sexual dimorphism. Male unknown.

Relationship. Differing from members of the *Orchomene* complex in the fused prebuccal members. See *Douniaella*.

Species. *Falklandia reducta* (Schellenberg, 1931) (De Broyer, 1985c) [800 + B].

Habitat and distribution. Marine, Falkland Islands and Bellinghausen Sea, 197-569 m, 1 species.

Figorella J.L. Barnard

Figorella J.L. Barnard, 1962d: 24.

Type species. *Figorella tanidea* J.L. Barnard, 1962d, original designation.

Diagnosis. Of pachynin form. Mouthparts forming conical bundle, partly styliform. Labrum and epistome [?continuous, not prominent, blunt]. Incisor ordinary, molar absent; palp attached strongly distal. Inner plate of maxilla 1 strongly reduced, weakly (2) setose; palp [?1-articulate], large. Inner poorly and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 strongly enlarged, strongly chelate, article 5 shorter than 6, vestigial, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus strongly shortened, outer ramus 2-articulate. Telson ordinary, entire.

Additional characters. Base of flagellum on antenna 1 without callynophore; mandible with rakers and left lacinia mobilis; spines on outer plate of maxilla 1 simple, 10, palp with small terminal setae; inner plate of maxilliped very reduced; coxa 4 with well-developed posteroventral lobe; defining spine of palm on gnathopod 1 small and simple; article 4 of pereopods 5-6 expanded.

Variables. Spine formula on outer plate of maxilla 1 equals 6/4 or 5/5; length of inner ramus on uropod 3 variable.

Relationship. Differing from *Pachynus* in the number of spines on the outer plate of maxilla 1 (10 versus 8), in the absence of a callynophore of the flagellum on antenna 1 and in the presence of terminal setae on the palp of maxilla 1.

Species. *Figorella tanidea* J.L. Barnard, 1962d [801A]; *F. tasmanica* Lowry, 1984b [784B].

Habitat and distribution. Marine, Antarctica at South Georgia and East Scotia Basin, and south-east Australia, 25-3770 m, 2 species.

Gainella Chevreux

Figs 92M, 93D

Gainella Chevreux, 1911c: 1167.

Type species. *Gainella chelata* Chevreux, 1912a,d, designated by Chevreux, 1912d.

Diagnosis. Mouthparts forming quadrate bundle, some weakly styliform. Labrum and epistome not prominent, separate, neither dominant in size nor projection, blunt. Incisor minutely toothed; molar weakly triturative, small; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (1) setose; palp 2-articulate, large. Inner and outer plates of maxilliped poorly developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 slightly enlarged, poorly chelate, palm transverse to chelate, article 5 much shorter than 6, lobate, dactyl large. Article 6 of gnathopod 2 pointed, slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 parviramous, short, peduncle ordinary, inner strongly shortened, outer ramus 2-articulate. Telson short, deeply cleft.

Additional characters. Article 1 of antenna 1 cristate; inner plates of maxilliped styliform, outer plates not exceeding inner, palp thin, geniculate, dactyl long and apically pubescent, coxa 1 expanded apically; article 6 of gnathopod 2 thin and tapering distally.

Relationship. Characterised by the styliform maxilliped similar to *Trischizostoma*; thus, differing from *Figorella* and *Pachynus* in maxillipeds and cleft telson. Differing from *Onesimoides* in the cleft telson, proximal mandibular palp and short article 5 of gnathopod 1. From *Euonyx, Schisturella*, and *Aristiopsis* in the large coxa 1 and proximal mandibular palp. From *Valettia* in the parviramous uropod 3 and proximal mandibular palp. From *Cheirimedon* and *Opisa* in the large and apically expanded coxa 1, short telson, proximal mandibular palp and tiny inner ramus of uropod 3. From *Orchomene* and *Rimakoroga* in the cristate antenna 1, chelate gnathopod 1, and styliform palp of the maxilliped. From *Kyska* in the parviramous uropod 3, styliform maxillipedal palp and pointed gnathopod 2.

Like *Trischizostoma* but *Gainella* with ordinary coxae 1-4 and more normal lower lip, mandible, and maxillae 1-2.

Species. *Gainella chelata* Chevreux, 1912a,d [872BI].

Habitat and distribution. Marine, Antarctica, Alexander Island, 297 m, in sponge, 1 species.

Galathella Barnard & Karaman

Galathella Barnard & Karaman, 1987: 866.

Type species. *Schisturella galatheae* Dahl, 1959, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome not differentially produced, not prominent, separate, neither dominant, blunt. Incisor ordinary; molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Innermost seta on inner plate of maxilla 2 dominant. Inner poorly and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened, tapering, and partly covered by coxa 2. Gnathopod 1 short, subchelate, palm oblique, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, deeply cleft.

Relationship. Differing from *Schisturella* in the poorly produced upper lip and lack of notch on the inner ramus of uropod 3. From *Ventiella* in the deeply cleft telson and unproduced upper lip. See *Cedrosella*.

Species. *Galathella galatheae* (Dahl, 1959) [715A].

Habitat and distribution. Marine, Kermadec Trench, 6960-7000 m, 1 species.

Glycerina Haswell

Fig. 95H

Glycera Haswell, 1879a: 256 (homonym, Polychaeta) (*Glycera tenuicornis* Haswell, 1879a, original designation).
Glycerina Haswell, 1882: 233 (new name).

Type species. *Glycera tenuicornis* Haswell, 1879a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, separate, labrum slightly dominant in size and projection, blunt. Incisor ordinary, molar simple, large, conicolaminate or subconical, setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp scarcely exceeding large outer plate, dactyl well developed. Coxa 1 large and visible, barely tapering. Gnathopod 1 short, simple, article 5 longer than 6, dactyl small, shrouded in setae; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Article 2 of pereopod 5 with deeply incised posterior teeth.

Variables. Type species needs redescription, illustration of gnathopod 1 strange; shroud of gnathopod 1 mostly on propodus (type), mostly on dactyl (*G. teretis*); palm of gnathopod 2 transverse (type), oblique (*G. teretis*).

Relationship. Like *Lucayarina* but only pereopod 5 with indentured article 2 and dactyl of gnathopod 1 with weak scopelocheirin appearance, thus dactyl short, with inner brush of digits and weakly covered by brushy shroud from article 6.

Also like scopelocheirins and *Ichnopus* but pereopod 5 indentured.

Differing from *Scopelocheirus* and *Aroui* in the poorly setose inner plate of maxilla 1.

Notes on species. *Glycerina woodmasoni* has a tooth on epimeron 3 and pereopod 6 has proportions distinct from Haswell's original figures of *G. tenuicornis*.

Species. *Glycerina tenuicornis* (Haswell, 1879a) (?= *G. affinis* Chilton, 1885b, also said to be *Amaryllis* species, Stebbing, 1906) (Haswell, 1882) [781]; *G.*

teretis Andres, 1981a [677B]; *G. woodmasoni* Giles, 1890 [662].

Habitat and distribution. Marine, Australia to Red Sea, 0-1869 m, 3 species.

Gronella n.gen.

Fig.95B

Type species. *Anonyx groenlandicus* Hansen, 1888, original designation.

Etymology. Named for the type species.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, nearly strongly subchelate, palm transverse, article 5 shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Sexual dimorphism. Male antenna 2 flagellum elongate; antennae 1-2 with calceoli; uropod 3 setose.

Relationship. Differing from *Tryphosella* in proximal position of mandibular palp and incised inner ramus of uropod 2. From *Orchomene* in tapering coxa 1 and incised inner ramus of uropod 2. From *Tmetonyx* in short article 3 of gnathopod 1.

Species. *Gronella groenlandica* (Hansen, 1888) (Sars, 1895) (Shoemaker, 1955a) (Bulycheva, 1957c) [250].

Habitat and distribution. Marine, pan-arctic, weakly boreal, 6-140 m, 1 species.

Hippomedon Boeck

Figs 88A, 89B, 90H, 93H, 95D

Hippomedon Boeck, 1871b: 102.–J.L. Barnard, 1964a: 5 (key).–Gurjanova, 1962: 93 (key).–Lincoln, 1979a: 74.–Jarrett & Bousfield, 1982: 105.

Platamon Stebbing, 1888: 642 (*Platamon longimanus* Stebbing, 1888, monotypy).

Type species. *Anonyx holbolli* Krøyer, 1846b, selected by Boeck, 1876.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, differentially produced, labrum slightly to strongly dominant in projection, blunt. Incisor ordinary, molar triturative, large; palp attached slightly distal to or opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 simple, strongly to poorly subchelate, palm oblique, article 5 longer than 6, dactyl large; article 6 of gnathopod 2 slightly to greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 almost aequiramous, peduncle slightly elongate; outer ramus 2-articulate. Telson ordinary to elongate, deeply cleft.

Additional characters. Head 'small'; base of primary flagellum on antenna 1 with callynophore, more than twice as long as articles 2-3 of peduncle combined; antenna 2 much longer than antenna 1; mandibular rakers few; pereopod 5 not shortened, pereopod 6 longest; some gills with accessory lobes, gill 7 present; each lobe of telson apex with 1-2 spines only (versus *Paratyphosites*).

Sexual dimorphism. Male antennae 1-2 better armed with aesthetascs and calceoli, antenna 2 flagellum slightly more elongate but uropod 3 not necessarily more strongly armed.

Variables. Eyes well developed (*H. oculatus*), weak or absent (type, etc.), unusual corneal lens present (*H. holbolli*); antenna 1 carinate (*H. denticulatus, H. nasutus*); mandibular palp article 3 varying between 0.5 and 1.0 times as long as article 2; mandibular rakers absent (*H. denticulatus*), or 2 present (*H. antitemplado*); inner plate of maxilla 1 generally with 2-5 apical setae but 9 setae present (*H. tasmanicus*); coxa 1 slightly tapering but not shortened (*H. tasmanicus*); gnathopod 1 strongly subchelate (*H. punctatus*), poorly subchelate *H. angustimanus*), simple (*H. serratus*); article 5 = 6 on gnathopod 1 (*H. concolor*); serrations on article 2 of pereopods 5-7 slightly enlarged (*H. kurilicus*); gills 5-6 each with one accessory lobe (*H. antitemplado*), with 3-4 (*H. denticulatus*); urosomite 1 with carina (*H. antitemplado, H. concolor, H. holbolli, H. longimanus*); peduncle of uropod 3 apically expanded and produced (*H. incisus*), inner ramus slightly shortened (*H. minusculus*); telson of intermediate length compared to *Paratryphosites* (*H. kurilicus*).

Relationship. Differing from *Anonyx* and *Tmetonyx* in the fully triturative molar and generally smaller head. From *Tryphosella* and *Uristes* in the unreduced coxa 1. From *Tryphosites* in the lack of notch on the inner ramus of uropod 2.

See *Douniaella*.

Removals. *Hippomedon brevicaudatus* Ledoyer, 1986, to *Elimedon*; *H. whero* Fenwick to *Paracantromedon*; possibly *H. manene* and *H. matikuku* also to *Paracentromedon* (fide Lowry, *in litt.*, 1991).

Species. See J.L. Barnard (1966a,b); K.H. Barnard (1916, 1930, 1932); Bellan-Santini (1965a, lists); Gurjanova, (1935a, 1936b); Ledoyer (1977); Schellenberg (1926a); Shoemaker (1930a,b); Stephensen (1923b, 1935a, 1940b, 1944a); Thurston (1974b); *H. ambiguus* Ruffo, 1946 [345]; *H. angustimanus* Gurjanova, 1962 [208A]; *H. antitemplado* J.L. Barnard, 1961a [818A]; *H. bandae* Pirlot, 1933a [602B]; *H. benthedii* Ledoyer, 1986 [618A]; *H. bidentatus* Chevreux, 1903, 1935 (Chevreux & Fage, 1925) (Bellan-Santini, 1965a,b) (Ledoyer, 1970, 1977) (Karaman, 1973b)[340 + B]; *H. bruuni* (Reid, 1951, as *Tmetonyx*) [444]; *H. coecus* (Holmes, 1908) (Hurley, 1963) (J.L. Barnard, 1971b) [372]; *H. columbianus* Jarrett & Bousfield, 1982 [270]; *H. concolor* J.L. Barnard, 1961a [715A]; *H. denticulatus* (Bate, 1857c, 1862) (Sars, 1895) (Chevreux & Fage, 1925) (Schellenberg, 1927) (Hurley, 1963) (J.L. Barnard, 1971b) (Lincoln, 1979a) [210 + B]; *H. d. orientalis* Gurjanova, 1961 (J.L. Barnard, 1971b) [280]; *H. frigidus* Stephensen, 1923b (Gurjanova, 1951) [216B]; *H. geelongi* Stebbing, 1888 [782]; *H. gorbunovi* Gurjanova, 1929, 1951 (Stephensen, 1935a) [297]; *H. granulosus* Bulycheva, 1955 (Gurjanova, 1962) (Jarrett & Bousfield, 1982) [280]; *H. hake* Lowry & Stoddart, 1983a [776]; *H. holbolli* (Krøyer, 1846b) (Sars, 1895) (Gurjanova, 1951) [200 + B + A]; *H. incisus* K.H. Barnard, 1930 (Birstein & Vinogradov, 1962b) [776]; *H. kergueleni* (Miers, 1875b, 1879) (Stebbing, 1888) (often as *Tryphosella*) (Bellan-Santini, 1972a) (Bellan-Santini & Ledoyer, 1974) (Thurston, 1974a,b) [880]; *H. kurilicus* Gurjanova, 1962 (Kudrjaschov, 1972) (Kudrjaschov & Zejagintsev, 1975) [280]; *H. longimanus* (Stebbing, 1888) (= *H. africana* K.H. Barnard, 1955) (Gurjanova, 1951) (Griffiths, 1975) [426 + B]; *H. macrocephalus* Bellan-Santini, 1972b [878]; *H. major* (K.H. Barnard, 1932) (Andres, 1983) [870 + B]; *H. massiliensis* Bellan-Santini, 1965 [348]; *H. mercatoris* Pirlot, 1939 [441]; *H. multidentatus* Schellenberg, 1925a [445]; *H. nasutus* Stephensen, 1923b, 1940b (Gurjanova, 1951) [209B]; *H. normalis* (K.H. Barnard, 1955) (= *H. rotundipleura* Ledoyer, 1973a, 1978a) (Griffiths, 1975) (Ledoyer, 1979a, 1986) [698 + B]; *H. oculatus* Chevreux & Fage, 1925 (Ledoyer, 1968, 1977) (Krapp-Schickel, 1971) [340 + B]; *H. onconotus* (Stebbing, 1908) (Schellenberg, 1926c, 1926a, as *Tryphosa*) (Griffiths, 1975) (Ledoyer, 1986) [743 + B]; *H. pacificus* Gurjanova, 1962 (Hirayama, 1985c) [286]; *H. propinquus* Sars, 1895 (= *H. squamosus* Stebbing, 1894) (Gurjanova, 1962), *H. p. sibiricus* Gurjanova, 1962, *H. p. eous* Gurjanova, 1962, *H. p. petschoricus* Bryazgin, 1974a [200 + B]; *H. punctatus* Gurjanova, 1962 [280 + B]; *H. reticulatus* Stephensen, 1923b (Gurjanova, 1951) [209B]; *H. robustus* Sars, 1895 (Chevreux, 1927) (Gurjanova, 1951) [216 + B]; *H. rylovi* Gurjanova, 1933b, 1935b, 1951 [292]; *H. serratipes* Stephensen, 1923b (Gurjanova, 1951) [209B]; *H. serratus* Holmes, 1903, 1905 (= *H. exiguus* Stimpson, 1853, *nomen oblitum*) (Gurjanova, 1962) (Steele, 1969) (Bousfield, 1973) [260]; *H. similis* Schellenberg, 1925a [447]; *H. strages* J.L. Barnard, 1964a [502A]; *H. striolatus* Stephensen, 1923b (Gurjanova, 1951) [209B]; *H. subrobustus* Hurley, 1963 (J.L. Barnard, 1971b) [270 + B]; ?*H. tasmanicus* J.L. Barnard, 1961a [818A]; *H. tenax* J.L. Barnard, 1966a [373]; ?*H. tracatrix* J.L. Barnard, 1971b [310A]; *H. tunisiacus* Stephensen, 1915 [344]; *H. zetesimus* Hurley, 1963 [376]; species, *H. exiguus* identification of Thomson, 1882 [*H. exiguus* Stimpson, 1853, now *nomen oblitum*, see *H. serratus*] [776]; species, (gaped *H. denticulatus* identification of J.L. Barnard, 1971) [268].

Habitat and distribution. Marine, coldwater and submergent, cosmopolitan, 0-4400 m, 49+ species.

Hirondellea Chevreux

Figs 90V, 93B

Hirondellea Chevreux, 1889a: 285.
Tetronychia Stephensen, 1923b: 63 (*Tetronychia abyssalis* Stephensen, 1923b, original designation).

Type species. *Hirondellea trioculata* Chevreux, 1889a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, both strong in projection, blunt. Incisor ordinary, molar weakly simple, large, conicolaminate or subconical, setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose, in adults setae sickle shaped; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2, tapering or subrectangular. Gnathopod 1 short, strongly subchelate, palm transverse, sometimes chelate, article 5 subequal to or longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with or without large notch. Uropod 3 almost aequiramous, ordinary, peduncle ordinary, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Eyes when present diffuse, present on the top and sides and forming a sickle shape from lateral view; inner plate of maxilla 1 with falcate or sickle setae in adults; medial apex of palp on maxilla 1 toothed; plates of maxilla 2 short and stout; accessory gill on coxae 5-6 (*H. antarctica*, *H. gigas*).

Sexual dimorphism. Flagellum of male antenna 1 proliferate and more elongate (*H. gigas*); articles 4-5 of antenna 2 with anterior male armament tufts, flagellum elongate (*H. gigas*).

Variables. Eyes forming sinuous upside-down question mark or divided into 3 parts, 2 side and 1 top; article 1 of antenna 1 carinate (*H. dubia*); article 1 of accessory flagellum flat (*H. dubia*); setae on inner plate of maxilla 1 not sickle-shaped, just thick (*H. gigas*); outer plate of maxilliped smaller than in type (*H. gigas*); dactyl of gnathopod 1 very long (*H. fidenter*), with spinules (*H. fidenter*), with teeth and setae (young *H. gigas*), corner of palm projecting (chelate) (*H. abyssalis, H. antarctica*); inner ramus of uropod 3 slightly shortened (*H. gigas*); telson short (*H. brevicaudata, H. gigas*), cleft weak (*H. abyssalis, H. brevicaudata*).

Relationship. Differing from *Euonyx* in the short chela of gnathopod 1. From *Opisa* and *Cheirimedon* in the feeble gnathopod 1 and more equally extending rami of uropod 3. From *Adeliella* in the longer and more deeply cleft telson, longer rami of uropods 1-2, better armed maxillae, more conicolaminate molar and stronger lobe of coxa 4. From *Aristiopsis* in the unlobate wrist of gnathopod 1 and longer telson. From *Paralicella* and *Alicella* in the short article 3 of gnathopod 1 and the poor medial setosity on the inner plates of maxillae 1-2. From *Eurythenes* in the weak article 1 of antenna 2, larger head, and fewer setae on the inner plate of maxilla 1. From *Ambasiopsis* in the lack of a differentially produced labrum and larger head.

Species. *Hirondellea abyssalis* (Stephensen, 1923b) [209B]; *H. antarctica* (Schellenberg, 1926a) (K.H. Barnard, 1930) (Birstein & Vinogradov, 1960) (Andres, 1983) [870 + B + ?523A]; *H. brevicaudata* Chevreux, 1910a (Chevreux, 1935) [231A]; *H. dubia* Dahl, 1959 (Birstein & Vinogradov, 1960) [390A = 714,715,523]; *H. fidenter* J.L. Barnard, 1966a [310B]; *H. gigas* (Birstein & Vinogradov, 1955, 1958, 1960) (Dahl, 1959) (Gurjanova, 1962) (Hessler, *et al.*, 1978) (Kamenskaya, 1981a) [390A = Philippine, Marianas, Kurile Trenches only]; *H. trioculata* Chevreux, 1889a (Chevreux, 1900a) (Stebbing, 1906) [304B].

Habitat and distribution. Marine, Antarctica shallow and cosmopolitan abyssal and hadal, 170-10, 190 m (deepest amphipod record, *H. gigas*, Philippine Trench), 7 species.

Ichnopus Costa

Figs 89L, 90J, 91M, 92K, 95P

Ichnopus Costa, 1853: 169.–Costa, 1857: 188.–Lincoln, 1979a: 94.

Type species. *Ichnopus taurus* Costa, 1853, monotypy.

Diagnosis. Of scopelocheirin form. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, not prominent, separate, labrum slightly dominant in size and projection, blunt. Incisor ordinary, molar simple, small, conicolaminate or subconical, setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly, and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl small, shrouded in setae; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 with (type) or without large notch. Uropod 3 ordinary, peduncle slightly elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Antenna 1 article 1 (or 2) with ventral tooth, mandibular palp article 3 sickle-shaped; lower lip without medial gap; article 3 of gnathopod 1 elongate; dactyl of gnathopod 1 with inner brush; article 6 of pereopods 3-4 not elongate; pereopod 7 longer than pereopod 6; rami of uropod 3 very setose in both sexes; gills pleated.

Sexual dimorphism. Male eyes enlarged; primary flagellum of antenna 1 with callynophore; antenna 2 flagellum elongate, articles bead-like and calceoliferous, articles 4-5 of peduncle swollen, with anterior male tufts; female of *I. spinicornis* also with male-like antenna 2.

Variables. Antenna 2 of male and female alike or female with male sexual attributes (*I. spinicornis*); dactyl of gnathopod 1 poorly shrouded, visible (*I. nossibeensis*); gnathopod 2 not minutely subchelate (*I. nosibeensis*); article 2 on pereopod 5 indentured like *Lucayrina* (*I. pseudoserratus*); notch on inner ramus of uropod 2 weak or absent (*I. pelagicus*); uropod 3 not setose (*I. pseudoserricrus*).

Relationship. Resembling scopelocheirins, but either maxilla 1 not medially setose, or gnathopod 1 dactyl visible and brush small, or mandibular palp article 3 sickle-shaped and bent strongly.

Differing from scopelocheirins, especially *Aroui* and *Scopelocheirus*, in the non-chelate gnathopod 2, much more visible dactyl of gnathopod 1, and lack of medial setae on maxilla 1. From *Paracallisomopsis* in the elongate article 3 of gnathopod 1, lack of constriction on the inner ramus of uropod 2, long antennae, and sickle-shaped article 3 of the mandibular palp. From *Socarnoides* in the longer telson with deeper cleft, the tooth on antenna 1, brushy dactyl of gnathopod 1, rounded outer plate of the maxilliped, and the long rami of uropod 3. From *Menigratopsis* in the strongly setose rami of uropod 3, brushy dactyl of gnathopod 1, tooth on antenna 1, long antennae, and long pereopods 5-7. From *Paronesimus* in the non-palmed gnathopod 1 with brushy dactyl, setose rami of uropod 3, small dactyl of gnathopod 2, and the deeply cleft telson. From *Menigrates* in the elongate telson, brushy dactyl of gnathopod 1, tooth on antenna 1, and sickle-shaped article 3 of the mandibular palp. From *Socarnes* in the brushy dactyl of gnathopod 1 and tooth of article 1 on antenna 1.

See *Cicadosa* and *Lucayarina*.

Species. *Ichnopus nossibeensis* Ledoyer, 1986 [698N]; *I. pelagicus* Schellenberg, 1926c (?= *I. longicornis* Birstein & Vinogradov, 1960, as *Socarnes*) (Schellenberg, 1929b) (Birstein & Vinogradov, 1964) [600N]; *I. pseudoserricrus* Ledoyer, 1986 [698N]; *I. spinicornis* Boeck, 1861 (= *I. calceolatus* Heller, 1867) (= *I. minutus* Boeck, 1876) (Sars, 1895) (Chevreux & Fage, 1925) (Gurjanova, 1951) (Lincoln, 1979a) (Ledoyer, 1986) [355 + B]; *I. taurus* Costa, 1853 (= *I. affinis* Heller, 1867) (= *I. longicornis* Norman, 1869a) (= *I. macrobetomma* Stebbing, 1917b) (?= *I. serricrus* Walker, 1909b) (Spandl, 1924a) (Chevreux & Fage, 1925) (Cecchini & Parenzan, 1935) [355 + 743 + ?600].

Habitat and distribution. Marine, cosmopolitan in low latitudes (50° or less), coming up in open trawls but probably mostly epipelagic, 0-300 (3503) m, 5 species.

Izinkala Griffiths

Izinkala Griffiths, 1977b: 115.

Type species. *Izinkala fihla* Griffiths, 1977b, original designation.

Diagnosis. Mouthparts forming quadrate bundle, some parts styliform. Epistome minutely produced. Incisor ordinary (with inner and outer sharp wing teeth), molar absent; palp attached strongly distal. Inner plate of maxilla 1 [?naked or absent] [outer plate undescribed]; palp 1-articulate. Inner and outer plates of maxilliped obsolete, palp long and thin, strongly exceeding outer plate, dactyl well developed, tumid. Coxa 1 strongly shortened, almost obsolete, fully covered by coxa 2. Gnathopod 1 elongate, filiform, chelate, palm transverse, article 5 much longer than 6, dactyl small, stubby, grotesque; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 very short, peduncle very short and broad, inner ramus weakly to strongly shortened, outer ramus 2-articulate. Telson elongate, entire.

Additional characters. Head small, article 1 of antenna 1 with sharp distoventral tooth, article 2 with large nasiform distodorsal tooth, article 3 short, article 4 tumid and brushy (long, thick aesthetascs), both flagella 3-articulate; article 5 of antenna 2 much shorter than 4, flagellum 3-articulate; lower lip and maxillae poorly identified, apparently palp of maxilla 1 1-articulate, with 1 apical spine; maxilla 2 with flabellate inner plate and thinner outer plate each with 1 seta; gnathopod 1 strongly filiform, article 3 very elongate, palm protruding, defined by large spine, dactyl stubby, large, grotesque; urosomite 1 with nasiform dorsal keel; uropod 3 partly enveloped by urosomite 3, peduncle very short and broad, outer ramus with exaggerated apical tooth on article 1, article 2 spiniform; telson partly enveloped by urosomite 3, elongate, narrow, entire, with 2 apical and 2 dorsal giant spines.

Variables. Uropod 3 with subequal rami, article 2 absent on outer ramus (Ledoyer, 1986).

Relationship. Resembling a stenothoid (thaumatelsonin), especially in the giant spines of the telson and nasiform process on antenna 1 and shape of maxilliped, with plates obsolete.

Differing from *Kerguelenia* in the obsolescent coxa 1, nasiform article 2 of antenna 1, distinct incisor, longer rami of uropod 3 and weakly subchelate gnathopod 1. From *Lepidepecreum* in the obsolescent coxa 1, reduced uropod 3, uncleft telson, filiform gnathopod 1, and degenerate mouthparts.

Rather similar to *Clepidecrella* but differing in more filiform gnathopod 1 with article 3 elongate, obsolescent coxa 1, fully obsolescent plates of the maxillipeds, strange telson with stenothoid spines and broad article 2 of pereopod 5 (thin in *Clepidecrella*).

Species. *Izinkala fihla* Griffiths, 1977b (Ledoyer, 1986) [621B].

Habitat and distribution. Marine, off southern Africa, 200-680 m, 1 species.

Kakanui Lowry & Stoddart

Kakanui Lowry & Stoddart, 1983a: 309.

Type species. *Kakanui punui* Lowry & Stoddart, 1983a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, differentially produced, prominent, coalesced, epistomal part strongly dominant in projection, blunt. Incisor ordinary, molar simple, small, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (1) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl small. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with notch. Uropod 3 short peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, entire.

Additional characters. Accessory flagellum 2-articulate; article 1 of mandibular palp elongate; pleopodal rami with only 4 articles, peduncles expanded basally; article 2 on outer ramus of uropod 3 elongate.

Relationship. Differing from *Lysianassa* in the presence of articulate spines on the palp of maxilla 1, the 'large telson' (in relation to urosome), and the 2-articulate outer ramus of uropod 3. From *Lysianopsis* in the articulate spines on the palp of maxilla 1. From *Paralysianopsis* 'in the simple gnathopod 1', and elongate article 1 of the mandibular palp.

Species. *Kakanui integricauda* (Stebbing, 1888) (= *Parambasia* species, Bellan-Santini & Ledoyer, 1974) (Lowry & Stoddart, 1983a) [810]; *K. punui* Lowry & Stoddart, 1983a [840 + 780].

Habitat and distribution. Marine, austral islands and South Australia, 0-100 m, 2 species.

Kerguelenia Stebbing

Figs 88G, 90C, 91J, 92O

Kerguelenia Stebbing, 1888: 1219.–Stebbing, 1906: 11.

Type species. *Kerguelenia compacta* Stebbing, 1888, monotypy.

Diagnosis. Mouthparts forming quadrate bundle, some styliform. Labrum and epistome continuous, not differentially produced, prominent, [?coalesced, projection blunt]. *Incisor absent*; molar absent; palp attached at distal end of mandible. Inner plate of maxilla 1 reduced and naked; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed (type only), palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, but tapering. Gnathopod 1 elongate, thin, flagelliform, simple, articles 5 and 6 subequal, dactyl large, weakly shrouded in setae; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, often both very elongate and linear, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle short, inner ramus slightly shortened or absent, outer ramus 1 or 2-articulate. Telson ordinary to short, entire.

Additional characters. Incisor absent; outer plate of maxilla 1 with 6 or fewer spines; plates of maxilla 2 small but well setose; maxillipedal palp almost filiform, dactyl elongate; article 3 of gnathopod 1 elongate; posteroventral lobe of coxa 4 immense; article 2 of pereopods 5-6 linear at least basally, article 4 widely expanded.

Sexual dimorphism. Male antenna 1 article 3 brushy (*K. borealis*).

Variables. Article 1 of antenna 1 carinate (*K. adeliensis, K. antarctica, K. borealis, K. glacialis*), not carinate (*K. compacta*); inner plate of maxilla 2 especially small (*K. adeliensis, K. borealis*); inner plate of maxilliped rounded (*K. antarctica, K. glacialis*), outer plate no larger than inner plate and both plates very reduced (*K. borealis, K. eoa*); dactyl of gnathopod 1 not shrouded (*K. macropoda*); article 2 of pereopod 5 dilated (*K. glacialis, K. eoa, K. palpalis*), not dilated (*K. adeliensis, K. antarctica, K. compacta*), nasiform (*K. borealis, K. reducta*); article 2 of pereopod 6 dilated (*K. macropoda, K. microphthalma*); uropod 3 parviramous (*K. b. japonica*); with 1 ramus of 1 article (*K. compacta, K. eoa*), with reduced ramus fused to peduncle (*K. reducta*), with 2 small rami, outer 2-articulate *K. borealis*).

Oddities. *Kerguelenia palpalis* with stout palp of maxilliped and parviramous uropod 3.

Relationship. Close to *Clepidecrella* but differing in loss of incisor, more flagellate gnathopod 1 and elongate article 3 of gnathopod 1.

Differing from *Paralysianopsis* and *Parawaldeckia* in the loss of incisor, reduction of maxillae and plates of maxillipeds and reduction of uropod 3. From *Azotostoma* in the tapering though large coxa 1, loss of incisor, reduced plates of the maxillipeds, reduced maxillae and reduced rami of uropod 3. From *Lysianassa* and allies in the elongate article 3 of gnathopod 1, flagellate gnathopod 1 and weak uropod 3. From *Onesimoides, Nannonyx*, and *Paronesimoides* in the simple gnathopod 1 and reductions in mouthparts. From *Menigrates* in the flagellate gnathopod 1 with elongate article 3, uncleft telson, and reduced mouthparts and uropod 3. From *Acidostoma* and allies in the loss of incisor and much reduced outer plate of the maxilliped. From *Scopelocheirus* and allies in the loss of incisor, reduction of maxillipedal plates and size of maxillae, and reduction of urosome, uropod 3 and telson.

Species. *Kerguelenia adeliensis* Bellan-Santini, 1972b [878]; *K. antarctica* K.H. Barnard, 1930 [876]; *K. borealis* Sars, 1895 (Stephensen, 1935a) (Gurjanova, 1951) [238 +B]; *K. b. japonica* Gurjanova, 1962 [391 + B]; *K. b. ochotica* Gurjanova, 1962 [283]; *K. compacta* Stebbing, 1888 (Bellan-Santini & Ledoyer, 1974) [851]; *K. eoa* Gurjanova, 1962 [281]; *K. glacialis* Schellenberg, 1926a [881]; *K. macropoda* Ledoyer, 1986 [698]; *K. microphthalma* Ledoyer, 1986 [618A]; ?*K. palpalis* K.H. Barnard, 1932 [870B]; *K. reducta* Ledoyer, 1977 [348].

Habitat and distribution. Marine, probably cosmopolitan (not yet found in most of Indo-Pacific deeps), mostly coldwater and submergent (except *K. macropoda, K. reducta*), 15-3700 m, 10 species.

Koroga Holmes

Fig.92A

Koroga Holmes, 1908: 502.

Type species. *Koroga megalops* Holmes, 1908, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, neither dominant in size nor projection, blunt. Incisor ordinary, molar simple, small, conicolaminate, setulose; palp attached slightly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 strongly enlarged, strongly subchelate, palm transverse, chelate, article 5 much shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, entire or emarginate.

Additional characters. Head 'large'; dactyl of maxilliped elongate, as long as article 3; coxa 1 expanded anteroventrally (versus *Pseudokoroga*), spines on outer plate of maxilla 1 widely disjunct (versus *Orchomene* complex).

Relationship. The large head, proximal mandibular palp, more articulose flagella and thinner article 4 of pereopods 5-7 distinguish this genus from such genera as *Figorella, Pachynus, Pachychelium* and *Prachynella*. Differing from *Podoprionella* in the non-chelate gnathopod 1, untoothed pereopods 5-7, and longer palp of the maxilliped. From *Sophrosyne* in the large head, entire telson, and robust maxillipeds.

See *Pseudokoroga*. See above for *Orchomene*.

Species. *Koroga megalops* Holmes, 1908 (K.H. Barnard, 1937) (Thorsteinson, 1941) (Gurjanova, 1962) (J.L. Barnard, 1964d) [420AB].

Habitat and distribution. Marine, cosmopolitan, abysso and bathypelagic, 500-2200 m, 1 species.

Kyska Shoemaker

Kyska Shoemaker, 1964: 391.

Type species. *Kyska dalli* Shoemaker, 1964, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?differentially produced, separate, labrum slightly dominant in size and projection, blunt]. Incisor ordinary, molar simple, small, conicolaminate, setulose; palp attached strongly distal to molar. Inner plate of maxilla 1 weakly (3) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 enlarged, strongly chelate, article 5 shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, deeply cleft.

Relationship. Like *Anonyx* but gnathopod 1 chelate.

See *Gainella*.

Species. *Kyska dalli* Shoemaker, 1964 [273].

Habitat and distribution. Marine, Alaska, Kyska Island, 11-15 m, 1 species.

Lepidepecreella Schellenberg

Fig.95J

Lepidepecreella Schellenberg, 1926a: 281.–J.L. Barnard, 1966a: 68 (key).

Paracyclocaris K.H. Barnard, 1930: 321 (*Paracyclocaris bidens* K.H. Barnard, 1930, original designation).

Type species. *Lepidepecreella ctenophora* Schellenberg, 1926a, monotypy.

Diagnosis. Of cyphocarin proportions with tall slightly deformed head bearing huge anterior keel. Coxae 1-2 strongly shortened and covered by coxa 3, coxae 3-4 long, coxa 5 shorter but large. Antennae of medium length, primary flagellum of antenna 1 with callynophore, accessory flagellum elongate. Mouthparts forming [?conical bundle], some styliform. Labrum and epistome continuous, not differentially produced, prominent, coalesced, blunt. Incisor ordinary, molar simple, large, often conicolaminate or subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 naked; palp 1-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Gnathopod 1 elongate, simple, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, both elongate, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle elongate, inner ramus strongly shortened or absent, outer ramus 1 or 2-articulate. Telson short, entire.

Additional characters. Above epistome head with large medial anterior keel; dactyl of gnathopod 1 elongate, combed and with 2 longer apical setae; article 4 of pereopods 5-7 very strongly expanded and posteroventrally lobate; pleonites 3-4 carinate or toothed dorsally.

Variables. Differences minor among species; mandibular palp poorly setose (type, *L. tridactyla*), well setose (others); apex of dactyl on gnathopod 1 with 2 setae, together forming trifid fork (*L. tridactyla*), article 6 of gnathopod 1 longer than 5, or article 5 equals 6; article 2 of pereopod 3 linear (type, *L. emarginata*, *L. cymba*), broad (*L. bidens*), without nasiform lobe (type, etc.), with posterodistal nasiform process (*L. bidens*); inner ramus of uropod 3 present (type), absent (*L. bidens, L. emarginata, L. tridactyla*), outer ramus of uropod 3 1 or 2-articulate, long or short; telson emarginate (*L. emarginata*).

Relationship. Among cyphocarins characterised by large anterior keel on head, elongate almost flagelliform gnathopod 1 with long or setulose dactyl, small or absent inner ramus of uropod 3, uncleft telson and greatly expanded article 4 of pereopods 5-7.

Differing from *Azotostoma* in reduced coxae 1-2 of cyphocarin form, short inner ramus of uropod 3, and large well-developed maxillipedal palp. From *Phoxostoma* in the cyphocarin body form with coxae 1-2 reduced, inner ramus of uropod 3 reduced, and head with keel. From *Cebocaris* in the simple pereopods, elongate gnathopod 1 with elongate dactyl, better developed antennae, smaller coxa 5 and strongly expanded article 4 of pereopods 5-7. From *Crybelocyphocaris* in the unfused urosome, elongate gnathopod 1 and long coxae. From *Mesocyphocaris* and *Metacyphocaris* in the uncleft telson, shorter outer ramus of uropod 3 and the elongate gnathopod 1.

See *Cyclocaris*.

Species. *Lepidepecreella bidens* (K.H. Barnard, 1930) [779N]; *L. charno* J.L. Barnard, 1966a [310B]; *L. ctenophora* Schellenberg, 1926a [881B]; *L. cymba* (Goes, 1866) (Stephensen, 1931b, 1935a) (Gurjanova, 1951) [220 + B]; *L. emarginata* Nicholls, 1938 [878B]; *L. ovalis* K.H. Barnard, 1932 [833 + B]; *L. pamanzi* Ledoyer, 1986 [618A]; *L. tridactyla* Bellan-Santini, 1972b [878B].

Habitat and distribution. Marine, cold water, bipolar, primarily Antarctica and Arctica, Mediterranean, tropically submergent in bathyal basins, but night surface New Zealand, 0-2500 m, 8 species.

Lepidepecreoides K.H. Barnard

Fig.88F

Lepidepecreoides K.H. Barnard, 1931a: 426.–K.H. Barnard, 1932: 62.

Type species. *Lepidepecreoides xenopus* K.H. Barnard, 1931a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, not prominent, separate, labrum slightly dominant in size and projection, blunt. Incisor ordinary, molar triturative, large; palp attached opposite molar. Inner plate of maxilla 1 weakly (3-2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, subchelate, palm oblique, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus scarcely shortened, outer ramus [? 2-articulate (*L. nubifer*)]. Telson elongate, deeply cleft.

Additional characters. Head small; accessory flagellum very short, 2-articulate; coxa 4 with posteroventral lobe very weak; coxa 5 as long as 4, fitting excavate margin of 4 very tightly; article 2 of pereopod 5 with blunt or sharp spur posteriorly and blunt spur (lobe) posteroventrally; integument indurated; pereonites 5-7 with lateral knob (unknown in *L. nubifer*).

Variables. Head broadly subtruncate (weakly concave) anteriorly, ocular lobe not projecting beyond rostrum, no antennal sinus below (type), with ocular lobe (*L. nubifer*); mandibular incisor faintly denticulate (*L. nubifer*); both spurs of pereopod 5 sharp (*L. nubifer*); outer ramus of uropod 3 with weak article 2 (*L. nubifer*, ?possibly present in type).

Relationship. Differing from *Valettiopsis* in the weakly setose maxillae and unshortened coxa 1. From *Valettia* in the non-chelate gnathopod 1, long anterior coxae, large coxa 5, and lack of notch on the inner ramus of uropod 2. From *Hippomedon* in the long narrow coxa 4, unexpanded coxa 1, deeply truncate head, absence of tooth on epimeron 3, presence of dorsal process on pleonite 4, and spurred pereopod 5. From *Psammonyx* in the long coxa 5, and teeth on both pereopod 5 and urosome. From *Paronesimus* in the triturative molar, presence of spurs on pereopod 5 and the more strongly subchelate gnathopod 1.

Very close to *Tryphosoides*, situation unclear, but latter differing in lack of spurs on pereopod 5 and presence of tooth on epimeron 3.

Bearing many characters in common with certain species of *Uristes* but differing in long coxa 1, unshortened carpus of gnathopod 1, and teeth on pereopod 5 and urosomite 1.

Species. *Lepidepecreoides nubifer* J.L. Barnard, 1971b (Griffiths, 1977a) [310A + 701A]; *L. xenopus* K.H. Barnard, 1931a, 1932 [865B].

Habitat and distribution. Marine, probably cosmopolitan, southpolar or deep cold water, 135-2860 m.

Lepidepecreum Bate & Westwood

Figs 86G, 87A, 89F, 93F

Lepidepecreum Bate & Westwood, 1868: 509.–Gurjanova, 1951: 274 (key).–Lincoln, 1979b: 72.

Type species. *Lepidepecreum carinatum* Bate & Westwood, 1868, selected by Stebbing, 1888.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small to medium, conicolaminate or subconical or setulose or smooth; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened and partly covered by coxa 2, (type) or not. Gnathopod 1 subchelate, palm oblique, articles 5 and 6 variable, either dominant, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 almost aequiramous, ordinary, peduncle scarcely elongate, outer ramus 2-articulate. Telson elongate, deeply cleft or rarely entire.

Additional characters. Body and antenna 1 carinate, telson spinose.

Sexual dimorphism. Male eyes slightly enlarged; antennae 1-2 more strongly armed than in female; primary flagellum on antenna 1 with callynophore; flagellum of antenna 2 elongate and calceolate; coxae 1-4 relatively smaller than in female; pleosome enlarged; uropod 3 more setose and article 2 on outer ramus often vestigial or absent.

Variables. Cuticle often punctate or ornamented (*L. comatum*, etc.); article 1 on antenna 1 not carinate (*L. chevreuxi*, *L. cingulatum*, *L. tawalae*, *L. typhlops*, etc.); primary flagellum on antenna 1 without callynophore (several species); accessory flagellum absent (type), 1+articulate (others); molar well triturative (*L. foraminiferum*); spines on outer plate of maxilla 1 occasionally reduced or fused together (*L. clypodentatum*); article 2 of pereopods 5-6 heavily serrate (*L. chevreuxi*), of 5-7 heavily serrate (*L. foraminiferum*); articles 3-7 of pereopod 7 together reduced in size (*L. clypeatum*, *L. clypodentatum*, etc.); only urosome carinate (*L. nautilus*, etc.); outer ramus of uropod 3 1-articulate (*L. vitjazi* identification of Hirayama, 1985c); telson not very elongate (*L. cingulatum*); telson weakly cleft (*L. carinatum*), or uncleft (*L. infissum*); telson very spiny (*L. eoum*, *L. nautilus*, etc.), not spiny (type, *L. umbo*, etc.).

Relationship. A probable polyphyletic and artificial genus differing from *Orchomene* in the advancement of diverse characters, none being shared among all species: carinate body, carinate antenna 1, reduced accessory flagellum, elongate or spiny telson.

Species. See Gurjanova, (1951); Stephensen (1925a); *L. alectum* Gurjanova, 1962 [286]; ?*L. annulatum* (Bate, 1862) (Gurjanova, 1962) (but see Steele, 1969, ? = *Orchomene*) [395]; *L. chevreuxi* Gurjanova, 1938b (= *L. serratum* Chevreux, 1925, homonym) [441]; *L. cingulatum* K.H. Barnard, 1932 (Thurston, 1974a,b) [875]; *L. clypeatum* Chevreux, 1888b, 1900a (Chevreux & Fage, 1925) (Griffiths, 1975) [426]; *L. clypodentatum* J.L. Barnard, 1962d (Griffiths, 1975) [701B]; *L. comatum* Gurjanova, 1962 [280 + B]; *L. crypticum* Ruffo & Schiecke, 1977 [340]; *L. eoum* Gurjanova, 1938b, 1951, 1962 (Kudrjaschov, 1972) [280 + B]; [*L. filiger* (Stimpson, 1864) [dubious] [269]]; *L. foraminiferum* Stebbing, 1888 (Nayar, 1959) [851]; *L. garthi* Hurley, 1963 (J.L. Barnard, 1971b) [270 + B]; *L. gurjanovae* Hurley, 1963 (J.L. Barnard, 1966b, ?1969a) [270 + B]; *L. infissum* Andres, 1983 [871]; *L. kasatka* Gurjanova, 1962 [286]; *L. longicornis* (Bate & Westwood, 1862, 1863, 1868) (= *L. carinatum* Bate & Westwood, 1868, Sars, 1895) (= *L. mirabile* Meinert, 1893) (Chevreux & Fage, 1925) (Ruffo & Schiecke, 1977) (Lincoln, 1979a) [352]; *L. madagascarensis* Ledoyer, 1986 [698N]; *L. nautilus* Gurjanova, 1962 [280+B]; *L. nudum* Imbach, 1969 [656]; *L. rostratum* Gurjanova, 1962 [231B]; *L. sagamiensis* Gamo, 1975 [395B]; *L. serratum* Stephensen, 1925a, 1940b [240B]; *L. subclypeatum* Ruffo & Schiecke, 1977 [345]; *L. twalae* Griffiths, 1974c, 1975 [743]; *L. typhlops* Bonnier, 1896 (Stephensen, 1925a) (Chevreux, 1927) [355B]; *L. umbo* (Goes, 1866) (Sars, 1895) (Stephensen, 1935a, 1944a) (Gurjanova, 1951) [200 + B]; *L. urometacarinatum* Andres, 1985 (= *L. carinatum* = homonym, Andres, 1983) [870 + B]; *L. vitjazi* Gurjanova, 1962 (Nagata, 1965a) (Hirayama, 1985c) [280].

Habitat and distribution. Marine, cosmopolitan but mostly northern hemisphere and tropics, mostly coldwater, 0-1861 m, 28 species.

Lepiduristes Barnard & Karaman

Lepiduristes Barnard & Karaman, 1987: 866.

Type species. *Uristes* (?) *lepidus* J.L. Barnard, 1964a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, not produced, epistome slightly dominant in size. Incisor ordinary, molar weakly triturative, large, palp attached opposite molar. Inner plate of maxilla 1 weakly (?2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 tapering, slightly shortened and partly covered by coxa 2. Gnathopod 1 poorly subchelate, palm oblique, article 5 scarcely longer than 6, dactyl large, article 6 of gnathopod 2 slightly longer than article 5, ordinary, propodus scarcely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, deeply cleft.

Additional characters. Head peculiar, with lateral lobe 'hanging' like appendage and hiding base of antenna 2. Article 1 of antenna 1 thickened and carinate. Article 3 of gnathopod 1 elongate.

Sexual dimorphism. Unstudied.

Relationship. Differing from *Uristes*, *Lepidepecreum* and *Tryphosella*, and most other similar lysianassids in the elongate article 3 of gnathopod 1. Differing from *Tmetonyx* in the strange head with lateral lobe hiding base of antenna 2, in the greatly enlarged article 1 of antenna 1, the distinctly tapering coxa 1, and the flat anterior margin of the prebuccal parts.

The almost complete loss of ventral cephalic integrity is not sufficient for generic differentiation because this is a feature of *Uristes perspinis* and is found moderately well developed in most of the taxa formerly assigned to *Tryphosa* or *Tryphosella*. The attachment of antenna 2 into a strong anteroventral cephalic notch is typical of most lysianassids but in the *Uristes-Tryphosa-Tryphosella* complex this cephalic support is weakened or lost and the base of antenna 2 is shoved posteriorly and has only weak cephalic envelopment.

Species. *Lepiduristes lepidus* (J.L. Barnard, 1964a) [404A].

Habitat and distribution. Marine, Caribbean Sea, 5419-5497 m, 1 species.

Lucayarina Clark & Barnard

Lucayarina Clark & Barnard, 1985: 243.

Type species. *Lucayarina catacumba* Clark & Barnard, 1985, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, separate, neither labrum nor epistome dominant in size, projection blunt. Incisor ordinary, molar triturative, large; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large, not shrouded in setae; article 6 of gnathopod 2 shorter than article 5, ordinary; propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary but peduncle elongate, inner strongly shortened, outer ramus 2-articulate. Telson ordinary, deeply cleft.

Additional characters. Laciniae mobiles absent; article 2 of pereopods 5-7 deeply indentured; outer plate of maxilliped uniformly spinose mediobasally to apex, spines weak, stubby; gills sac-like, not pleated, with small basal accessory lobe.

Relationship. Differing from *Glycerina* and *Ichnopus* in the less shrouded (scopelocheirin-type) gnathopod 1 and the strong cuspidation of *all* pereopods 5-7 article 2; additionally from *Ichnopus* in the lack of a tooth on antenna 1. From *Aroui* and *Menigratopsis* in the pereopodal teeth.

Species. *Lucayarina catacumba* Clark & Barnard, 1985 [481Z].

Habitat and distribution. Marine, Bahamas Islands, in blue holes (sea caves), 15 m, 1 species.

Lysianassa Milne Edwards

Figs 88H, 89D, 90I, 91F, 92E, 93J, 95E

Lysianassa Milne Edwards, 1830: 364.–Lincoln, 1979a: 100.–Lowry & Ruffo, 1984: 295.
Lysianax Stebbing, 1888: 681 [new name for *Lysianassa*, same type species] [new name superfluous].

Type species. *Lysianassa costae* Milne Edwards, 1830, selected by Boeck, 1876.

Taxonomy. We have now removed from this genus various species into the separate genera *Aruga*, *Arugella*, *Bonassa*, *Dartenassa*, *Dissiminassa*, *Falcanassa*, *Lysianassina*, *Lysianopsis*, *Macronassa*, *Pronannonyx* and *Shoemakerella*. We keep here the general references to problems with '*Lysianassas*' and any unassigned species.

Diagnosis. Typical. Mouthparts forming quadrate bundle. Labrum and epistome separate, differentially produced, prominent, labrum strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small, conicolaminate, setulose; palp attached strongly proximal to molar, article 1 short in type. Inner plate of maxilla 1 not setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 simple, articles 5 and 6 subequal, dactyl small; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 with (type) or without notch. Uropod 3 aequiramous, ordinary, peduncle elongate, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Outer plate of maxilla 1 with 11 spines; outer plate of maxilla 2 narrowed; gills pleated (at least in type).

Sexual dimorphism. Male eyes enlarged; antenna 2 elongate, articles 4-5 enlarged, with male tufts, uropod 3 setose.

Relationship. The basic '*Lysianassa*'.

Removals. *Lysianassa alba* Holmes, 1905, to *Lysianopsis*; *L. bonairensis* Stephensen, 1933d, to *Bonassa*; *L. coelochir* (Walker, 1904), to *Arugella*; *L. cubensis* (Stebbing, 1897), to *Shoemakerella*; *L. dartevillei* Ruffo, 1953b, to *Dartenassa*; *L. dissimilis* (Stout, 1913), to *Dissiminassa*; *L. ewa* J.L. Barnard, 1970a, to *Arugella*; *L. falcata* Stephensen, 1933a, to *Falcanassa*; *L. falklandica* K.H. Barnard, 1932, to *Aruga*; *L. heterodonta* (Pirlot, 1936b), to *Arugella*; *L. holmesi* (J.L. Barnard, 1955b), to *Aruga*; *L. hummelincki* Stephensen, 1933a, to *Lysianopsis alba*; *L. hypocrita* Ruffo, 1953b, to *Phoxostoma*; *L. indica* (Rabindranath, 1971c), to *Arugella*; *L. longicornis* Lucas, 1846, to *Lysianassina*; *L. macromera* (Shoemaker, 1916), to *Macronassa*; *L. minima* (Schellenberg, 1953), to *Proannonyx*; *L. nasuta* Dana, 1853, to *Shoemakerella*; *L. oculata* (Holmes, 1908), to *Aruga*; *L. pariter* J.L. Barnard, 1969a, to *Macronassa*; *L. subantarctica* (Schellenberg, 1931), to *Lysianopsis*; *L. variegatus* (Stimpson, 1856a), ? to *Phoxostoma*.

Species. See J.L. Barnard (1964c, 1966a,b, 1969b); K.H. Barnard (1932, 1937); Chevreux (1911d, 1927); Dickinson *et al.* (1980); Feeley & Wass (1971, ecology); Griffiths (1975); Gurjanova (1962); Ledoyer (1967b); [*L. brasiliensis* Dana, 1852a, 1853 (Bate, 1862) [unclarified] [751]]; *L. ceratina* (Walker, 1889) (Chevreux & Fage, 1925) (Lincoln, 1979b) (?Ledoyer, 1986) [352 + 685]; *L. cinghalensis* (Stebbing, 1897) (?= *L. urodus* Walker & Scott, 1903) (Sivaprakasam, 1968a) (Ruffo, 1969) [685]; *L. costae* Milne Edwards, 1830 (Lowry & Ruffo, 1984) [348]; [?*L. goesi* Jarzynsky, 1870, 1885 [*nomen nudum*]]; *L. insperata* Lincoln, 1979b [242] *L. latipes* Ledoyer, 1986 [698]; *L. pilicornis* (Heller, 1867) (= *L. bispinosa* Della Valle, 1893, Chevreux & Fage, 1925, Krapp-Schickel, 1969b, Karaman, 1973b) (Krapp-Schickel, 1974, 1976) [340]; *L. plumosa* Boeck, 1871b, 1876 (= *L. septentrionalis* Della Valle, 1893) (= *L. costae* identification of Sars, 1895) (?Chevreux & Fage, 1925) (Lincoln, 1979b) [352 + B]; [?*L. punctata* (Costa, 1851, 1851-53, 1857) (Cecchini & Parenzan, 1935) [unclarified] [348]]; species A, (= identification of *L. punctata* by Kunkel, 1910) [367]; species B, (= *Shoemakerella nasuta* identifications of Nayar, 1959, 1967; Sivaprakasam, 1968a; Ledoyer, 1986) [685]; species C, (= *L. variegata* identification of Ledoyer, 1986) [698].

Habitat and distribution. Marine, west Norway to Senegal, Mediterranean, Red Sea, South Africa into west Indian Ocean and to Brazil, 0-800 m, 7 species.

Lysianassina Costa

(*Lysianassina*) Costa, 1867: 8.

Type species. *Lysianax longicornis* Lucas, 1846, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome both equally produced, prominent, separate, labrum strongly enlarged, blunt. Incisor ordinary, molar simple, small; conicolaminate, subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 not setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with notch. Uropod 3 aequiramous, elongate, peduncle elongate, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Antenna 1 with tooth; outer plate of maxilla 2 narrowest.

Relationship. Differing from *Lysianassa* in the produced epistome.

Species. *Lysianassina longicornis* (Lucas, 1846) (= *L. spinicornis* Costa, 1853, 1857) (= *L. loricata* Costa, 1863, 1867) (= *L. filicornis* Costa, 1862, 1867) (Chevreux & Fage, 1925) (Krapp-Schickel, 1974) (Ledoyer, 1977) [340 + B].

Habitat and distribution. Marine Mediterranean ?to Red Sea and Indian Ocean, 0-540 m, 1 species

Lysianella Sars

Fig.94I

Lysianella Sars, 1883: 78.

Type species. *Lysianella petalocera* Sars, 1883, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in projection, blunt. Incisor ordinary, molar simple, obsolescent, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, strongly subchelate, palm oblique, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch(es). Uropod 3 aequiramous, ordinary, peduncle slightly elongate, outer ramus 2-articulate. Telson elongate, entire, (or cleft one fourth).

Additional character. Article 4 of antenna 2 tumid in both sexes.

Sexual dimorphism. Male body smaller and pleon more streamlined; eyes enlarged; primary flagellum on antenna 1 with callynophore; flagellum of antenna 2 elongate; pleopods enlarged.

Variables. Eyes absent (*L. mimica*); palm of gnathopod 1 weak (*L. mimica*); pleonite 3 produced dorsoposteriorly (*L. mimica*); notch on inner ramus of uropod 2 weak (*L. mimica*); telson cleft one fourth (*L. dellavallei*).

Relationship. Characterised by tumid article 4 on antenna 2 in both sexes. Differing from *Lysianassa* and relatives in the tumid article 4 of antenna 2 and the subchelate gnathopod 1 (but see *L. mimica*). From *Parawaldeckia* in the subequal rami of uropod 3 and the subchelate gnathopod 1. From *Paralysianopsis* in the better subchelate gnathopod 1 and blunt prebuccal projection (sharp in *Paralysianopsis*). From *Microlysias* in the dominant labrum, well-developed dactyl of the maxilliped and the uncleft telson. From *Pseudokoroga* in the discrete labrum and small hand of gnathopod 1.

Species. *Lysianella dellavallei* Stebbing, 1906 (= *L. petalocerus* Della Valle, 1893, homonym) (Ruffo, 1971) (Ledoyer, 1977) [340]; *L. mimica* J.L. Barnard, 1962d [416A]; *L. petalocera* Sars, 1883, 1895) (Stephensen, 1935a) (Gurjanova, 1951) [240I].

Habitat and distribution. Marine, Arctic, Mediterranean, deep sea of South Atlantic, 35-4050 m, 3 species.

Lysianopsis Holmes

Fig.95C

Lysianopsis Holmes, 1905: 475.

Type species. *Lysianopsis alba* Holmes, 1905, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small; conicolaminate, subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp article 2 slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 short, peduncle expanded, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, entire.

Additional character. Male antenna 2 not elongate (versus *Aruga*).

Relationship. See *Aruga*.

Species. *Lysianopsis alba* Holmes, 1905 (? = *L. hummelincki* Stephensen, 1933a, 1947, fide Hurley, 1963) (Shoemaker, 1933c) (Bousfield, 1973) [362]; *L. subantarctica* (Schellenberg, 1931) (Lowry & Stoddart, 1984a [864]; *L. tieke* Lowry & Stoddart, 1983a [844].

Habitat and distribution. Marine, western Atlantic Ocean from Cape Cod to the Caribbean Sea at Curacao, 0-20 m; Campbell Island, 2-23 m; and Magellan area, 11-91 m; 0-91 m; 3 species.

Macronassa n.gen.

Type species. *Aruga macromerus* Shoemaker, 1916, original designation.

Etymology. Named for roots in *Lysianassa* and *macromerus*.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome both produced, prominent, separate, blunt. Incisor ordinary, molar simple, conicolaminate, subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 short, peduncle expanded, inner ramus not or slightly shortened, outer ramus 1-articulate. Telson ordinary, entire.

Relationship. Differing from *Bonassa*, *Dartenassa* and *Phoxostoma* in the nonsetose uropod 1. From *Lysianassa* in the short plate-like peduncle of uropod 3.

Like *Arugella*, *Aruga*, *Falcanassa*, *Lysianassa*, *Lysianopsis* and *Shoemakerella*, but epistome produced.

Species. *Macronassa macromera* (Shoemaker, 1916) (J.L. Barnard, 1969a, 1979b [373]; *M. pariter* (J.L. Barnard, 1969a) [373].

Habitat and distribution. Marine, southern California to Gulf of California, intertidal, 2 species.

Martensia n.gen.

Type species. *Lysianassa martensi* Goes, 1866.

Etymology. Named for the type species.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, neither labrum nor epistome dominant. Incisor ordinary, molar simple, subconical, smooth; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; some spines on outer plate disjunct; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl small. Coxa 1 large and visible, not tapering. Gnathopod 1 short, strongly subchelate, palm oblique, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, propodus chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Relationship. Like *Centromedon* but coxa 1 quadrate, not tapering, and palm of gnathopod well developed. Differing from *Rifcus* in the deep cleft of the telson, stout gnathopod 1, obsolescent molar and presence of many setae on article 2 of mandibular palp. Differing from *Douniaella* in the well-setose inner plate of maxilla 2, the oddly armed outer plate of maxilla 1, poorly defined molar, and in the carpus of gnathopod 1 being as long as the propodus. Differing from *Uristes* in the more strongly reduced molar, smaller dactyl of maxilliped and non-tapering coxa 1.

Species. *Martensia martensi* (Goes, 1866) (= *M. caecus* Vosseler, 1889, fide Olerod, 1980, see *Centromedon typhlops*) (Steele, 1968) [295].

Habitat and distribution. Marine, Spitzbergen, 37-95 m, 1 species.

Menigrates Boeck

Figs 86E, 89I, 90M, 92U

Menigrates Boeck, 1871b: 113.–Lincoln, 1979a: 92.

Type species. *Anonyx obtusifrons* Boeck, 1861, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not differentially produced. Incisor ordinary, molar simple, obsolescent or absent; palp attached slightly proximal to molar (when present). Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 simple, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate, article 7 tiny. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson short, weakly cleft or emarginate.

Additional characters. Peduncular articles 2 and 3 of antenna 1 half or less as long as article 1 (versus *Waldeckia* and *Socarnes*); branchiae lacking accessory lobes in type species (versus *Waldeckia*).

Sexual dimorphism. Flagella of male antennae 1-2 longer than in female and furnished with calceoli.

Variables. Rami of uropod 2 subequal (*M. obesum*), unequal (*M. angustipes*).

Relationship. See *Paralibrotus* and *Menigratopsis*.

Species. *Menigrates angustipes* Gurjanova, 1962 [279]; *M. maslovi* Bryazgin, 1974a [238]; *M. obtusifrons* (Boeck, 1861) (= *M. brachycercus* Liljeborg, 1865a) (Sars, 1895) (Chevreux & Fage, 1925) (Stephensen, 1935a, 1944a) (Vader, 1978) (Lincoln, 1979a) [216 + I]; *M. spinirami* Gurjanova, 1936d, 1951, *M. s. japonica* Gurjanova, 1962 [200].

Habitat and distribution. Marine, cold northern seas, 7-200 m, occasionally on or in starfishes, 4 species.

Menigratopsis Dahl

Menigratopsis Dahl, 1945: 2.

Type species. *Menigratopsis svennilssoni* Dahl, 1945, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not differentially produced. Incisor ordinary, molar simple, large, setulose, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 simple, article 5 longer than 6, dactyl small; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Sexual dimorphism. [Unknown].

Relationship. Differing from *Menigrates* in the longer and more deeply cleft telson and the short propodus of gnathopod 1.

Species. *Menigratopsis svennilssoni* Dahl, 1945 (Vader & Johanssen, 1978) (Just, 1979) [216].

Habitat and distribution. Marine, The Sound between Denmark and Sweden and Norway and northwest Greenland, 11-210 m, 1 species.

Mesocyclocaris Birstein & Vinogradov

Mesocyclocaris Birstein & Vinogradov, 1964: 156.

Type species. *Mesocyclocaris gracilis* Birstein & Vinogradov, 1964, monotypy.

Diagnosis. Of cyphocarin form, [head ?tall, horizontally short, grotesque]. Flagella of antennae long, calceolate, flagellum on antenna 1 with callynophore, accessory flagellum absent. Mouthparts forming [?quadrate bundle]. Labrum and epistome [?continuous, not differentially produced, neither prominent]. Incisor ordinary, rakers present; molar absent; palp absent. Inner plate of maxilla 1 moderately (5) setose; palp 2-articulate, small, article 2 short. Inner poorly and outer plate of maxilliped well developed, palp scarcely exceeding outer plate, dactyl well developed. Coxae 1-2 small, strongly shortened and [?partly covered by coxa 3], coxa 4 narrow, long, weakly lobate and excavate. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, both very elongate and linear, propodus minutely subchelate. Uropod 3 ordinary, peduncle ordinary, aequiramous, outer ramus 1-articulate. Telson [unknown].

Additional characters. Note callynophore on flagellum of antenna 1 and calceoli; pereopods 3-7 prehensile, hands thickened and spiny, article 5 shortened on pereopods 3-6 [?7].

Relationship. Differing from *Metacyclocaris* in the reduction of coxa 2, the lack of both mandibular palp and accessory flagellum, the reduction of the palp on maxilla 1, the reduction of the inner plate on the maxilliped and the loss of article 2 on the outer ramus of uropod 3.

Species. *Mesocyclocaris gracilis* Birstein & Vinogradov, 1964 [613B].

Habitat and distribution. Marine, Arabian Sea, bathypelagic, less than 1500 m, 1 species.

Mesocyphocaris Birstein & Vinogradov

Mesocyphocaris Birstein & Vinogradov, 1960: 170.

Type species. *Mesocyphocaris longicaudatus* Birstein & Vinogradov, 1960, original designation.

Diagnosis. Of cyphocarin form, head tall, horizontally short, grotesque. Flagellum of antenna 2 short (2-articulate); accessory flagellum vestigial, 1-articulate. Mouthparts forming quadrate bundle. Labrum and epistome [?continuous, not differentially produced, neither dominant]. Incisor ordinary, rakers present, molar absent; palp attached to middle of mandible. Inner plate of maxilla 1 weakly (3) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl well developed. Coxae 1-2 small, strongly shortened and partly covered by coxa 3, coxa 4 largest, lobate, excavate. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, propodus minutely subchelate. Uropod 3 elongate, peduncle elongate, parviramous, inner ramus strongly shortened, outer ramus 2-articulate. Telson short, weakly cleft.

Additional characters. Pereopods 3-5 and less so pereopod 6 prehensile, hands thickened and spiny, article 5 very short.

Relationship. *Mesocyphocaris* differs from *Paracyphocaris* in the short telson, presence of rakers and the elongate uropod 3.

See *Metacyphocaris*, *Crybelocephalus*, *Crybelocyphocaris* and *Cebocaris*.

Species. *Mesocyphocaris longicaudatus* Birstein & Vinogradov, 1960, 1964 [600A].

Habitat and distribution. Marine, Indo-Pacific, abyssopelagic, less than 3420 m, 1 species.

Metacyclocaris Birstein & Vinogradov

Metacyclocaris Birstein & Vinogradov, 1955: 217.

Type species. *Metacyclocaris polycheles* Birstein & Vinogradov, 1955, original designation.

Diagnosis. Of weak cyphocarin form, [?head tall, horizontally short, grotesque]. Flagella of antennae long and calceolate, primary flagellum on antenna 1 with callynophore, accessory flagellum long, 3-articulate. Mouthparts forming quadrate bundle. Labrum and epistome [?continuous, not differentially produced, neither prominent]. Incisor ordinary, 2 rakers present; molar absent; palp very large, setose, attached strongly distal. Inner plate of maxilla 1 moderately (5) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2, latter large and visible, not tapering, coxae 3-4 scarcely larger, 4 lobate and excavate. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, both very elongate and linear, propodus minutely subchelate. Uropod 3 elongate, peduncle elongate, dispariramous, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Note callynophore on flagellum of antenna 1 and calceoli; large mandibular palp; pereopods 3-7 prehensile, hands thickened and spiny, article 5 shortened on pereopods 3-6, pereopod 7 scarcely modified in either respect.

Relationship. *Metacyclocaris* has more plesiomorphic characters than any other cyphocarid because only coxa 1 is reduced, the mandibular palp is present and well setose, the accessory flagellum is long, the maxillae are well setose, the telson is elongate and deeply cleft, article 2 of pereopods 5-7 is well expanded and uropod 3 is relatively close to the aequiramous condition. A few raker spines remain but the molar is absent, unlike *Cyphocaris*.

See *Cyclocaris*, *Crybelocephalus* and *Mesocyclocaris*.

Species. *Metacyclocaris polycheles* Birstein & Vinogradov, 1955, 1958 (Gurjanova, 1962) [280B].

Habitat and distribution. Marine, Kurile-Kamchatka Trench region, bathypelagic, less than 1800 m, 1 species.

Metacyphocaris Tattersall

Fig.88B

Metacycphocaris Tattersall, 1906: 29.

Type species. *Metacyphocaris helgae* Tattersall, 1906, original designation.

Diagnosis. Of cyphocarin form, head tall, horizontally short, grotesque, with hood. Flagella of antennae short (4-articulate); accessory flagellum vestigial, 1-articulate. Mouthparts forming quadrate bundle. Labrum and epistome [?continuous, not differentially produced, prominent, coalesced, separate, labrum epistome slightly strongly dominant in size. projection. and blunt. sharp]. Incisor ordinary, molar simple, small; rakers absent; palp absent. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner small and outer plate of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxae 1-2 small, strongly shortened and partly covered by coxa 3, coxa 4 largest, lobate, excavation weak. Gnathopod 1 short, nearly simple, articles 5 and 6 subequal, dactyl medium; article 6 of gnathopod 2 greatly shorter than article 5, propodus simple. Uropod 3 ordinary, peduncle ordinary, parviramous, inner ramus strongly shortened, outer ramus 2-articulate. Telson elongate, weakly cleft.

Additional characters. Pereopods 3-5 prehensile, article 4 shortened, hands thick and spiny, pereopods 6-7 increasingly elongate and simple; article 2 of pereopods 5-7 expanded (versus *Crybelocephalus*).

Relationship. *Metacyphocaris* differs from *Paracyphocaris* in the absence of mandibular palp and the poorly cleft telson.

Differing from *Mesocyphocaris* in the absence of mandibular palp and the elongation of the telson.

See *Metacyclocaris*, *Crybelocephalus*, *Crybelocyphocaris* and *Cebocaris*.

Species. *Metacyphocaris helgae* Tattersall, 1906 (Schellenberg, 1926c, 1927) (K.H. Barnard, 1932) (Stephensen, 1933b) (Thorsteinson, 1941) (Shoemaker, 1945a) (Gurjanova, 1962) (Hurley, 1963) (Birstein & Vinogradov, 1958, 1960, 1964) [420B].

Habitat and distribution. Marine, cosmopolitan, bathypelagic, possibly abyssopelagic, confirmed 600-1200 m, 1 species.

Metambasia Stephensen

Metambasia Stephensen, 1923b: 76.

Type species. *Metambasia faeroensis* Stephensen, 1923b, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, not prominent, separate, labrum slightly dominant in size and projection, blunt. Incisor ordinary, molar simple, small, conicolaminate, setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 slightly elongate, simple, article 5 longer than 6, dactyl small; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Sexual dimorphism. Male with calceoli, antenna 2 flagellum elongate, articles 4-5 of peduncle short and weakly inflated, with anterior male tufts, article 3 very stout; uropod 3 elongate and setose.

Relationship. Differing from *Schisturella* and *Ambasiopsis* in the fully simple gnathopod 1. From *Parschisturella* in the short, blunt labral lobe, the presence of only 2 setae on inner plate of maxilla 1, and the very reduced coxa 1.

Species. *Metambasia faeroensis* Stephensen, 1923b [209B].

Habitat and distribution. Marine, south-west of Faeroes Islands, 835-900 m, 1 species.

Microlysias Stebbing

Microlysias Stebbing, 1918: 63.

Type species. *Microlysias xenokeras* Stebbing, 1918, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?continuous, not differentially produced, not prominent, coalesced, blunt]. Incisor ordinary, molar simple, small; subconical; palp attached strongly proximal to molar. Inner plate of maxilla 1 naked; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, strongly subchelate, palm transverse, article 5 shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle slightly elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Head large, subglobular, lacking rostrum, lateral lobes or sinus for antenna 1; article 1 of mandibular palp slightly elongate; branchiae pleated.

Sexual dimorphism. Female antenna 2 ordinary, though article 3 elongate; male peduncle of antenna 2 with articles 1-4 short, bead-like, article 5 swollen, enlarged, flagellum thin, elongate, in terminal male articles = 60+, bead-like, meandering; in young male, article 1 of flagellum long, cone-like, tipped with about 5 short articles.

Relationship. Differing from *Orchomene* in the peculiar male antenna 2. From *Lysianella* in article 5, not 4, of antenna 2 in male being tumid, and the elongate deeply cleft telson.

Note on taxonomy. *Microlysias indica* identification of K.H. Barnard, 1940 = *Orchomene plicata*, fide Griffiths (1975).

Species. *Microlysias xenokeras* Stebbing, 1918 (= *M. indica* K.H. Barnard, 1937) (not K.H. Barnard, 1940) (Griffiths, 1975) [690I].

Habitat and distribution. Marine, South Africa to South Arabian coast, 4 m, 1 species.

Nannonyx Sars

Figs 89R, 90X, 91K, 92W, 95F

Nannonyx Sars, 1895: 71.–Lincoln, 1979a: 64.

Type species. *Orchomene goesii* Boeck, 1871, monotypy.

Diagnosis. Mouthparts forming quadrate bundle, some styliform. Labrum and epistome continuous, differentially produced, not prominent, coalesced, epistomal part slightly dominant in projection, blunt. Incisor ordinary, molar simple, obsolescent; conicolaminate, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (1) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl small to vestigial. Coxa 1 large and visible, not tapering. Gnathopod 1 short, thick, nearly simple, palm when present transverse, articles 5 and 6 subequal, 5 lobate, dactyl small; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle short, expanded, inner ramus strongly shortened, outer ramus 2-articulate. Telson ordinary, entire (type) or emarginate.

Additional characters. Following parts styliform; inner plate of maxilla 1, both plates of maxilla 2, apical part of inner plate of maxilliped, but base of inner plate broadly lobate and setose (type only); gnathopod 1 very thick; peduncle of uropod 3 expanded and plate-like, rami shorter than peduncle.

Variables. Gnathopod 1 palm obsolescent (*N. propinquus*); inner ramus of uropod 3 vestigial (*N. reductus*).

Relationship. Characterised by small uropod 3 with short rami and plate-like peduncle, large coxa 1, thick gnathopod 1, certain thin plates of maxilla 1, maxilla 2, maxilliped, and vestigial maxilliped dactyl.

Differing from *Lysianassa* in amalgamated prebuccal mass and vestigial maxilliped dactyl. From *Parambasia* in the thick gnathopod 1, reduced uropod 3 and weak maxilliped dactyl. From *Pseudambasia* in the thin plates of maxilla 2, and the reduced uropod 3. From *Perrierella* in the proximal mandibular palp, thin inner plate of maxilla 1 and thin inner and outer plates of maxilla 2, presence of long inner plate of maxilliped, plate-like peduncle of uropod 3, and large coxa 1. From *Normanion* in the subsimple gnathopod 1, lack of thin lobe on the carpus of gnathopod 1, small uropod 3, and longer maxilliped palp. From *Menigrates* in the proximal mandibular palp, small uropod 3, and vestigial dactyl of the maxilliped. From *Paralysianopsis* in the unproduced prebuccal mass, simple inner ramus of uropod 2, shorter rami of uropod 3, and proximal mandibular palp. From *Boeckosimus* and *Onisimus* in the proximal mandibular palp, very thin inner plate of maxilla 1 and inner and outer plates of maxilla 2, and reduced uropod 3. From *Rifcus* in proximal mandibular palp, uncleft telson, plate-like peduncle of uropod 3, and thick gnathopod 1. From *Paronisimus* in the proximal mandibular palp, reduced maxilliped dactyl, and uncleft short telson. From *Parawaldeckia* in the reduced dactyl of the maxilliped, and the thinness of the plates on maxillae 1 and 2 and the thin inner plate of the maxilliped.

Close to, but different from *Paralibrotus* in the proximal mandibular palp, and reduced dactyl of the maxilliped.

Removal. *Nannonyx integricauda* Stebbing, 1888, to *Kakanui*.

Species. See Chevreux & Fage (1925); Lincoln (1979a); *N. goesii* Boeck, 1871b (Sars, 1895) (Gurjanova, 1951) [216]; *N. propinquus* Chevreux, 1911d (MacQuart-Moulin, 1968) [340]; *N. reductus* Greze, 1975 [334]; *N. spinimanus* Walker, 1895b (Lincoln, 1979a) [239 + 242].

Habitat and distribution. Marine, Barents Sea around eastern North Atlantic into Black Sea, 0-75 m, 4 species.

Normanion Bonnier

Figs 90N, 91O, 94D

Normania Boeck, 1871b: 119 (homonym, Ostracoda) (*Opis quadrimana* Bate & Westwood, 1868, monotypy).
Normanion Bonnier, 1893: 167 (new name).–Ledoyer, 1977: 378.-Lincoln, 1979a: 44.

Type species. *Opis quadrimana* Bate & Westwood, 1868, monotypy.

Diagnosis. Mouthparts forming slightly conical bundle, weakly styliform. Labrum and epistome continuous, not differentially produced, coalesced, blunt. Incisor ordinary, molar simple, small, conicolaminate, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp not or scarcely exceeding outer plate, dactyl vestigial. Coxa 1 scarcely shortened and weakly covered by coxa 2, mostly large and visible, scarcely tapering. Gnathopod 1 enlarged, strongly subchelate, palm transverse, but weakly chelate at corner, article 5 shorter than 6, lobate, *eusirid*, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, peduncle elongate, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Palp of maxilliped very short; article 3 of gnathopod 1 slightly elongate, carpus of eusirid form; gills occasionally pleated.

Variables. Outer plate of maxilliped much smaller than type (*N. abyssi*), palp slightly exceeding outer plate (*N. abyssi*), dactyl vestigial (*N. abyssi*); palm of gnathopod 1 denticulate (*N. quadrimanus*), or not (*N. amblyops*, etc.); carpus of gnathopod 2 not lobate (*N. abyssi*).

Relationship. Characterised by the aequiramous uropod 3 with elongate peduncle, with 1-articulate outer ramus, and the short palp of the maxillipeds.

Differing from *Opisa* in the poorly chelate gnathopod 1, short palp of maxilliped and uncleft telson. From *Cheirimedon* in the eusirid wrist of gnathopod 1, uncleft telson and short palp of the maxilliped. From *Koroga* in the short palp of the maxilliped, eusirid carpus of gnathopod 1, antennal notch on head, subequal rami of uropod 3 and the 1-articulate outer ramus of uropod 3. From *Kyska* in the proximal placement of the mandibular palp, nonchelate gnathopod 1 and uncleft telson.

See *Podoprionella* and *Trischizostoma*.

Species. See Ledoyer (1977); *N. abyssi* Chevreux, 1903, 1935 [302A]; *N. amblyops* Sars, 1895 [238BI]; *N. quadrimanus* (Bate & Westwood, 1868) (Lincoln, 1979a, part) [239]; *N. sarsi* Stebbing, 1906 (= *N. quadrimana* identification of Sars, 1895, not Bate & Westwood, 1868) (Stephensen, 1928) (?Ledoyer, 1977) [355 + B + I]; species 1 (Mediterranean *N. quadrimanus*, see Ledoyer, 1977) (Chevreux, 1920) (Chevreux & Fage, 1925) [330]; species 2 (Naples, see Ledoyer, 1977) [348].

Habitat and distribution. Marine, boreal and warm-temperate north-eastern Atlantic and Mediterranean, and 1 abyssal species in Mediterranean, often parasitic on skin of fishes, 20-2368 m, 4 species.

Ocosingo J.L. Barnard

Fig.93G

Ocosingo J.L. Barnard, 1964b: 230 [female].–Lowry & Stoddart, 1983a: 284.
Fresnillo J.L. Barnard, 1969a: 169 (*Fresnillo fimbriatus* J.L. Barnard, 1969a, original designation) [male].

Type species. *Ocosingo borlus* J.L. Barnard, 1964b, original designation.

Diagnosis. Of conicostomin form. Mouthparts forming conical bundle, some styliform. Labrum and epistome continuous, coalesced, blunt. Incisor ordinary, molar weakly triturative, conicolaminate, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (1) setose; palp 1-articulate, small. Inner poorly and outer plates of maxilliped well developed, palp not exceeding outer plate, dactyl absent. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 equal to article 5, ordinary, propodus minutely chelate, article 7 absent. Inner ramus of uropod 2 without notch. Uropod 3 short, composed only of peduncle. Telson elongate, entire.

Additional characters. Body posteriorly carinate and toothed; head mostly hidden by coxa 1; article 1 of antenna 1 crested; accessory flagellum vestigial; rakers present; article 5 of pereopods 3-7 very short; article 4 of only pereopods 5-6 broadly expanded; telson strongly setospinose apically.

Sexual dimorphism. Females with pubescent body, males lacking such pubescence; male mandibular incisor reduced and sharpened; maxillae degenerate and outer plate of maxilliped reduced; inner rami of uropods 1-2 larger in male than in female; carinae of pereon 7 and pleonites 1-2 reduced. *Fresnillo fimbriatus* thus secondary male of female described as *Ocosingo borlus*.

Variables. Uropods 1-2 uniramous (*O. fenwicki*).

Relationship. Differing from *Acontiostoma* and *Stomacontion* in the strongly reduced inner rami of uropods 1-2 and the loss of dactyl on gnathopod 2. From *Conicostoma* in the loss of rami on uropod 3 and the unnotched telson.

Species. *Ocosingo borlus* J.L. Barnard, 1964b (= *F. fimbriatus* J.L. Barnard, 1969a) [370]; *O. fenwicki* Lowry & Stoddart, 1984b [774].

Habitat and distribution. Marine, Carmel California to Bahia San Ramon, Mexico; New Zealand; 0-11 m, 1 species.

Onesimoides Stebbing

Fig.87C

Onesimoides Stebbing, 1888: 647.–Pirlot, 1933a: 128.

Type species. *Onesimoides carinatus* Stebbing, 1888, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, variously produced, occasionally with sharp tubercle. Incisor ordinary, possibly toothed; molar triturative, large; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 strongly subchelate, often strongly enlarged, palm almost transverse, article 5 much shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle slightly elongate, inner ramus strongly shortened, outer ramus 2-articulate. Telson short, entire.

Additional characters. Basal article of accessory flagellum elongate, flattened or cristate; posteroventral lobe of coxa 4 weak (versus *Clepidecrella*).

Variables. Body carinate (*O. carinatus*), weakly or not (others); molar somewhat reduced (*O. chelatus*); gnathopod 1 enlarged more than type and palm oblique and sculptured (*O. cavimanus*), thin, slightly chelate, with article 5 poorly lobate and slightly elongate (*O. chelatus, O. mediterraneus*); peduncle of uropod 3 plate-like (*O.

cavimanus, O. mediterraneus), weakly (*O. chelatus*), inner ramus one third as long as outer (*O. mediterraneus*), half as long as outer (*O. mediterraneus*).

Relationship. Differing from *Clepidecrella* in the small lobe of coxa 4, subchelate gnathopod 1 and well-developed plates of the maxillipeds. From *Koroga* in the smaller inner ramus of uropod 3, short telson and small head.

Like *Pseudambasia* (not *Parambasia*), but inner ramus of uropod 3 very short, inner ramus of uropod 2 without significant notch, epistome not dominant, lobe of coxa 4 weak, and basal article of accessory flagellum widened and elongate.

See *Paronesimoides*.

Species. *Onesimoides carinatus* Stebbing, 1888, 1906 [532A]; *O. cavimanus* Pirlot, 1933a (Dahl, 1959) (Ledoyer, 1978a, 1986) [600BA]; *O. chelatus* Pirlot, 1933a (J.L. Barnard, 1961a) (Ledoyer, 1978a, 1986) [425A + 600AB]; *O. mediterraneus* Bellan-Santini, 1974, 1984 [302B].

Habitat and distribution. Marine, Mediterranean, South Atlantic, Indian and south-west Pacific Oceans, bathyal and abyssal, 1264-4940 m, 4 species.

Onisimus Boeck (= *Pseudalibrotus* Della Valle)

Onisimus Boeck, 1871b: 111.–J.L. Barnard, 1969: 352.
Pseudalibrotus Della Valle, 1893: 798 (*Anonyx litoralis* Boeck, 1871, monotypy).–Stephensen, 1923b: 55 (marine key).

Type species. *Anonyx litoralis* Boeck, 1871b, selected by Boeck, 1876.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, differentially produced, coalesced, epistome slightly dominant in projection and blunt. Incisor ordinary, molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Both plates of maxilla 2 medially setose. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 slightly enlarged, strongly subchelate, palm oblique, articles 5 and 6 subequal, article 5 lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate (or not). Inner ramus of uropod 2 with or without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate (type) or 1-articulate. Telson short, entire.

Sexual dimorphism. Male flagella of antennae 1-2 elongate and calceoliferous, article 1 on primary flagellum of antenna 1 slightly elongate and more brushy; peduncle of antenna 2 with anterior male tufts.

Variables. Gnathopod 2 not chelate (*O. nanseni*); inner ramus of uropod 2 lacking notch (*O. caspius, O. glacialis, O. platyceras*); rami of uropod 3 almost naked to moderately spinose and setose; outer ramus of third uropod 1-articulate (*O. birulai, O. caspius, O. platyceras*).

Relationship. Not very distinct from *Boeckosimus* but latter always with weakly cleft telson and dominant labral part of prebuccal complex.

See *Rifcus*.

Distribution notes. In the Arctic Ocean considered also as epipelagic, occurring also under central arctic ice canopy (*O. nanseni*); comes to bait; many arctic records deeper than 150 m expunged as specimens probably caught in shallower waters during trawl recovery.

Species. See Bushueva, 1977; Dunbar, 1954; Gurjanova, 1951, 1962; Holmquist, 1965; Schellenberg, 1927; Stephensen, 1923b (key), 1929, 1933b, 1935a, 1940b, 1944a; Shoemaker, 1955a; *O. caspius* (Sars, 1896) (Gurjanova, 1951) (Birstein & Romamova, 1968) [332 + B]; *O. glacialis* (Sars, 1900) (J.L. Barnard, 1959) (Holmquist, 1965, 1975) (Just, 1970) [220]; *O. litoralis* (Krøyer, 1845, 1846a,b) (Sars, 1895) (Holmquist, 1965) (?= *O. birulai* Gurjanova, 1929b, 1962) [220]; *O. nanseni* (Sars, 1900) (J.L. Barnard, 1959) [220]; *O. platyceras* (Sars, 1896) (Birstein & Romanova, 1968) [332]; *O. zenkevitchi* Mednikov, 1960 [278].

Habitat and distribution. Marine and Ponto-Caspian, mostly arctic, circumpolar, often in very diluted seawater, ocean = 0-100 m (mostly shallow); Caspian Sea, about 25-140 m, 6 species.

Opisa Boeck

Figs 90Q, 92G, 95O

Opis Krøyer, 1842: 149 (homonym, Mollusca).
Opisa Boeck, 1876: 190 (new name).–Lincoln, 1979a: 48.

Type species. *Opis eschrichtii* Krøyer, 1842, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, not prominent, separate, labrum slightly dominant in size and projection, blunt. Incisor ordinary, molar obsolescent or absent, setulose, palp attached slightly proximal. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 slightly to strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 strongly enlarged, strongly chelate, article 5 much shorter than 6, eusirid, weakly lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle slightly elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson very elongate, deeply cleft.

Additional characters. Carpus of gnathopod 2 short, weakly lobate and eusirid, thus hand reversible, chela with large gap.

Sexual dimorphism. Male antenna 1 with article 1 of primary flagellum more elongate and brushy, articles 4-5 of peduncle on antenna 2 strongly brushy anteriorly, flagellum elongate and calceolate.

Variable. Ocular lobes sharp (*O. tridentata*).

Relationship. Differing from *Podoprionella* in the elongate cleft telson, normal maxillipeds and lack of posterior teeth on article 2 of pereopod 5. From *Trischizostoma* in the elongate cleft telson, ordinary mouthparts and regular coxae 2-4. From *Koroga* in the reduced coxa 1 and elongate cleft telson. From *Euonyx* in the broad chela of gnathopod 1 and unproduced epistome. From *Cheirimedon* in the chelate condition of gnathopod 1 and the eusirid wrist.

Species. See Shoemaker (1930a); Stephensen (1923b, 1935a); *O. eschrichti* (Krøyer, 1842) (= *O. typica* Krøyer, 1846a,b) (Sars, 1895) (Gurjanova, 1962) (Lincoln, 1979a) [200I]; *O. tridentata* Hurley, 1963 (J.L. Barnard, 1966a,b) [373].

Habitat and distribution. Marine, circumpolar and boreal south to California, Korea and British Isles, 30-432 m, possibly parasitic on fishes, 2 species.

Supergenus *Orchomene* Boeck

Figs 89C,E,H,Q, 90L, 91C, 92D, 95V

Orchomene Boeck, 1871b: 114.–Lincoln, 1979a: 68. [Valid genus.]

Tryphosa Boeck, 1871b: 117 (*Anonyx nanus* Krøyer, 1846, selected by Boeck, 1876).

Orchomenella Sars, 1895: 66 (*Anonyx minutus* Krøyer, 1846b, original designation). [Valid genus.]

Orchomenopsis Sars, 1895: 73 (*Orchomenopsis obtusa* Sars, 1895, monotypy). [Valid subgenus of *Orchomenella*.]

?*Allogaussia* Schellenberg, 1926a: 245 (*Allogaussia paradoxa* Schellenberg, 1926a, selected by Stasek, 1958). [Valid genus.]

(*Orchomenyx*) De Broyer, 1984: 198 (*Orchomenella macronyx* Chevreux, 1905d, original designation). [Valid subgenus of *Orchomenopsis*.]

Abyssorchomene De Broyer, 1984: 198 (*Orchomenella chevreuxi* Stebbing, 1906, original designation). [Valid genus.]

Type species. *Anonyx serratus* Boeck, 1861, selected by Boeck, 1876.

Classification. This complex of genera is being worked out slowly in the 1980's but is too difficult to treat in more than a superficial way until all of the species have been allocated to their proper genera by the taxonomists engaged in the study. If we allocated to their genera various species that have been studied adequately, a pool of taxa would still remain that would have to be 'dumped' into *Orchomene*. The species are divided into genera on the basis of extremely small characters that we have not yet been able to use adequately even on preserved specimens. We prefer therefore to leave these taxa together under *Orchomene*.

A summary of the sketchy details of the taxa are as follows: *Orchomene* with mandibular molar in the form of a crest or comb bearing cusps, denticles and 'setae' (actually pubescence), outer plate of maxilliped without 2 strong apical spines; *Orchomenella* with mandibular molar button shaped (truncated cylinder) and armed with denticles and cusps but no pubescence, outer plate of maxilliped with 2 strong apical spines; this is divided into subgenus *Orchomenella* with carpal lobe broad and propodus not excavate along posterior margin; subgenus *Orchomenopsis* with carpal lobe thinner and propodus with excavate posterior margin; *Abyssorchomene* with molar like *Orchomene*, maxilliped like *Orchomenella* and gnathopod 1 like *Orchomenopsis*; *Allogaussia* differing from above genera in lack of coxal gill 7, grotesquely enlarged basis of pereopod 5, uncleft telson and an 'elongate' peduncle of antenna 1. We find some of these characters very difficult to evaluate and await further clarification.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome typically differentially produced, prominent, separate, usually epistome slightly to strongly dominant in size and projection, blunt. Incisor ordinary; molar weakly triturative or simple, medium to small, occasionally conicolaminate or subconical, setulose, palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 subchelate, palm oblique to transverse, articles 5 and 6 subequal, or 5 shorter than 6, dactyl medium; article 6 of gnathopod 2 shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, weakly to deeply (type) cleft or emarginate or entire.

Sexual dimorphism. Male eyes enlarged, antenna 1 stouter and more strongly armed, antenna 2 elongate, flagellum calceolate, urosomite 1 often more strongly humped and notched dorsally, rami of uropod 3 more subequal and more setose, article 2 on outer ramus often obsolescent to absent.

Variables. Primary flagellum with callynophore and usually article 1 of accessory flagellum elongate in both sexes (but scarcely so in *O. pelagica*) (not in *O. franklini*, etc.).

Epistome triangularly produced (*O. oxystoma* is this *Tryphosites*?); epistome and upper lip not differentially produced (*O. chilensis*, *O. pinguis*, etc.), upper lip dominant (*O. rossi*, etc.), weakly so (*O. holmesi*), epistome dominant (*O. minuta*, *O. serrata*, etc.), epistome large and nasiform but poorly separated from labrum (*O. batei*).

Molar more or less universal, triturative and symmetrical (*O. goniops*, *O. chelipes*) to setulose and conicolaminate, thus asymmetrical (*O. obtusus*), kernelled and furnished strongly with pubescence between rakers and molar (for example, *O. crispata*, *O. amblyops*, *O. pectinata*), not so (*O. nana*). Article 1 of mandibular palp elongate (*O. magdalenensis*); palp strongly proximal to molar (European species, especially *O. serrata*, *O. crispata*, *O. humilus*, *O. pectinata*, also *O. chilensis*), poorly proximal (*O. hureaui*, *O. chelipes*, *O. goniops*, *O. plebs*). Inner plate of maxilla 1 with 2 + 2 setae (*O. hureaui*); spines on outer plate reduced and fused together or broadened (*O. arnaudi*, etc.). Coxa 1 geniculate forward (*O. lobata* and some specimens of *O. nana*); coxa 1 tapering distally (*O. goniops*, *O. crenata*, *O. pinguides*, etc.), slightly bevelled (*O. littoralis*, *O. chelipes*, *O. tabarini*), expanded apically (*O. plebs*, etc.). Gnathopod 1 weakly chelate (*O. charcoti*, *O. chelipes*, *O. recondita*, etc.); article 3 elongate (*O. plicata*); article 5 very short but with long lobe (*O. plicata*) or with long lobe only (*O. rotundifrons*, *O. pelagica*, *O. obtusa*, etc.), less lobate (*O. minuta*). Article 2 of pereopod 5 grotesquely lobate (*Allogaussia*, for example *O. paradoxa*, *O. pinguides*, etc.); article 2 of pereopods 5-7 generally diverse. Epimeron 3 smooth or serrate. Outer rami of uropods 1-2 often slightly shortened, or inner ramus shortened (*O. littoralis*); peduncle of uropod 3 platelike (*O. franklini*, *O. grimaldii*, etc.), or not (*O. rossi*, etc.); inner ramus of uropod 3 significantly reduced (*O. grimaldii*). Telson cleft (typical) to entire (*Allogaussia*, for example *O. goniops*), or barely cleft and emarginate (*O. grimaldii* and *O. chelipes*); telson elongate (*O. abyssorum*).

Relationship. Differing from *Tryphosites* in the un-notched inner ramus of uropod 2 and the shorter carpus of gnathopod 1 which is shorter than the propodus.

Orchomene oxystoma has a sharp protruding epistome like *Tryphosites* but is distinguished by the above differences. From *Uristes* and *Tryphosella* in the larger head and non-tapering, unreduced coxa 1.

Merging with *Lepidepecreum* but distinguished by the lack of carinations on antenna 1.

See *Douniaella* and *Gronella*.

Removals. *Orchomene abyssalis* Stephensen, 1925a, to *Uristes*; *O. groenlandicus* Hansen, 1888, to *Gronella*; *O. morbihanensis* Bellan-Santini & Ledoyer, 1974, to *Socarnes*; *O. reducta* Schellenberg, 1931, to *Falklandia*; *O. takoradia* J.L. Barnard, 1961a, to *Adeliella*.

Species. See K.H. Barnard (1932); Bellan-Santini (1972a,b); Chevreux & Fage (1925); Gurjanova (1951, 1962); Hurley (1963); Karaman (1973h); Krapp-Schickel (1974); Ledoyer (1977); Nicholls (1938); Olerod (1975, mouthparts); Reid (1951); Schellenberg (1925a, 1926a, 1942); Shoemaker (1920a, 1930a,b, 1955a); Stephensen (1923a,b, 1925a, 1928, 1929, 1935a, 1944a); *O. aahu* Lowry & Stoddart, 1983a [776s]; *O. abyssorum* Stebbing, 1888 (Nicholls, 1938) (Birstein & Vinogradov, 1960, 1962b, 1964) [420BAV]; *O. acanthurus* (Schellenberg, 1931) (Shoemaker, 1945d) (Thurston, 1974a) (De Broyer, 1985b) [870]; *O. amblyops* Sars, 1895 (Stephensen, 1935a) (Gurjanova, 1951) [216B]; *O. anaquelus* J.L. Barnard, 1964e [373]; [*O. annulatus* (Bate, 1862) (Steele, 1969) (but see Gurjanova, 1962 as *Lepidepecreum*) [395]]; *O. arnaudi* Bellan-Santini, 1972b [870]; *O. breviceps* Hirayama, 1986b [391]; *O. cavimanus* Stebbing, 1888 (J.L. Barnard, 1961a) (Bellan-Santini, 1972a,b) (Thurston, 1979) (Andres, 1983); *O. c. rostratus* Schellenberg, 1931 [800BAV + ?303]; *O. charcoti* (Chevreux, 1912a,d) (K.H. Barnard, 1932) (Schellenberg, 1931) [870]; *O. chelipes* (Walker, 1906b, 1907) (De Broyer, 1975a) [881]; *O. chevreuxi* (Stebbing, 1906) (= *O. excavata* Chevreux, 1903, homonym) (valid despite J.L. Barnard, 1961a) [304A]; *O. chilensis* (Heller, 1868a) (Schellenberg, 1931, part) (Hurley, 1965b) [765]; *O. commensalis* (Chevreux & Fage, 1925) [?353I]; *O. crenatus* (Chevreux & Fage, 1925) (Reid, 1951) [330]; *O. crispatus* (Goes, 1866) (Sars, 1895) (Gurjanova, 1951) [240 + B]; *O. decipiens* (Hurley, 1963) (J.L. Barnard, 1966a,b, 1971b) [379 + B]; *O. depressus* Shoemaker, 1930b [254]; *O. dilatatus* (Chevreux, 1903, 1935) [302A]; *O. distinctus* (Birstein & Vinogradov, 1960) [531A]; *O. faeroensis* Stephensen, 1923b [209B]; *O. franklini* (Walker, 1903) (= *O. litoralis* Schellenberg, 1926a) [*Allogaussia*] (Hurley, 1965a) (Bellan-Santini, 1972a,b) (Andres, 1983) [870]; *O. galeatus* (Schellenberg, 1926a) [*Allogaussia*] [881]; *O. gerulicorbis* Shulenberger & Barnard, 1976 (= *O. affinis* identification of Birstein & Vinogradov, 1955) (Thurston, 1979) [422A]; *O. glabrus* (Lagardere, 1968) [295]; *O. goniops* Walker, 1906b, 1907 (De Broyer, 1975a) [876]; *O. grimaldii* Chevreux, 1890a (Karaman, 1973b) [340 + B]; *O. guillei* De Broyer, 1985a [851]; *O. hanseni* Meinert, 1893 (?= *O. melanophthalmus* Norman, 1867b) (Sars, 1895) (Stephensen, 1923a) [240]; *O. hiata* Andres, 1983 [870, 875 + B]; *O. holmesi* (Hurley, 1963) [369 + B]; *O. humilis* (Costa, 1853, 1857) (= *O. goesii* Della Valle, 1893) (= *O. batei* Sars, 1883, 1895, Gurjanova, 1951) (Bellan-Santini, 1984) (Lincoln, 1979a) [352BA]; *O. hureaui* De Broyer, 1973 [878]; *O. indicus* (Giles, 1890) (see *O. mannarensis*) [664]; *O. intermedius* (Gurjanova, 1962) [389]; *O. japonicus* (Gurjanova, 1962) (Kudrjaschov, 1972) [389]; *O. kryptopinguides* Andres, 1983[871]; *O. laevipes* Stephensen, 1923b [209B]; *O. lepidulus* (Gurjanova, 1962) (Bryazgin, 1974a) [280 + B]; *O. limodes* Meador & Present, 1985 [373]; *O. liomargo* Hirayama, 1986b [391]; *O. lobatus* (Chevreux, 1907b, 1935) (Stephensen, 1935a) (Gurjanova, 1951) [295 + B]; *O. macronyx* (Chevreux, 1905d, 1906a) (Bellan-Santini, 1972b) (Thurston, 1972)

[800I]; *O. macrophthalmus* (Birstein & Vinogradov, 1962b) [*Allogaussia*] [806B]; *O. macroserratus* Shoemaker, 1930b (Dunbar, 1954) (Gurjanova, 1962) (Bryazgin, 1974a) [200]; *O. magdalenensis* (Shoemaker, 1942) (J.L. Barnard, 1964a,e, 1969a,b) [370]; ?*O. mannarensis* (Rabindranath, 1971c) (?= *Anonyx indicus* Giles, 1890) [664]; *O. massiliensis* Ledoyer, 1977 [348 + B]; *O. melanophtalmus* (Gurjanova, 1962) [not *O. melanophthalmus* Norman, see *O. hanseni*] [286]; *O. minor* Bulycheva, 1952 (Gurjanova, 1962) (Kudrjaschov & Zvjagintsev, 1975) [389]; *O. minusculus* (Gurjanova, 1962) (Kudrjaschov, 1972) [389]; *O. minutus* (Kroyer, 1846, 1846a) (Sars, 1895) (Bousfield, 1973) [200]; *O. musculosus* Stebbing, 1888 (J.L. Barnard, 1961a) [280N + ?740A]; *O. naikaiensis* Hirayama, 1986b (= *O. littoralis* Nagata, 1965a, = homonym) (= species, Nagata, 1960) [395]; *O. nanus* (Krøyer, 1846a,b) (= *O. ciliata* Sars, 1883, 1895) (Karaman, 1973b) (Lincoln, 1979a) [200 + B]; *O. naviculus* (K.H. Barnard, 1932) [*Allogaussia*] [871 + B]; *O. nodimanus* (Walker, 1903) (Bellan-Santini, 1972a,b) (Thurston, 1974b) [870]; *O. nugax* (Holmes, 1904a) (Gurjanova, 1962) [277]; *O. obtusus* (Sars, 1895) (= *O. affinis* Holmes, 1908) (Hurley, 1963) [210 + B]; *O. orchospina* Hirayama, 1986b [391]; *O. oxystomus* Stephensen, 1923b [212A]; *O. pacificus* (Gurjanova, 1938b, 1951, 1962) (J.L. Barnard, 1971b) [230 + B]; *O. paradoxus* (Schellenberg, 1926a) [*Allogaussia*] [881]; *O. pectinatus* Sars, 1883, 1895 (Gurjanova, 1951) [200 + B]; *O. pelagicus* (Birstein & Vinogradov, 1960) [523AP]; *O. pinguides* Walker, 1903) [*Allogaussia*] (= *O. lobata* K.H. Barnard, 1932) (Hurley, 1965a) (Andres, 1986) [870 + B]; *O. pinguis* (Boeck, 186a) (Sars, 1895) (Bousfield, 1973) [200 + B]; *O. plebs* (Hurley, 1965c) (Bellan-Santini, 1972b) (Thurston, 1974a) (Andres, 1983) [870 + B]; *O. plicatus* (Schellenberg, 1926a) (= *O. chilensis* identification of Schellenberg, 1925a) (Griffiths, 1973, 1974a,c, 1975) (Ledoyer, 1986) [745]; *O. proximus* (Chevreux, 1903, 1935) [401B]; *O. reconditus* (Stasek, 1958) [*Allogaussia*] [371I]; *O. rossi* (Walker, 1903) (Hurley, 1965a) (Andres, 1979b, 1983) [870 + B]; *O. rotundifrons* (K.H. Barnard, 1932) (Thurston, 1974a,b) [870]; *O. schellenbergi* Thurston, 1972 [833]; *O. scotianensis* Andres, 1983 [871 + B]; *O. serratus* (Boeck, 1961) (Sars, 1895) (Vader, 1969a) [200 + B]; *O. sibirjakovi* Gurjanova, 1951 [220 + B]; *O. similis* Chevreux, 1912c (Chevreux & Fage, 1925) (Toulmond, 1964) [242]; *O. tabarini* Thurston, 1972, 1974a) (Andres, 1979b, 1983a) [875]; *O. tabasco* J.L. Barnard, 1967a [309B]; *O. thorii* Stephensen, 1923b [209B]; *O. tomiokaensis* Hirayama, 1986b [391]; *O. triangulus* (Stephensen, 1925a) (Gurjanova, 1951) [253]; *O. tschernyschevi* Bruggen, 1909 (Stephensen, 1935a) (Gurjanova, 1951) [216 + 280]; *O. ultimus* Bellan-Santini, 1972b [878]; *O. zschaui* (Pfeffer, 1888) (Schellenberg, 1931) (K.H. Barnard, 1932) (Stephensen, 1938c) (Andres, 1983a) [833 + B]; spp., (Sowinsky,1898) [334]; *O. affinis* identification of Sivaprakasam, 1968a [664].

Habitat and distribution. Marine, cosmopolitan, but mostly cold or deep water, rare in shallow tropics, occasionally inquilinous, 0-9938 m, 85 species.

Pachychelium Stephensen

Figs 87B, 92Q

Pachychelium Stephensen, 1925a: 121.

Type species. *Pachychelium davidis* Stephensen, 1925a, original designation.

Diagnosis. Of pachynin form. Mouthparts [unknown in type species] forming quadrate bundle, some reduced. Labrum and epistome separate, blunt. Incisor ordinary, molar absent; palp attached strongly distal. Inner plate of maxilla 1 tiny, weakly (0) setose; palp absent. Inner absent, and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 strongly enlarged, strongly subchelate, palm oblique, not chelate, article 5 shorter than 6, vestigial, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate, article 7 vestigial. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, entire.

Additional characters. Base of flagellum on antenna 1 with callynophore; mandible lacking rakers and lacinia mobilis; spines on outer plate of maxilla 1 simple, 4-6, 3 of these vestigial; maxilla 2 with 2 fused vestigial plates, inner very short; posteroventral lobe of coxa 4 poorly developed or absent; article 5 of gnathopod 1 vestigial, 4 reduced, article 3 elongate, palm lacking defining spine, with or without tooth; dactyl of gnathopod 2 vestigial; pereonite 5 [? lacking dorsal tooth].

Variables. Gnathopod 1 palm defined by tooth (*P. antarcticum*, *P. schellenbergi*), no (*P. davidis*); maxilliped palp 3 (*P. antarcticum*, *P. davidis*), 4 (*P. schellenbergi*, *P. nichollsi*).

Relationship. Very advanced; differing from *Ekelofia* in the loss of defined spine on gnathopod 1, loss of rakers, loss of lobe on coxa 4, and loss of expansion on article 4 of pereopods 5-6.

Differing from *Pachynus* in the absence of both the palp of maxilla 1 and the inner plate of the maxillipeds, the vestigial maxilla 2, in the non-chelate gnathopod 1, elongate article 1 on the primary flagellum of antenna 1 and the poorly developed coxa 4. From *Prachynella* in the elongate article 1 of the primary flagellum on antenna 1, lack of inner plate and long palp of the maxilliped, the non-chelate gnathopod 1 and poorly developed coxa 4. From *Acheronia* in the loss of palp on maxilla 1, loss of plates of maxilliped and loss of lobe of coxa 4.

See *Figorella*.

Removals. *Pachychelium mediterraneum* Ruffo, 1975b, to *Prachynella*; *P. oculatum* Schellenberg, 1931, to *Ekelofia*.

Species. *Pachychelium antarcticum* Schellenberg, 1926a [881B]; *P. davidis* Stephensen, 1925a [211B]; *P. nichollsi* Lowry, 1984b (= *P. antarcticum* identification of Nicholls, 1938, Bellan-Santini, 1972b) [870 + B]; *P. schellenbergi* Lowry, 1984b (= ?*P. antarcticum* identification of Schellenberg, 1931) (? = *P. davidis* identification of K.H. Barnard, 1932) [866].

Habitat and distribution. Marine, Antarctica and ?Arctica, (possibly 2 distinct genera, fide Lowry, 1984b), 5-740 m, 4 species.

Pachynus Bulycheva

Fig.91I

Pachynus Bulycheva, 1955: 193.–Lowry, 1984b: 74..

Type species. *Pachynus chelatum* Bulycheva, 1955, original designation.

Diagnosis. Of pachynin form. Mouthparts forming quadrate bundle. Labrum and epistome not prominent, separate, blunt. Incisor ordinary, molar absent; palp attached distally. Inner plate of maxilla 1 reduced, not setose; palp 2-articulate, large. Inner very poorly and outer plate of maxilliped well developed, palp thin, slightly exceeding outer plate, dactyl absent (article 3 elongate) or dactyl present. Coxa 1 large and visible, not tapering. Gnathopod 1 strongly enlarged, strongly chelate, article 5 much shorter than 6, almost obsolescent, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate, article 7 vestigial. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary (rectangular), entire.

Additional characters. Base of flagellum on antenna 1 with callynophore; peduncle of antenna 1 with weak cristae; mandible with rakers and left lacinia mobilis; spines on outer plate of maxilla 1 simple, 8 (5/3), palp with apical spines; plates of maxilla 2 very thin; coxa 4 with well-developed posteroventral lobe; gnathopod 1 palm defined by complex spine; article 4 of pereopods 5-7 expanded; pereonite 5 [?without dorsal tooth].

Variables. Eyes present or absent; accessory flagellum formed of scale (*P. barnardi*); outer plate of maxilla 1 with 8 or 10 spines, palp 1-articulate (*P. barnardi*); outer plate of maxilliped with 3 spines (*P. barnardi*), dactyl present (*P. barnardi*).

Relationship. Differing from other pachynin genera in the simple spines on the outer plate of maxilla 1, in the conjoint base of the flagellum on antenna 1 and in the presence of terminal spines on the palp of maxilla 1, the 5/3 arrangement of spines on the outer plate, and the relatively smaller outer plate (medium) of the maxilliped, with inner plates slightly enlarged.

Differing from *Pachychelium* in the presence of a palp on maxilla 1, better developed inner plate of the maxilliped, chelate gnathopod 1, and smaller antenna 1 with much shorter article 1 on the primary flagellum. From *Prachynella* in the presence of a palp on maxilla 1. From *Figorella* in the non-excavate posterior margin of the hand on gnathopod 1 and the enlarged, claw-like defining spine. From *Koroga* in the small head and coxae, vermiform body, vestigial carpus of gnathopod 1, stouter and shorter antennae 1-2, vestigial inner plate of the maxilliped, and the feeble maxilla 2. From *Normanion* in the much longer palp of the maxilliped, more distally placed mandibular palp, and the short peduncle of uropod 3. From *Onesimoides* in the lack of molar, very short and lobate article 5 of gnathopod 1, short article 1 of the primary flagellum on antenna 1, and lack of flange on the accessory flagellum.

Species. *Pachynus barnardi* Hurley, 1963 (= species, J.L. Barnard, 1964b) (J.L. Barnard, 1966a,b, 1969b, 1971b) [379 + B]; *P. chelatum* Bulycheva, 1955 (Gurjanova, 1962) [390]; *P. denticulatum* Lowry, 1984b [781]; *P. pugilator* Lowry, 1984b [783].

Habitat and distribution. Marine, fringes of North Pacific from Baja California to the Japan Sea, south-east Australia, 2-800 m, 4 species.

Paracallisoma Chevreux

Paracallisoma Chevreux, 1903: 84.

Type species. *Paracallisoma alberti* Chevreux, 1903, original designation.

Diagnosis. Of scopelocheirin form. Mouthparts forming quadrate bundle. Labrum and epistome each weakly produced, separate, epistome strongly dominant in size, blunt. Incisor ordinary, molar simple, small, subconical; palp attached slightly proximal to molar. Inner plate of maxilla 1 strongly setose medially; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, simple, article 5 longer than 6, dactyl vestigial, shrouded in setae; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 almost aequiramous, ordinary, peduncle ordinary, outer ramus 2-articulate. Telson elongate, deeply cleft.

Variables. Coxa 5 covering most of coxa 6 (*P. alberti*); gnathopod 2 article 6 distally broadened, subtriangular, short, dactyl inserted on forward distal angle of article 6 (*P. alberti*), article 6 distally slender, right-angled, little narrowed proximally, dactyl with somewhat middle insertion on apex of article 6, dactylar apex reaching palmar edge, palm transverse (*P. coecum, P. platepistomum*); telson with spine in apical notch (*P. alberti*), spine absent (*P. coecum, P. platepistomum*).

Relationship. Differing from *Scopelocheirus* in the non-chelate gnathopod 2.
See *Paracallisomopsis*.

Species. *Paracallisoma alberti* Chevreux, 1903, 1935 (Schellenberg, 1926a) (Birstein & Vinogradov, 1960) (Gurjanova, 1962) [420BA]; *P. coecum* (Holmes, 1908, as *P. coecus*) (J.L. Barnard, 1954b) (Hurley, 1963) (Andres, 1977) [310B]; *P. platepistomum* Andres, 1977 [303A]; species, Schellenberg, 1955 [406A].

Habitat and distribution. Marine, cosmopolitan bathyal-abyssal, pelagic, capture depths imprecise, ?1000-?7625 m, 3 species.

Paracallisomopsis Gurjanova

Fig.92J

Paracallisomopsis Gurjanova, 1962: 311.

Type species. *Paracallisomopsis beljaevi* Gurjanova, 1962, monotypy.

Taxonomy. Possible juvenile of *Paracallisoma alberti* (fide Stroobants, 1976).

Diagnosis. Of scopelocheirin form. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small [?smooth]; palp attached slightly proximal to molar. Inner plate of maxilla 1 moderately (5) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened and partly covered by coxa 2, tapering. Gnathopod 1 slightly elongate, nearly simple, palm oblique, articles 5 and 6 subequal, dactyl vestigial, shrouded in setae; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus scarcely shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Outer plate of maxilla 1 with 4 spines; setae of plates on maxilla 2 weak; outer plate of maxilliped with 2 apical spines and 1 setule; pereopods 5-7 thin and of similar length, article 2 of pereopod 5 slender; article 2 of outer ramus on uropod 3 elongate.

Relationship. Differing from *Paracallisoma* and *Eucallisoma* in the lack of medial setae on the inner plate of maxilla 1, indistinct dactyl of gnathopod 1, and differing from *Eucallisoma* additionally in larger head, smaller antenna 1 with less elongate flagellum base, erect accessory flagellum, less styliform gnathopod 1 with more dense cirri, more spines on outer plate of maxilliped, and shorter article 2 on outer ramus of uropod 3.
Differing from *Aroui* and *Scopelocheirus* in the non-chelate gnathopod 2.

Species. *Paracallisomopsis beljaevi* Gurjanova, 1962 [278].

Habitat and distribution. Marine, Bering Sea, Kamchatka, Olyutorsky Bay, 150 m, 1 species.

Paracentromedon Chevreux & Fage

Figs 90S, 92B

Paracentromedon Chevreux & Fage, 1925: 57.

Type species. *Centromedon crenulatum* Chevreux, 1900a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not prominent, coalesced, labral part slightly dominant in size and projection, blunt. Incisor ordinary, molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple (type) or subchelate, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Head 'small'; article 3 of mandibular palp half or less as long as article 2; article 1 of flagellum on antenna 1 twice as long as articles 2-3 on peduncle combined; female antenna 2 as long as antenna 1; article 2 of pereopods 5-6 narrowly rectangular (versus *Hippomedon*); pereopod 5 not shortened; pereopod 6 or 7 slightly longest but generally pereopod 5=6=7; gill 7 [unknown].

Variables. Dactyls of pereopods 3-4 elongate (*P. carabicus*); article 2 of pereopods 5-6 narrowly rectangular (*P. carabicus*); urosomite 1 with sharp dorsal cusp (*P. carabicus*).

Note on *P. whero*. Probably belongs in a new genus because of the expanded article 2 of pereopods 5-6; other oddities of this species include eye with corneal lens dorsally, flanged peduncle of uropod 2, flanged articulation on pleonite 4 and nails on dactyls of gnathopod 1 and pereopods 3-4. Generic placement may also include *Hippomedon manene* and *H. matikuku* (fide Lowry, *in litt.*, 1991).

Relationship. Differing from *Hippomedon*, *Psammonyx* and *Wecomedon* in the short article 3 of the mandibular palp. From *Elimedon* in the three fourths cleft of the telson (*Elimedon* = half).

Species. *Paracentromedon carabicus* J.L. Barnard, 1964a [406B]; *P. crenulatus* (Chevreux, 1900a) (Chevreux & Fage, 1925) (Bellan-Santini, 1984) [350B]; ?*P. manene* (Lowry & Stoddart, 1983a) [776s]; ?*P. matikuku* (Lowry & Stoddart, 1983a) [776s], ?*P. whero* (Fenwick, 1983) [774].

Habitat and distribution. Marine, amphi-Atlantic low latitudes, 180-1715 m, 2 species; *P. whero* from New Zealand, 6 m.

Paracyphocaris Chevreux

Fig.91Q

Paracyphocaris Chevreux, 1905a: 1.

Type species. *Paracyphocaris praedator* Chevreux, 1905a, original designation.

Diagnosis. Of cyphocarin form, head tall, horizontally short, grotesque. Flagellum of antenna 2 short (5-articulate); accessory flagellum vestigial, 1-articulate. Mouthparts forming quadrate bundle. Labrum and epistome almost continuous, not differentially produced, neither dominant. Incisor ordinary, rakers absent; molar absent; palp attached in middle of mandible. Inner plate of maxilla 1 weakly (3) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxae 1-2 small, strongly shortened and partly covered by coxa 3, coxa 4 largest, lobate, excavate. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, propodus simple. Uropod 3 ordinary, peduncle scarcely elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Pereopods 3-5, less so pereopod 6, prehensile, propodi thick and spiny, article 5 slightly shortened, article 2 of pereopods 5-7 expanded (versus *Crybelocephalus*).

Variables. Palp of mandible 3-articulate (type) or 2 (*P. distinctus*); pereopod 6 simple (*P. brevicornis*).

Relationship. *Paracyphocaris* is a good model for a *Paracyphocaris* group counter to the *Cyclocaris* group; the base of the flagellum on antenna 1 has no callynophore. *Paracyphocaris* seems to be primitive because the telson is elongate and deeply cleft, and the mandible has a palp but it is poorly setose.

See *Cebocaris*, *Crybelocephalus*, *Crybelocyphocaris*, *Cyphocarioides*, *Mesocyphocaris* and *Metacyphocaris*.

Species. *Paracyphocaris brevicornis* Birstein & Vinogradov, 1955, 1958, 1960 (Gurjanova, 1962) [500B]; *P. distinctus* Birstein & Vinogradov, 1963 [601A?]; *P. praedator* Chevreux, 1905a, 1935 (Schellenberg, 1926) (Stephensen, 1933b) (Shoemaker, 1945a) (Birstein & Vinogradov, 1960, 1964) (Bowman & Wasmer, 1984) [420B].

Habitat and distribution. Marine, cosmopolitan, bathy-, possibly abyssopelagic, often egg parasite on pelagic shrimp, *Oplophorus*, confirmed 900-1020 m, 3 species.

Paralibrotus Stephensen

Fig.89V

Paralibrotus Stephensen, 1923b: 61.

Type species. *Paralibrotus setosus* Stephensen, 1923b, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, both equally projecting, blunt. Incisor ordinary, molar weakly triturative, small, also setulose; palp attached slightly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 5 shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with small notch. Uropod 3 short, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson short, emarginate.

Additional characters. Peduncles of antennae 1-2 thick, articles short (versus *Lysianassa*); outer plate of maxilla 1 with only 4 spines; coxa 4 scarcely excavate posteriorly, not definitely lobate.

Relationship. Characterised from all other genera in the reduction of spines to 4 on the outer plate of maxilla 1.

Differing from *Onisimus* (= *Pseudalibrotus*) and *Boeckosiumus* in the simple gnathopod 1. From *Lysianella* in the simple gnathopod 1 and much shorter telson. From *Paralysianopsis* in the blunt (versus sharp) prebuccal mass and stouter carpus of gnathopod 1. From *Lysianopsis* in the unexpanded peduncle of uropod 3 and from *Lysianassa* in the more distally placed mandibular palp and the thick peduncles of antennae 1-2. From *Menigrates* in the more distally placed mandibular palp, thicker peduncle of antenna 2, and the deeper notch of the prebuccal mass. From *Parambasia* in the thick peduncle of antenna 2, the 2-articulate outer ramus of uropod 3, and the short telson. From female *Pseudambasia* in the slight plates of maxilla 2, the 2-articulate outer ramus of uropod 3, the relatively even size of the epistome and labrum in the prebuccal mass, the shorter telson, and the more distally placed mandibular palp.

See *Douniaella.*

Species. *Paralibrotus setosus* Stephensen, 1923b (Gurjanova, 1951) [220].

Habitat and distribution. Marine, West Greenland to Chukchi Sea, 128-166 m, 1 species.

Paralicella Chevreux

Paralicella Chevreux, 1908a: 3.–Shulenberger & Barnard, 1976: 267.

Type species. *Paralicella tenuipes* Chevreux, 1908a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome not differentially produced, separate. Incisor ordinary, molar simple, large, conicolaminate, setulose, palp attached opposite molar. Inner plate of maxilla 1 strongly (10+) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 subchelate, palm oblique, articles 5 and 6 subequal, dactyl large, article 6 of gnathopod 2 slightly shorter than article 5, both very elongate and linear, propodus subchelate, palm oblique, dactyl large. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle slightly elongate, rami subequal, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Flagella of antennae elongate, articles short; article 1 of antenna 2 swollen; article 5 of antenna 2 moderately to greatly shortened; inner plate of maxilla 2 with oblique facial row of setae; article 3 of gnathopod 1 elongate (versus *Aristias*, *Eurythenes*); outer rami of uropods 1-2 shortened.

Sexual dimorphism. Article 1 of primary flagellum on antenna 1 more elongate and better armed in male; urosomite 1 with dorsal notch in male.

Variables. Coxa 1 reduced (*P. similis*), article 2 of pereopods 5-7 alike (*P. fusiformis*), diverse (type, etc.); article 2 of pereopod 7 strongly bevelled (type, etc.), poorly bevelled (*P. caperesca*), not bevelled (*P. fusiformis*); article 2 on outer ramus of uropod 3 variable in length.

Relationship. Like *Alicella* but gnathopod 1 subchelate.

Differing from *Eurythenes* in the elongate article 3 of gnathopod 1.

Species. See Gurjanova (1962, minor records); *P. caperesca* Shulenberger & Barnard, 1976 (Thurston, 1979) [420A]; *P. fusiformis* (Birstein & Vinogradov, 1955, 1958) [510A]; *P. microps* (Birstein & Vinogradov, 1958, 1960) [510A]; *P. similis* Birstein & Vinogradov, 1960, 1962b [520A]; *P. tenuipes* Chevreux, 1908a, 1935 (Shulenberger & Barnard, 1976) [422BA].

Habitat and distribution. Marine, cosmopolitan, bathy and abyssopelagic, 1414-5720 m, 5 species.

Paralysianopsis Schellenberg

Paralysianopsis Schellenberg, 1931: 7.–K.H. Barnard, 1932: 37.–Lowry & Stoddart, 1984a: 103.
Austronisimus K.H. Barnard, 1931a: 425 (*Austronisimus rhinoceros* K.H. Barnard, 1931a, original designation).

Type species. *Paralysianopsis odhneri* Schellenberg, 1931, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, coalesced, labral part strongly projecting and sharp. Incisor ordinary, molar simple, small, scarcely ridged; palp attached slightly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large, apex weakly spinose. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, nearly simple but poorly subchelate, palm oblique, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle ordinary, inner ramus scarcely shortened, outer ramus 2-articulate, article 2 long. Telson ordinary, emarginate.

Variables. *Paralysianopsis mauritiensis* with following anomalies: outer ramus of uropod 3 1-articulate, inner ramus somewhat shortened; notch on inner ramus of uropod 2 weak; lobe of coxa 4 weak; telson un-notched.

Relationship. Differing from *Lysianassa* and allies in the relatively distal placement of the mandibular palp and the apparent fusion of the upper lip and epistome into a sharp cusp; thus from *Lysianopsis* in the short article 1 on the mandibular palp. From *Kakanui* in the weakly subchelate gnathopod 1 and distally placed mandibular palp. From female *Pseudambasia* (not = *Parambasia*) in the relatively distal mandibular palp, with short article 1; thin plates of maxilla 2, sharp prebuccal mass, and the short article 2 of antenna 1.

Species. ?*Paralysianopsis mauritiensis* Ledoyer, 1978b [697]; *P. odhneri* Schellenberg, 1931 (= *P. rhinoceros* K.H. Barnard, 1931a,1932) (Lowry & Stoddart, 1984a) [880].

Habitat and distribution. Marine, Falklands, South Georgia and ?Mauritius, 2-27 m, 2 species.

Parambasia Walker & Scott

Parambasia Walker & Scott, 1903: 221.–not Lowry & Stoddart, 1983a: 321.

Type species. *Parambasia forbesi* Walker & Scott, 1903, monotypy.

Taxonomy. Lowry & Stoddart (1983a) believe that *Pseudambasia* Walker & Scott is a junior synonym of *Parambasia.* We also believe this to be possible but keep them separate until the type species of *Parambasia* is definitely recovered.

Diagnosis. Mouthparts [?forming quadrate bundle], not styliform. Labrum and epistome [?prominent, coalesced, epistome strongly dominant in size and projection, blunt]. Incisor ordinary, molar [?absent]; palp attached strongly proximal. [?Inner plate of maxilla 1 weakly setose; palp 2-articulate, large]. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl small. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 5 much shorter than 6, dactyl large, weakly shrouded in setae; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle elongate, inner ramus inset but as long as outer, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Article 3 of gnathopod 1 elongate; propodus of gnathopod 2 broad, scutelliform, with large apical setae and small dactyl offset towards palm (like *Pseudambasia*).

Relationship. Differing from *Pseudambasia* in the elongate article 3 of gnathopod 1 and short article 5, short article 2 of antenna 1 and non-constricted inner ramus of uropod 2.

Too many other attributes of *Parambasia forbesi* are unknown to make further distinctions; for example, *Pseudambasia*, the senior synonym attributed by Lowry & Stoddart (1983a), has the unusual feature of coalesced urosomites 2-3, unknown for *Parambasia.* Items needed for *Parambasia* include details on all mouthparts, urosomites and uropods.

See *Arugella, Pronannonyx.*

Species. *Parambasia acuticaudata* Ledoyer, 1984 [586]; *P. forbesi* Walker & Scott, 1903 [676]; *P. nui* Myers, 1985c [576].

Habitat and distribution. Marine, Abd-el-Kuri, New Caledonia, and Fiji, 0 m, 3 species.

Paratryphosites Stebbing

Fig.95M

Paratryphosites Stebbing, 1899a: 206.–Jarrett & Bousfield, 1982: 120.

Type species. *Lysianassa abyssi* Goes, 1866, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?differentially produced, separate, labrum slightly dominant in size and projection, blunt]. Incisor ordinary, molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 moderately (5) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, poorly subchelate, palm oblique, article 5 longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, cleft halfway.

Additional characters. Head 'small'; article 1 of antenna 1 weakly carinate apically; female antenna 2 more than twice as long as antenna 1; pereopod 5 not shortened, pereopod 6 longest; telson cleft halfway or less, telsonic lobes broadly truncate, each with 7-9 spines; gill 7 absent.

Sexual dimorphism. Male antenna 1 flagellum elongate (30 articles versus 12 articles in female); antenna 2 flagellum elongate in male.

Relationship. Differing from *Hippomedon*, *Psammonyx* and *Wecomedon* in the strongly spinose apices of the telson, and the combination of long antenna 2 and lack of gill 7. From *Elimedon* and *Paracentromedon* in the regularly elongate article 3 of mandibular palp.

Species. *Paratryphosites abyssi* (Goes, 1866) (= *P. stephensenii* [sic] Frost, 1936) (Shoemaker, 1930b, 1955) (Gurjanova, 1962) (Jarrett & Bousfield, 1982) [200 + B].

Habitat and distribution. Marine, amphiboreal, arctic, south to 32° in West Atlantic, 0-528 m, 1 species.

Parawaldeckia Stebbing

Fig.88C

Parawaldeckia Stebbing, 1910a: 571.–Barnard & Hurley, 1975: 68.–Lowry & Stoddart, 1983a: 327.

Type species. *Nannonyx thomsoni* Stebbing, 1906, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, coalesced, with slight raphus, epistomal part strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small, conicolaminate to subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal or 5 shorter than 6, weakly lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with or without small notches. Uropod 3 parviramous, peduncle ordinary, inner ramus strongly shortened in female, less in male, outer ramus 2-articulate. Telson ordinary, weakly cleft, emarginate, or entire.

Additional characters. Palp of maxilla 1 apically serrate, not spinose; outer plate of maxilliped spineless; peduncle of uropod 3 expanded and plate-like.

Sexual dimorphism. Male primary flagellum of antenna 1 with callynophore and with calceoli; flagellum of antenna 2 elongate and calceolate; mandibular palp articles 2-3 with long spines; peduncle of uropod 1 with long dorsal spines; rami of uropod 3 more equal in size and heavily setose; telson thickened and more deeply notched than in female, with 2 dorsal rows of prickles.

Variables. Article 1 of antenna 1 cristate and/or with dorsodistal process (*P. kidderi*), these features not present (*P. hirsuta*, etc.); left lacinia mobilis present or absent (right always absent); article 1 of mandibular palp elongate (*P. stebbingi*), not elongate (*P. yamba*); palp of maxilla apically serrate (*P. dilkera*), not serrate (*P. yamba*); propodus of gnathopod 1 serrate (*P. stebbingi*, etc.), not serrate (*P. dilkera*); article 4 of pereopod 3 short (*P. pulchra*), long (*P. suzae*, etc.); notch on inner ramus of uropod 3 weak or absent; telson cleft halfway (*P. vesca*), spinose (*P. stebbingi*), or not (type, etc.).

Relationship. Generally the 'austral Lysianassa' but differing from *Lysianassa* in the mostly fused prebuccal mass with the epistomal part dominant (in *Lysianassa* the labral portion is usually dominant, occasionally with matching but never dominating epistome); also differing from *Lysianassa* in the short inner ramus of uropod 3.

Differing from *Onesimoides* in the simple gnathopod 1, proximal position of mandibular palp, and unexpanded base of the accessory flagellum. From *Clepidecrella* in the proximal position of the mandibular palp, well-developed plates of the maxilliped, better developed maxillae 1-2, and broad article 2 of pereopod 5. From *Pseudambasia* in the diversity of the sexes concerning the antennae and uropod 3, in the weak or absent notch on the inner ramus of uropod 2, the 2-articulate outer ramus of uropod 3 and in the male the simple gnathopod 1 (female *Pseudambasia* with simple gnathopod 1, male with subchelate gnathopod 1). From *Socarnella* in the 2-articulate outer ramus of uropod 3. From *Socarnoides* in the poorly notched inner ramus of uropod 2.

Waldeckia differs from *Parawaldeckia* in the elongate, deeply cleft telson and long inner ramus of uropod 3.

The prebuccal shape distinguishes *Parawaldeckia* from *Socarnes, Menigrates* and *Onesimoides*.

The parviramous uropod 3 distinguishes *Parawaldeckia* females from *Socarnes, Menigrates, Socarnella, Socarnoides* and *Waldeckia*.

Species. See Lowry & Stoddart (1983a,b); *P. angusta* Lowry & Stoddart, 1983b [775]; *P. dabita* Lowry & Stoddart, 1983a [776s]; *P. dilkera* J.L. Barnard, 1972a [787]; *P. hirsuta* Lowry & Stoddart, 1983a [844]; *P. karaka* Lowry & Stoddart, 1983b [775]; *P. kidderi* (S.I. Smith, 1876) (? = *P. anomala* Nicholls, 1938) (Bellan-Santini & Ledoyer, 1974) (Barnard & Hurley, 1975) (Lowry & Stoddart, 1983a) [835]; *P. lowryi* Myers, 1985c [576]; *P. mua* Myers, 1986b [575]; *P. parata* Lowry & Stoddart, 1983b [773]; *P. pulchra* Lowry & Stoddart, 1983a [776s]; *P. stebbingi* (Thomson, 1893) (= *P. kidderi* identification of Chilton, 1921d) (J.L. Barnard, 1972a) [780]; *P. stephenseni* Hurley & Cooper, 1974 (Lowry & Stoddart, 1983b) [775]; *P. suzae* Lowry & Stoddart, 1983a [850]; *P. thomsoni* (Stebbing, 1906) (Lowry & Stoddart, 1983a) [775]; *P. vesca* Lowry & Stoddart, 1983a [850]; *P. yamba* J.L. Barnard, 1972a [780]; species, (= *P. kidderi* identification of Chilton, 1911c) [771]; species, (= *P. kidderi* identification of Tattersall, 1922) [789]; species, (= part of *P. kidderi* identification of Stephensen, 1949) [731].

Habitat and distribution. Marine, circum-austral, primarily southern Australia, New Zealand, Fiji, and antiboreal islands, males coming to night lights, 0-42 m, 16 species.

Paronesimoides Pirlot

Paronesimoides Pirlot, 1933a: 139.

Type species. *Paronesimoides lignivorus* Pirlot, 1933a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?continuous, not differentially produced, not prominent, ?coalesced, ?labrum 'strongly dominant' in size, blunt]. Incisor ordinary, molar weakly triturative, large, weakly conicolaminate and setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner plate well developed but outer plate of maxilliped poorly developed, palp strongly exceeding outer plate, dactyl well developed, small. Coxa 1 slightly shortened and partly covered by coxa 2, tapering. Gnathopod 1 slightly enlarged, strongly subchelate, palm transverse, article 5 much shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus vestigial, fused to peduncle, outer ramus 2-articulate, weak. Telson short, entire.

Additional characters. Ocular lobe narrow and sharp; article 1 of antenna 1 with weak tooth, article 2 about 45% as long as article 1.

Relationship. Differing from *Onesimoides* in the full loss of the inner ramus on uropod 3 and the longer article 2 of antenna 1. From *Clepidecrella* in the thinner antenna 1 with longer article 2, subchelate gnathopod 1, large plates of the maxillipeds, and well-developed maxillae 1-2. From all other non-cyphocarid genera in the loss of the inner ramus on uropod 3.

Species. *Paronesimoides lignivorus* Pirlot, 1933a [601A].

Habitat and distribution. Marine, Celebes Sea, 2053 m, 1 species.

Paronesimus Stebbing

Paronesimus Stebbing, 1894: 14.

Type species. *Paronesimus barentsi* Stebbing, 1894, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, neither dominant in size nor projection, blunt. Incisor ordinary, molar weakly triturative, small, almost conicolaminate; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, nearly simple, palm oblique, article 5 slightly shorter than 6, dactyl large and strongly overlapping obsolescent palm; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely and weakly chelate. Inner ramus of uropod 2 without large notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, weakly or well cleft.

Additional characters. Article 1 of antenna 1 dorsally cristate (but weakly in *P. uschakovi*); palp of maxilla 1 with 4 apical spines (versus *Boeckosimus*); plates of maxilla 2 very thin (versus *Anonyx*); outer plate of maxilliped with numerous tiny bead-like spines (versus *Anonyx*); propodus of gnathopod 2 slightly inflated, dactyl large; uropod 3 not overextending uropod 2 (versus *Anonyx*).

Variables. Articles 5 and 6 of gnathopod 1 subequal (*P. uschakovi*); telson weakly cleft (type), more deeply cleft (*P. uschakovi*).

Relationship. Very close to *Rifcus* but differing in the elongate telson, longer palp of the maxilliped and the normal spines on the outer plate of maxilla 1.

Very close to *Pseudoanonyx* but differing in the larger dactyls of both gnathopod 1 and the maxilliped.

Differing from *Boeckosimus* in the broader palm and larger dactyl of gnathopod 2, the elongate telson, more elongate mandibular palp, and more elongate palp of maxilla 1 with fewer apical spines. From *Anonyx* in the narrow inner plate of maxilla 2, smaller uropods, fewer spines on the palp of maxilla 1, and the "...small bead-like spines on the outer plate of the maxilliped..." (fide Stebbing, 1894, not necessarily well documented). From *Menigrates* in the elongate telson, longer dactyl of the maxilliped and in the more distally placed mandibular palp. From *Ichnopus* in the short article 3 and lack of an inner setal brush on the dactyl of gnathopod 1. From *Paracentromedon* in the larger head, thinner inner plate of maxilla 2, fewer spines or teeth on the apex of the palp on maxilla 1 and the shorter uropods. From *Menigratopsis* in the larger head, more evenly spined outer plate of the maxilliped, the larger dactyl of gnathopod 2 and the shorter uropod 3.

Species. *Paronesimus barentsi* Stebbing, 1894 (Stephensen, 1935a) (Dunbar, 1954) (Shoemaker, 1955a) (Gurjanova, 1962) [200]; *P. uschakovi* Gurjanova, 1933b, 1935, 1951 [292].

Habitat and distribution. Marine, high Arctic (including Hudson Bay), 12-180 m, 2 species.

Parschisturella Andres

Parschisturella Andres, 1983: 212.

Type species. *Parschisturella simplex* Andres, 1983, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in size and projection, sharp. Incisor ordinary, molar weakly triturative, large, also setulose; palp attached opposite molar. Inner plate of maxilla 1 moderately (5-7) setose apically; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened but large and visible, not tapering. Gnathopod 1 short, simple, (or weakly subchelate), article 6 shorter than 5, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with small (to large) notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Antenna 1 article 1 carinate; maxilliped outer plate with apical spines and setae (versus *Tryphosites*), palp very long (versus *Tryphosites*); gnathopod 1 palm very small, transverse, 4-dentate, dactyl with inner tooth; pereopods 5-7 short (versus *Tryphosites*); each apex of telson with 2+ (usually 3-5) spines.

Variables. Notches above and below sharp process of prebuccal mass absent (*P. carinata*); gnathopod 1 simple (type), subchelate, palm small and transverse (*P. capadarei*, *P. carinata*).

Relationship. Differing from *Schisturella*, *Ambasiopsis* and *Metambasia* in the much larger coxa 1, sharply conical process of the upper lip, lack of the one especially enlarged basalmost medial seta on the inner plate of maxilla 2, many more apical spines on the outer plate of the maxilliped, and the shorter article 1 on the primary flagellum of antenna 1. From *Tryphosites* in the shorter article 1 of the primary flagellum, the fusion of the prebuccal mass and lack of notch therein, the presence of 5+ (versus 2) setae on the inner plate of maxilla 1, the presence of apical spination on the outer plate of the maxilliped, the long maxillipedal palp, the unexpanded apex of coxa 1, the almost simple gnathopod 1 and the short pereopods 5-7. From *Paralysianopsis* in the elongate, deeply cleft telson, carinate antenna 1, and the presence of a tooth on epimeron 3. From *Tryphosella* in the unreduced coxa 1 and sharp prebuccal mass. From *Cicadosa* in the sharp prebuccal mass, poorly subchelate gnathopod 1 and well-setose inner plate of maxilla 1.

Identification note. The second species requires further distinction from the earlier, less fully described *P. carinata.*

Species. *Parschisturella carinata* (Schellenberg, 1926a, 1931, as *Tryphosa*) (= *P. capadarei* Hurley, 1965) (= *P. stebbingi* identification of Chilton, 1912) [870 + B]; *P. simplex* Andres, 1983 [833].

Habitat and distribution. Marine, Antarctica and outliers, 0-385 m, 2 species.

Perrierella Chevreux & Bouvier

Fig.93A

Perrierella Chevreux & Bouvier, 1892.–Lincoln, 1979a: 46.
Pararistias Robertson, 1892: 201 (*Lysianassa Audouiniana* Bate, 1857a, monotypy).

Type species. *Perrierella crassipes* Chevreux & Bouvier, 1892 (= *Lysianassa Audouiniana* Bate, 1857a), original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not differentially produced, not prominent, coalesced, blunt. Incisor ordinary, molar simple, obsolescent, conicolaminate, setulose, palp attached opposite molar. Inner plate of maxilla 1 moderately (6) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp not exceeding outer plate, dactyl absent. Coxa 1 strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, poorly subchelate, palm oblique, articles 5 and 6 subequal, 5 weakly lobate, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus not shortened, outer ramus 2-articulate. Telson elongate, emarginate.

Additional characters. Head large, but flat, relative to body, rostrum large and keel-like; antenna 1 thin; main flagella of antennae 1-2 about 4-articulate; article 2 of mandibular palp elongate, article 3 less than 60% as long as article 2; plates of maxilla 2 short, broad, gaping, arranged so inner plate with medial edge setose; inner plates of maxilliped very small; gnathopod 1 very short and thick; pereopods 3-7 with weak chelate palm.

Relationship. Differing from *Menigrates* in the elongate uncleft telson and short coxa 1. From *Adeliella* in small coxa 1, well setose and spinose maxillae 1-2, and elongate telson.

Close to *Aristias* and *Ambasia* but differing in loss of maxilliped dactyl and uncleft telson.

Close to but differing from *Ambasiopsis* and

Scholasturella in the undivided prebuccal mass lacking labral lobation, reduced inner plate and palp of maxilliped, and uncleft telson.

Differing from *Centromedon* in the much smaller coxa 1, shorter coxae 2-4; multisetose inner plate of maxilla 1; broad, short plates of maxilla 2; and uncleft telson. From *Paralibrotus* in the short coxa 1, well-setose inner plate of maxilla 1, no maxilliped dactyl, and elongate telson.

Species. *Perrierella audouiniana* (Bate, 1856, 1857a) (= *P. crassipes* Chevreux and Bouvier, 1892) (Sars, 1895) (Chevreux & Fage, 1925) (Stephensen, 1935a) (Lincoln, 1979a) [355 + I].

Habitat and distribution. Marine, West Norway to eastern Mediterranean, occasionally on sponges, 0-100 m, 1 species.

Phoxostoma K.H. Barnard

Phoxostoma K.H. Barnard, 1926: 323.–Lowry & Stoddart, 1983a: 284.

Type species. *Phoxostoma algoense* K.H. Barnard, 1926, monotypy.

Diagnosis. Of conicostomin form. Mouthparts forming conical bundle, some weakly styliform. Labrum and epistome not differentially produced, not prominent, separate, blunt. Incisor ordinary, molar simple, small, conicolaminate or subconical, setulose, palp attached proximal to molar. Inner plate of maxilla 1 naked or with 1 seta, palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl small to vestigial. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, outer ramus 1-articulate. Telson ordinary, emarginate or moderately cleft.

Additional characters. Head visible; antenna 1 with tooth; rakers present; outer plate of maxilla 1 with about 7 spines; outer plate of maxilla 2 thin, attached to geniculate process; dactyl of maxilliped small; article 4 of pereopods 5-7 slightly expanded posteroventrally, articles 5-6 narrow; uropods 1-2 strongly setose.

Sexual dimorphism. Reproductive male with elongate flagellum of antenna 2.

Variables. Gills pleated; antenna 1 lacking tooth; inner plate of maxilla 1 lacking seta (versus 1 giant in TS); telson deeply notched (all *P. variegatus*, probably = another genus).

Relationship. The most primitive conicostomin because of the elongate antenna 2 in the reproductive male, presence of (albeit vestigial) gill 7, and non-compressed urosome with well-developed biramous uropod 3. Differing from *Bonassa* and *Dartenassa* in the geniculate outer plate of maxilla 2.

Species. *Phoxostoma algoense* K.H. Barnard, 1926 (Griffiths, 1974c, 1975) (Lowry & Stoddart, 1984b) [743]; *P. hypocrita* (Ruffo, 1953b) [447]; ?*P. variegatus* (Stimpson, 1856a) (Stebbing, 1888) (?Ledoyer, 1979a, 1986) [743 to 683].

Habitat and distribution. Marine, Congo River around Cape of Good Hope to Zanzibar, shallow to 118 m, ?3 species.

Podoprion Chevreux

Podoprion Chevreux, 1891b: 6.

Type species. *Podoprion bolivari* Chevreux, 1891b, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome not differentially produced, separate, neither dominant in size nor projection, blunt. Incisor [?toothed]; molar absent; palp attached strongly distal. Inner plate of maxilla 1 moderately (6) setose apically; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, palm poorly chelate, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely and bluntly chelate. Inner ramus of uropod 2 without notch. Uropod 3 elongate, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Article 1 of antenna 1 with ventral tooth; antennal flagella elongate; incisor ?toothed; article 1 of palp on maxilla 1 elongate; outer plate of maxilla 2 narrower than inner; article 3 of gnathopod 1 slightly elongate; article 2 of pereopod 5 with large posterior teeth (indurated); pereopods 6-7 very elongate; uropods 1-3 elongate.

Relationship. Characterised by chelate gnathopod 1, indurate pereopod 3 and slightly reduced coxa 1.

Differing from *Valettia* in the elongate telson and uropod 3, weak to absent molar, elongate article 1 of palp on maxilla 1 and indurated pereopod 5. From *Podoprionella, Prachynella, Podoprionella* and

Normanion in the well-developed palp and dactyl of the maxilliped. From *Hirondellea* in the smaller, less globular head, elongate telson and indurated pereopod 5. From *Euonyx* in the elongate pereopods 6-7 and uropod 3, the gap in the chela of gnathopod 1, elongate article 1 of the palp on maxilla 1, and the indurated pereopod 5. From *Opisa* in the narrow chela of gnathopod 1, elongate pereopods 6-7, large palp of the maxilliped, and non-eusirid carpus of gnathopod 1. From *Cheirimedon* in the long, unlobate carpus of gnathopod 1, narrow chela of gnathopod 1, elongate antennae and pereopods 6-7 and uropod 3 and the indurated pereopod 5. From *Gainella, Pachynus, Koroga, Figorella, Sophrosyne*, and *Kyska* in the reduced coxa 1. From *Sophrosyne* in the smaller coxa 1, elongate telson, indurated pereopod 5, elongate pereopods 6-7 and uropod 3, and the long carpus of gnathopod 1. From following genera also bearing indurated pereopod 5 in the well-developed maxillipedal palp: *Podoprionella* and *Podoprionides*.

Glycerina and *Lucayarina* have a simple gnathopod 1, normal palp of maxilla 1 and short uropod 3.

Schisturella has a subchelate gnathopod 1 and untoothed pereopod 5.

Species. *Podoprion bolivari* Chevreux, 1891b (Chevreux & Fage, 1925) (Karaman, 1973b) (Ledoyer, 1977) [330].

Habitat and distribution. Marine, Brittany to Mediterranean, 12-183 m, 1 species.

Podoprionella Sars

Podoprionella Sars, 1895: 687.

Type species. *Podoprionella norvegica* Sars, 1895, 'onotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, not differentially produced, coalesced, submassive, blunt. Incisor ordinary, molar absent; palp attached slightly proximal. Inner plate of maxilla 1 vestigial, naked, or absent, palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp weak, not exceeding outer plate, dactyl absent. Coxa 1 slightly shortened and partly covered by coxa 2, not tapering. Gnathopod 1 enlarged, strongly chelate, article 5 shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, both very elongate and linear, propodus minutely chelate. Inner ramus of uropod 2 with notches. Uropod 3 ordinary, peduncle elongate, inner ramus strongly shortened, outer ramus 2- articulate. Telson ordinary, entire.

Additional characters. Article 3 of mandibular palp much less than half as long as article 2; outer plate of maxilla 1 with 6 spines; article 2 of pereopods 5-7 deeply indentured; inner ramus of uropod 2 notched on both sides.

Variables. Plates of maxilla 2 of similar width but inner short (type), extending equally, but inner very broad, outer thin (*P. fissicaudata*); telson weakly cleft (*P. fissicaudata*).

Relationship. Differing from *Podoprionides* and *Normanion* in the uncleft telson; and from *Normanion* in the indentured pereopods 5-7, non-eusirid carpus of gnathopod 1 and shorter peduncle of uropod 2. From *Podoprionides* also in the 1-articulate outer ramus of uropod 3.

Species. *Podoprionella fissicaudata* Ledoyer, 1977 [348]; *P. norvegica* Sars, 1895 (Stephensen, 1935a) [238].

Habitat and distribution. Marine, Marseille to Trondjheim Fjord, west Norway, 50-180 m, 2 species.

Podoprionides Walker

Podoprionides Walker, 1906b: 457.

Type species. *Podoprionides incerta* Walker, 1906b, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome weakly separate, blunt. Incisor ordinary, molar absent; palp attached slightly proximal. Inner plate of maxilla 1 naked; palp 2-articulate, large. Inner poorly and outer plate of maxilliped well developed, palp not exceeding outer plate, dactyl absent. Coxa 1 large and visible, not tapering. Gnathopod 1 enlarged, strongly chelate, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Mandibular palp article 3 more than half as long as article 2 (versus *Podoprionella*); coxae small; article 2 of pereopods 5-7 deeply indentured.

Sexual dimorphism. Primary flagellum of antenna 1 with callynophore, enlarged and more brushy than in female.

Relationship. Differing from *Podoprion* in having pereopods 6-7 also indentured, and incisor not toothed. From *Podoprionella* in the longer article 3 of the mandibular palp, 2-articulate outer ramus of uropod 3, and small coxae. From the following genera in the indentured pereopods 5-7: *Euonyx*, *Gainella*, *Normanion* and *Opisa*.

Species. *Podoprionides incerta* Walker, 1906b, 1907, (Schellenberg, 1926a) (K.H. Barnard, 1930) [870 + B].

Habitat and distribution. Marine, Antarctica, ?0-?385 m (depths unclarified), 1 species.

Prachynella J.L. Barnard

Prachynella J.L. Barnard, 1964b: 232.–Lowry, 1984b: 72.

Type species. *Prachynella lodo* J.L. Barnard, 1964b, original designation.

Diagnosis. Of pachynin form. Mouthparts forming conical bundle, somewhat styliform, some reduced. Labrum and epistome [?continuous, not differentially produced, not prominent, blunt]. Incisor ordinary, molar absent; palp attached strongly distal. Inner plate of maxilla 1 strongly reduced, not setose; palp absent or vestigial. Inner poorly and outer plates of maxilliped well developed, palp shorter than outer plate, dactyl absent, thus 3-articulate. Coxa 1 large and visible, not tapering. Gnathopod 1 strongly enlarged, strongly chelate, article 5 shorter than 6, vestigial, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus strongly shortened, outer ramus 2-articulate. Telson ordinary, entire.

Additional characters. Base of flagellum on antenna 1 conjoint, with rows of aesthetascs; peduncle of antenna 1 with weak cristae; mandible lacking rakers and lacinia mobili; maxilla 1 with vestigial palp (*P. mediterraneum*); palp lacking setae; spines on outer plate of maxilla 1 sculptured, 8-10; plates of maxilla 2 very thin; coxa 4 with well-developed posteroventral lobe; gnathopod 1 palm defined by complex spines; pereonite 5 with small posterodorsal tooth; article 4 of pereopods 5-7 expanded.

Relationship. Differing from *Drummondia* in the absence of lacinia mobilis on the mandible, fewer spines on the outer plate of maxilla 1 and in the presence of only 3 articles on the maxillipedal palp.

Differing from *Pachynus* and *Figorella* in the short (3-articulate) palp of the maxilliped and the lack of the palp on maxilla 1. From *Podoprionella* in the vermiform body and small coxae, non-indurated pereopods 5-7, the 2-articulate outer ramus of uropod 3, thin plates of maxilla 2, lack of palp on maxilla 1 and vestigial wrist of gnathopod 1.

See *Pachychelium*.

Species. See J.L. Barnard (1966a,b); *P. lodo* J.L. Barnard, 1964b (J.L. Barnard, 1967a) (Lowry, 1984b: 72) [370 + B + 391]; *P. mediterraneum* (Lowry, 1984b: 72) (Ruffo, 1975b) [345].

Habitat and distribution. Marine, California, west Mexico and Adriatic Sea, 10-791 m, 2 species.

Procyphocaris J.L. Barnard

Procyphocaris J.L. Barnard, 1961a: 48.

Type species. *Procyphocaris primata* J.L. Barnard, 1961a, original designation.

Diagnosis. Of cyphocarid form with coxae 1-2 strongly shortened and partly covered by coxa 3, both tapering, coxa 2 largest. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, not prominent, coalesced, neither dominant in size nor projection, blunt. Incisor ordinary, molar weakly triturative, small; palp attached opposite molar. Inner plate of maxilla 1 [?weakly setose]; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Gnathopod 1 short, nearly simple, palm oblique, article 5 longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle slightly elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Head slightly reduced and deformed; coxae 4-5 very large.

Relationship. The least specialised cyphocarid with essentially ordinary head bearing well-developed ocular lobes, well-developed triturative molar, non-indentured pereopods and lacking significant prehensility on pereopods. Mouthparts, legs and uropods essentially normal.

Species. *Procyphocaris indurata* K.H. Barnard, 1926 (= *P. primata* J.L. Barnard, 1961a) (Griffiths, 1975) (Ledoyer, 1986) [625B].

Habitat and distribution. Marine, southern Australia and southern Africa, 1280-1320 m, 1 species.

Pronannonyx Schellenberg

Pronannonyx Schellenberg, 1953: 107.

Type species. *Pronannonyx minimus* Schellenberg, 1953, monotypy.

Diagnosis. Mouthparts forming [?quadrate] bundle. Labrum and epistome continuous, prominent, coalesced, blunt. Incisor ordinary, molar simple, ['verkummert'], small; palp attached strongly distal to molar. Inner plate of maxilla 1 weakly (several) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl small. Coxa 1 large and visible, not tapering, not expanded. Gnathopod 1 short, simple, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle expanded, plate-like, rami short, inner slightly shortened, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Palp article 3 of mandible elongate (articles 1-3 = 11:20:14); maxilliped palp short and thin, dactyl small.

Relationship. Differing from *Parambasia* in antenna 1 being less cristate, flagella of antennae 1-2 shorter, coxa 1 not expanded apically, not adze-shaped, and in the shorter telson. From *Socarnes* group in the unpleated gills. From *Nannonyx* in the more projecting prebuccal area with no epistomal part apparent, narrower gnathopod 1, and lack of article 2 on the outer ramus of uropod 3.

Species. *Pronannonyx minimus* Schellenberg, 1953 [743].

Habitat and distribution. Marine, south-west Africa, Luderitz Bay to Walvis Bay, shallow water, 1 species.

Psammonyx Bousfield

Psammonyx Bousfield, 1973: 144.–Bousfield & Jarrett, 1982: 118.

Type species. *Anonyx nobilis* Stimpson, 1853, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome not prominent, separate, labrum slightly dominant in projection, blunt. Incisor ordinary, molar triturative, large, also setulose, palp attached opposite molar. Inner plate of maxilla 1 weakly (1-2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, strongly subchelate, palm oblique, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate or chelate. Inner ramus of uropod 2 without notch. Uropod 3 almost equiramous, ordinary, peduncle ordinary, outer ramus -articulate. Telson elongate, deeply cleft.

Additional characters. Peduncle of antenna 1 little inflated but elongate, weakly cristate apicodorsally; flagellar article 1 shorter than either articles 2-3 of peduncle (versus *Wecomedon*); coxae 2-4 very long (versus *Anonyx*); dactyl of gnathopod 1 lacking tooth; article 4 of pereopods 3-4 strongly produced anterodistally; pereopod 5 about 25% shorter than pereopods 6-7 (versus *Wecomedon*); pereopod 7 distinctly longest (versus *Wecomedon*); coxal gill 7 absent (versus *Hippomedon*).

Sexual dimorphism. Female with or without calceoli on antenna 2, male with calceoli on antenna 1-2.

Variables. Antenna 2 with calceoli in female (Atlantic), without calceoli (Pacific); coxae 1-4 well setose (type), setae absent, notches unitary (all others); gnathopod 1 articles 5-6 long and narrow (Pacific species), short and broad (Atlantic species); epimeron 3 tooth well developed (Pacific species, *P. longimerus*, *P. kurilicus*), not well developed (Atlantic species, *P. nobilis*, *P. terranovae*); telson with lateral spines (type), lacking spines (*P. terranovae*).

Relationship. *Kyska* differs in chelate gnathopod 1 with short lobate carpus and apically expanded coxa 1.

Differing from *Wecomedon* in the long pereopod 7, short pereopod 5 and short article 1 of primary flagellum on antenna 1.

Hippomedon differs from *Psammonyx* in conjoint base of primary flagellum on antenna 1 and presence of coxal gill 7.

Differing from *Anonyx* in the unexpanded coxa 1, longer coxae 2-4, smaller head, stronger and ridged molar, and longer pereopod 7. From *Tmetonyx* in the short article 3 of gnathopod 1.

Paratryphosites differs in the apically broad, spinose (7-9) lobes of telson, with the telson cleft only halfway.

See *Wecomedon*

Species. *Psammonyx kurilicus* (Gurjanova, 1962) [280]; *P. longimerus* Jarrett & Bousfield, 1982 [270]; *P. nobilis* (Stimpson, 1853) (= *P. quadratus* Kunkel, 1918) (Shoemaker, 1930a) (Bousfield, 1973) (J. Dickinson *et al.*, 1980) [260]; *P. terranovae* Steele, 1979c [255].

Habitat and distribution. Marine, pan boreal, 0-200 m, 4 species.

Pseudamaryllis Andres

Pseudamaryllis Andres, 1981a: 436.

Type species. *Pseudamaryllis nonconstricta* Andres, 1981a, original designation.

Diagnosis. Mouthparts forming quadrate bundle.

Labrum and epistome separate, neither dominant in size nor projection, blunt. Incisor ordinary, molar simple, large, conicolaminate or subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp absent. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2. Gnathopod 1 short, simple, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, but peduncle elongate, outer ramus 1-articulate. Telson ordinary, weakly cleft.

Additional character. Anteroventral corner of coxa 4 rounded (versus *Vijaya*).

Relationship. Differing from *Amaryllis* and *Vijaya* in the absence of the notch on the inner ramus of uropod 2 and the strongly proximal position of the mandibular palp. From *Vijaya* in the rounded anteroventral corner of coxa 4.

Species. *Pseudamaryllis nonconstricta* Andres, 1981a (Ledoyer, 1986) [677B].

Habitat and distribution. Marine, Red Sea, bathyal, 731-1544 m, 1 species.

Pseudambasia Stephensen

Pseudambasia Stephensen, 1927a: 305.
not *Parambasia* Walker & Scott, 1903 (see).

Type species. *Pseudambasia bipartita* Stephensen, 1927a, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous, prominent, coalesced, epistomal part strongly dominant in size and projection, blunt. Incisor ordinary, smooth; palp attached strongly proximal. Inner plate of maxilla 1 naked; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, sexually diverse, nearly simple in female, strongly subchelate in male, palm oblique and excavate, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 with large notch. Uropod 3 almost aequiramous, short, but peduncle elongate, inner ramus scarcely shortened, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. Article 2 of antenna 1 longer than usual, more than half as long as article 1; mandibular palp article 1 elongate, article 3 with only 2 feeble E setae; plates of maxilla 2 short broad, inner triangular, outer rectangular, inner with setose bevelled apical margin; outer plate of maxilliped lacking spines; propodus of gnathopod 2 broad, scutelliform, with large apical setae and small dactyl offset towards palm (like *Parambasia*); *urosomites 2-3 coalesced.*

Sexual dimorphism. Propodus of gnathopod 1 in male powerful, well subchelate, in female propodus feeble, palm obsolescent, dactyl more feeble; otherwise antennae, eyes and uropods similar between the sexes.

Technical note. Molar absent, line of setae noted by Lowry & Stoddart (1983a) not considered to be molar but normal to other lysianassids with pubescence between rakers and molars.

Relationship. Differing from *Parambasia* in the short article 3 and long article 5 of gnathopod 1, long article 2 of antenna 1, constricted inner ramus of uropod 2; and see *Parambasia*. From *Lysianassa* in the dominant epistome in the prebuccal mass. From *Adeliella* in the elongate article 2 of antenna 1, constricted inner ramus of uropod 2, large dactyl of the maxilliped and absence of molar. From *Nannonyx* in the unexpanded peduncle of uropod 3, broad plates of maxilla 2, larger dactyl on the maxilliped and the coalesced urosomites 2-3. From *Microlysias* in the slender articles on the peduncle of antenna 2. From *Parawaldeckia* in the long inner ramus of uropod 3. From *Paralysianopsis* in the blunt (not sharp) prebuccal mass, broad plates of maxilla 2, proximal position of the mandibular palp and the 1-articulate outer ramus of uropod 3. From *Socarnella* in the longer article 2 of antenna 1, lack of tooth on articles 1-2 of antenna 1 and the unnotched telson. From *Pronannonyx* in the longer palp of the maxilliped, unexpanded peduncle of uropod 3, equal rami of uropod 3, unconstricted inner ramus of uropod 2 and probably the broader plates of maxilla 2.

Species. *Pseudambasia rossii* Stephensen, 1927a (= *P. bipartita* Stephensen, 1927a) (Lowry & Stoddart, 1983a) [850].

Habitat and distribution. Marine, southern New Zealand and outliers, 0-25 m, 1 species.

Pseudoanonyx Kudrjaschov

Pseudoanonyx Kudrjaschov, 1965a: 515.

Type species. *Pseudoanonyx caecus* Kudrjaschov, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?separate, labrum slightly dominant in projection, blunt]. Incisor ordinary, molar simple, large, conicolaminate or subconical, setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose (setae large); palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl small, tumid but weakly unguiform. Coxa 1 large and visible, not tapering. Gnathopod 1 short, poorly subchelate, palm transverse, almost chelate, article 5 subequal to 6, lobate, dactyl very small; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate, dactyl very small. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Dactyl of maxilliped short and tumid; propodus of gnathopod 1 like typical lysianassid gnathopod 2; pereopods 3-4 without locking spines.

Relationship. Characterised by the reduced dactyl of gnathopod 1, with gnathopod 1 thus resembling gnathopod 2, and the reduced and tumid dactyl on the maxilliped.

Like *Anonyx* but gnathopod 1 minutely chelate and similar to gnathopod 2, and locking spines on pereopods 3-4 absent.

Differing from *Pachynus* in the elongate cleft telson.

Vaguely similar to *Gainella* but molar not ridged, palp opposite molar, inner plates of maxillipeds not styliform and inner ramus of uropod 3 well developed.

Technically like scopelocheirins in gnathopod 1 but differing from all of those genera in the tumid dactyl of the maxilliped, and the stout gnathopod 1 with minutely chelate palm like a misplaced gnathopod 2.

Differing from *Centromedon* in the better developed gnathopod 1 and apically expanded coxa 1. From *Paronesimus* in the elongate telson, reduced dactyl of gnathopod 1 and tumid, reduced dactyl of the maxilliped. From *Orchomene* in the reduced dactyl of gnathopod 1.

Species. *Pseudoanonyx caecus* Kudrjaschov, 1965a [282].

Habitat and distribution. Marine, Okhotsk Sea, Penzhinskaya Gulf, 124 m, 1 species.

Pseudocyphocaris Ledoyer

Pseudocyphocaris Ledoyer, 1986: 82.

Type species. *Pseudocyphocaris coxalis* Ledoyer, 1986, original designation.

Diagnosis. Of cyphocarin form, head tall, horizontally short, grotesque. Flagella of antennae short, base of flagellum on antenna 1 essentially not conjoint, accessory flagellum small. Mouthparts forming quadrate bundle. Labrum and epistome apparently fused together, strongly projecting. Incisor ordinary, molar absent, palp poorly setose, attached strongly proximal to molar. Inner plate of maxilla 1 naked; palp [?2-articulate], large. Inner and outer plates of maxilliped well developed, palp feeble, barely exceeding outer plate, dactyl absent. Coxae 1-3 small, strongly shortened and fully covered by coxa 4, latter large and visible, strongly lobate and excavate, coxa 5 usually medium-small. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, both elongate and linear, propodus minutely subchelate. Uropod 3 small, peduncle elongate, inner ramus slightly shortened, outer ramus 1-articulate, but with strong notch marking fused article 2. Telson slightly elongate, entire.

Additional characters. Calceoli unknown (only female known). Article 2 of pereopods 5-7 diverse, linear (5), weakly expanded (6), broadly shield-shaped (7); outer rami of uropods 1-2 with deep notch.

Relationship. *Pseudocyphocaris* joins *Cyphocaris* because coxa 3 is as small as coxae 1-2 and covered by coxa 4; in other cyphocarins coxa 3 is large. But *Pseudocyphocaris* is distinctive in the thin article 2 of pereopod 5, the proximal mandibular palp, the naked inner plate of maxilla 1, uncleft telson, unequal rami of uropod 3, simple pereopods, and absence of callynophore on flagella of antennae.

Differing from *Crybelocyphocaris* in the small coxa 3, short inner ramus of uropod 3, and notched 1-articulate outer ramus of uropod 3.

Species. *Pseudocyphocaris coxalis* Ledoyer, 1986 [725wN].

Habitat and distribution. Marine, Indian Ocean, Walters Bank, 40-43 m, epipelagic, 1 species.

Pseudokoroga Schellenberg

Pseudokoroga Schellenberg, 1931: 16.

Type species. *Pseudokoroga barnardi* Schellenberg, 1931, monotypy.

Diagnosis. Mouthparts forming quadrate bundle, weakly styliform. Labrum and epistome prominent, separate, epistome dominant in size and projection, blunt. Incisor ordinary, molar weakly triturative, of medium size, also setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner moderately and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 in male strongly enlarged, strongly subchelate, palm transverse, article 5 much shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle slightly elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, entire or emarginate.

Additional characters. Plates of maxilla 2 and maxilliped very thin (versus *Koroga*), inner plate of maxilla 2 almost as long as outer (versus *Koroga*) coxa 1 not expanded anteroventrally (versus *Koroga*).

Relationship. Differing from *Koroga* in the moderately well-developed and triturative molar, thinner plates of maxilla 2, with the inner plate almost reaching the apex of the outer plate, in the shorter dactyl of the maxilliped, the apically unexpanded coxa 1, smaller head and the presence of a notch on the inner ramus of uropod 2. From *Orchomene* in the expanded propodus of gnathopod 1.
See *Rimakoroga*.

Removal. *Pseudokoroga rima* J.L. Barnard, 1964, to *Rimakoroga*.

Species. *Pseudokoroga barnardi* Schellenberg, 1931 [831].

Habitat and distribution. Marine, Falkland Islands, 40 m, 1 species.

Pseudonesimoides Bellan-Santini & Ledoyer

Pseudonesimoides Bellan-Santini & Ledoyer, 1974: 686.

Type species. *Pseudonesimoides cornutilabris* Bellan-Santini & Ledoyer, 1974, original designation.

Diagnosis. Mouthparts forming slightly conical bundle. Labrum and epistome continuous, not differentially produced, coalesced, blunt. Incisor ordinary, molar absent; palp attached strongly proximal. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp not exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened and tapering, mostly visible. Gnathopod 1 short, palm poorly chelate, article 5 shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with small notch. Uropod 3 short, peduncle expanded, plate-like, inner ramus absent, outer ramus, short, 1-articulate. Telson ordinary, entire, subtriangular.

Additional characters. Ocular lobe thick and long (versus *Paronesimoides*); antennae very short, antenna 1 scarcely exceeding ocular lobe, flagella sparsely articulate; rakers present; following edges with very thick spines: apex of outer lobe of lower lip (1 spine); palp of maxilla 1; apex of inner and medial margin of outer plate on maxilliped; dactyl of maxilliped thin and sharp (versus *Derjugiana*); peduncle of uropod 3 with apicomedial hump.

Sexual dimorphism. Males smaller than females (only distinction).

Relationship. Differing from *Onesimoides* in uropod 3 bearing only 1 ramus, carpus of gnathopod 1 shorter than propodus, and shorter article 1 of primary flagellum on antenna 1. From *Paronesimoides* in the short maxillipedal palp, thick ocular lobe, short article 2 of antenna 1, lack of molar, and 1-articulate outer ramus of uropod 3. From *Derjugiana* in the thin maxillipedal dactyl, presence of rakers, broader plates of maxilla 2, short antennae and much less styliform mandible.

Species. *Pseudonesimoides cornutilabris* Bellan-Santini & Ledoyer, 1974 (Lowry & Stoddart, 1983a) [810].

Habitat and distribution. Marine, Kerguelen and Macquarie Islands, 10-124 m, 1 species.

Pseudorchomene Schellenberg

Fig.92Z

Pseudorchomene Schellenberg, 1926a: 295.–Lowry & Stoddart, 1983a: 381.

Type species. *Orchomenopsis coatsi* Chilton, 1912, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, separate, labrum slightly dominant in size and projection, blunt. Incisor ordinary, molar triturative, large; palp attached slightly proximal to corner of molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large, apex spinose. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 greatly elongate, nearly simple, palm short and transverse, tuberculate, articles 5 and 6 subequal, both very elongate and linear, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Article 1 of accessory flagellum elongate and primary flagellum with callynophore in both sexes; article 3 of gnathopod 1 elongate; rami of uropod 3 setose in both sexes.

Sexual dimorphism. Males with calceoliferous antennae.

Relationship. Characterised by the elongate articles 3, 5 and 6 of gnathopod 1, setose rami of uropod 3 in both sexes, large callynophore of primary flagellum on antenna 1, weakly proximal mandibular palp, and deeply cleft telson.

Differing from *Orchomene* in the long linear articles of gnathopod 1, more distally placed mandibular palp and presence of plumose setae on the rami of uropod 3 in both sexes. From *Hippomedon* in the large head not covered by coxa 1. From *Tryphosella* in the immediate molarial position of the mandibular palp. From *Socarnes* in the elongate articles of gnathopod 1, and the larger article 1 of the primary flagellum. From *Waldeckia* in the slightly subchelate gnathopod 1, less proximal mandibular palp, longer carpus of gnathopod 1, much smaller lobe of coxa 4 (huge in *Waldeckia*), thus base of pereopod 5 hidden, larger article 1 on the primary flagellum of antenna 1, elongate article 3 of gnathopod 1, and stronger spines on the palp of maxilla 1. From *Socarnella* in the longer gnathopod 1, with longer article 6, the 2-articulate outer ramus of uropod 3, and the slightly subchelate gnathopod 1. From *Psammonyx* and *Menigratopsis* in the elongate gnathopod 1 with elongate article 3. From *Socarnopsis* in the 2-articulate outer ramus of uropod 3, and elongate articles 3, 5, 6 of gnathopod 1.

Species. *Pseudorchomene coatsi* (Chilton, 1912) (Nicholls, 1938) (Lowry & Stoddart, 1983a) (Andres, 1983) [870 + B].

Habitat and distribution. Marine, Antarctica, 15-295 m, often coming to baited traps, 1 species.

Rhinolabia Ruffo

Rhinolabia Ruffo, 1971: 103.

Type species. *Rhinolabia parthenopeia* Ruffo, 1971, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome continuous but differentially produced, prominent, coalesced, labrum strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small, subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible but tapering slightly. Gnathopod 1 short, nearly simple, palm oblique, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle slightly elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, entire but emarginate.

Additional characters. Outer plate of maxilla 1 with 11 spines in 2 kinds of 7 + 4; pereopod 6 as long as 5, thus articles 4-6 longer and thinner than on pereopod 5, article 2 with anteroventral and posteroventral lobes.

Relationship. Differing from *Lysianassa* and related genera in the undivided prebuccal mass, the shape of pereopod 6 (see 'Additional characters'), the elongate dactyls of pereopods 6-7 and the elongate outer ramus on article 2 of the outer ramus on uropod 3. From *Parawaldeckia* in the long inner ramus of uropod 3. From *Paralysianopsis* in the simple gnathopod 1, unconstricted inner ramus of uropod 2 and the blunt prebuccal mass. From *Pseudorchomene* in the simple gnathopod 1, short article 3 of gnathopod 1, uncleft telson, and in the reversed dominance of the labrum and epistome. From *Parambasia* in the unconstricted inner ramus of uropod 2, the 2-articulate outer ramus of uropod 3, presence of a molar, deep anterior lobe on article 2 of pereopod 6, and the dominance of the labral part of the fused prebuccal mass.

See *Lysianella*.

Species. *Rhinolabia parthenopeia* Ruffo, 1971 (Ledoyer, 1977) [348].

Habitat and distribution. Marine, Mediterranean Sea, 35-120 m, 1 species.

Rifcus Kudrjaschov

Rifcus Kudrjaschov, 1965a: 513.

Type species. *Rifcus auspicatus* Kudrjaschov, 1965a, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?separate, neither dominant in size nor projection, blunt]. Incisor ordinary, molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 [?weakly setose; palp 2-articulate, large]. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl small, stubby. Coxa 1 large and visible, not tapering. Gnathopod 1 short, poorly subchelate, palm oblique, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, weakly cleft.

Additional characters. Outer plate of maxilla 1 with 5 spines (versus *Tryphosoides*); palp of maxilliped very stout and short, barely exceeding outer plate (versus *Boeckosimus*).

Relationship. Differing from *Anonyx* in the triturative molar. From *Boeckosimus* and *Onisimus* in the very stout maxillipedal palp, with the outer plate reaching nearly to end of palp article 3. From *Hippomedon* in the short telson and stubby dactyl on the maxillipedal palp.

See 'Additional characters'.

Species. *Rifcus auspicatus* Kudrjaschov, 1965a [282].

Habitat and distribution. Marine, north part of west Kamchatka shelf, depth unknown, 1 species.

Rimakoroga Barnard & Karaman

Rimakoroga Barnard & Karaman, 1987: 867.

Type species. *Pseudokoroga rima* J.L. Barnard, 1964e, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome prominent, separate, epistome slightly dominant in size and projection, blunt. Incisor ordinary, molar weakly triturative, of medium size, also setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 [?weakly (2) setose]; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 in male strongly enlarged, strongly subchelate, palm transverse, article 5 much shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, weakly to deeply cleft.

Additional characters. Primary flagellum of antenna 1 with 5 articles only; terminal male gnathopod 1 with carpus very short, lobe thin, propodus enormous, palm and hind margin continuous (as in *Ischyrocerus*), dactyl immense and folding back on false palm; epimeron 3 weakly serrate.

Sexual dimorphism. Female gnathopod 1 small but thick, carpus short and lobate, hand subrectangular, palm almost transverse, dactyl fitting palm; otherwise antennae, eyes and uropod 3 similar between the sexes.

Relationship. Differing from *Pseudokoroga* in the cleft telson and unconstricted inner ramus of uropod 2. From *Orchomene* in the inflated article 6 of male gnathopod 1, in the terminal male this propodus developing massively, palm and hind margin contiguous, dactyl huge and folding back on false palm. From *Koroga* in the cleft telson, strongly transformed gnathopod 1 of the terminal male and the better developed molar.

Species. *Rimakoroga rima* (J.L. Barnard, 1964b,e, 1966a) [370].

Habitat and distribution. Marine, southern California and west Mexico, 2-30 m, 1 species.

Schisturella Norman

Fig.92C

Schisturella Norman, 1900a: 208.–J.L. Barnard, 1967a: 71 (key).
Pseudonesimus Chevreux, 1926a: 3 (*Pseudonesimus abyssi* Chevreux, 1926a, monotypy).
Thrombasia J.L. Barnard, 1966a: 72 (*Thromasia tracalero* J.L. Barnard, 1966a, original designation).

Type species. *Tryphosa pulchra* Hansen, 1887, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in projection, blunt. Incisor ordinary, molar weakly triturative, large, also setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; outer plate with 7 spines; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2, tapering or truncate. Gnathopod 1 short, nearly simple (type) or strongly subchelate, palm oblique to transverse, articles 5 and 6 subequal, or 6 shorter than 5, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 almost aequiramous, ordinary, peduncle ordinary, outer ramus 2-articulate. Telson elongate (type) or short, weakly to deeply (type) cleft.

Additional characters. Inner plate of maxilla 2 medially setose, one seta enlarged, apex of outer plate of maxilliped with 2-3 spines (versus 5-7 in *Parschisturella*).

Sexual dimorphism. Male flagellum of antennae 1-2 elongate and calceoliferous, female antenna 1 with calceoli.

Variables. Antenna 1 apex of flagellum article 1 with large spine (*S. pulchra*); mandibular molar poorly triturative and well setulose (*S. tracalero*) (*S. totorami*), palp article 3 very short (*S. zopa*) (*S. grabensis*); coxa 1 variable, short or long, quadrate or triangular, but coxa 1 also slightly elongate (*S. tracalero*); gnathopod 1 simple (type), subchelate, palm oblique (*S. adversicola*, *S. rotundatus*, *S. dorotheae*), almost simple (*S. cocula*), subchelate, palm transverse (*S. zopa*) (*S. robusta*) (*S. abyssi*); telson deeply cleft (type, etc.), cleft 1/3 (*S. adversicola*, etc.)

Relationship. *Metambasia* differing from *Schisturella* and *Ambasiopsis* primarily in complete loss of palm in gnathopod 1.

Differing from *Ambasiopsis* in the strong notch on the inner ramus of uropod 2, stronger medial setation on maxilla 2, and lack of major dorsal hump or tooth on urosomite 1. The type species of *Ambasiopsis* has no apical spines on the outer plates of the maxillipeds. The type species of *Schisturella* has many distal spines. Usually *Ambasiopsis* has a stout gnathopod 1 and *Schisturella* has a thin gnathopod 1. From *Hirondellea* in smaller head, sharper ocular lobe, dominance of labrum, and lack of inner serration on palp of maxilla 1. From *Aristiopsis* in lacking hump on epistome and absence of lobe on carpus of gnathopod 1. From *Gronella groenlandica* in dominance of upper lip (not dominance of epistome), unlobed carpus of gnathopod 1 and more distally placed mandibular palp.

Removals. *Schisturella galatheae* Dahl, 1959, to *Galathella*; *S. parachelata* Ledoyer, 1986, to *Aristiopsis*.

Species. *Schisturella abyssi* (Chevreux, 1926a, 1935) (J.L. Barnard, 1967a), *S. a. tasmanensis* J.L. Barnard, 1961a [420A]; *S. adversicola* (K.H. Barnard, 1926) (Schellenberg, 1926c) (J.L. Barnard, 1962d) [735BA]; *S. cocula* J.L. Barnard, 1966a [372]; *S. dorotheae* (Hurley, 1963) [373 + B]; *S. grabensis* J.L. Barnard, 1967a [309B]; [?*S. incerta* Ledoyer, 1986, as *Thrombasia* but not this or *Schisturella*, see coxa 1, genus unknown [618B]]; *S. pulchra* (Hansen, 1888) (Shoemaker, 1930a) (Schellenberg, 1935b) (Gurjanova, 1962) (Sekiguchi & Yamaguchi, 1983) [200 + AB]; *S. robusta* (J.L. Barnard, 1961a) (*S. r. cedrosiana* J.L. Barnard, 1967a) [715A]; *S. rotundata* (K.H. Barnard, 1926) (J.L. Barnard, 1962d, 1967a) [735BA]; *S. totorami* J.L. Barnard, 1967a [373]; *S. tracalero* J.L. Barnard, 1966a [373]; *S. zopa* J.L. Barnard, 1966a [310B].

Habitat and distribution. Marine, cosmopolitan cold water, thus tropically submergent, 75-4961 m, comes to baited traps, 11 species.

Scolopostoma Lowry & Stoddart

Scolopostoma Lowry & Stoddart, 1983a: 285.

Type species. *Stomacontion prionoplax* Monod, 1937, original designation.

Diagnosis. Of conicostomin form. Mouthparts forming conical bundle, some styliform. Labrum and epistome continuous, coalesced, blunt. Incisor ordinary, molar simple, small, or absent; palp attached strongly proximal. Inner plate of maxilla 1 [?not setose]; palp 1-articulate, small. Inner poorly and outer plates of maxilliped well developed, palp scarcely or not exceeding outer plate, dactyl small. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 5 [?shorter longer than 6], dactyl large; article 6 of gnathopod 2 shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, rami absent. Telson hemiacetabulate, emarginate.

Additional characters. Head visible; accessory flagellum 2-articulate; rakers present; inner plate of maxilla 1 broad, subquadrate, outer plate narrow and tapering; inner plate of maxilliped short, broad, apically toothed, outer plate tapering distally, inner margin serrate; article 4 of pereopods 5-7 strongly expanded posteriorly, article 5 of pereopods 5-7 short; rami of uropods 1-2 subequal; telson multispinose.

Sexual dimorphism. Oostegites absent, female with penial processes, thus protandrously hermaphroditic.

Relationship. Differing from *Stomacontion* in the medially serrate outer plate of the maxilliped and the broad inner plate with apical teeth.

Notes on distribution. Various authors, except Ledoyer, have failed to note depths of distribution for this species.

Species. *Scolopostoma prionoplax* (Monod, 1937) (Griffiths, 1974c, 1975, 1976a) (Ledoyer, 1979a, 1986) (Lowry & Stoddart, 1983a) [600].

Habitat and distribution. Marine, Suez canal to Darwin, Australia, ?-24 m, 1 species.

Scopelocheiropsis Schellenberg

Fig.91R

Scopelocheiropsis Schellenberg, 1926a: 260.

Type species. *Scopelocheiropsis abyssalis* Schellenberg, 1926a, monotypy.

Diagnosis. Of scopelocheirin form. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, both strongly produced, blunt. Incisor ordinary, molar absent; palp attached strongly distal. Inner plate of maxilla 1 strongly (9) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl vestigial. Coxa 1 large and visible, not tapering. Gnathopod 1 elongate, nearly simple, palm oblique, articles 5 and 6 subequal, dactyl vestigial, shrouded in setae; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, deeply cleft.

Additional characters. Outer plate of maxilliped reaching apex of palp article 2 (versus *Scopelocheirus*); coxae short (compared to *Scopelocheirus* type); pereopods 3-4 especially strong, article 5 vestigial and lobate; pereopods 3-7, especially 3-4, weakly prehensile; article 2 of pereopod 5 slender, article 4 of pereopods 5-7 hardly expanded; outer ramus of uropod 2 (less so on uropod 1) much shorter than inner ramus; article 2 on outer ramus of uropod 3 half as long as article 1.

Relationship. Differing from *Scopelocheirus* in the short coxae, shorter reach on the outer plate of the maxilliped, vestigial dactyl of maxilliped, non-chelate gnathopod 2, strong pereopods 3-4, and thin articles 2 and 4 on pereopods 5-7.

Species. *Scopelocheiropsis abyssalis* Schellenberg, 1926a,c (?Birstein & Vinogradov, 1962b) [426A + 870B].

Habitat and distribution. Marine, North and South Atlantic, ?Antarctica, in tows of 0-3000 m depth, 1 species.

Scopelocheirus Bate

Figs 89G, 90U, 91D, 92V, 93F

Callisoma Costa, 1851-1853: 1 (homonym, Coleoptera).
Scopelocheirus Bate, 1856: 58 (*Scopelocheirus crenatus* Bate, 1857d, monotypy).–Bate, 1857d: 138.–Lincoln, 1979a: 50.
Bathycallisoma Dahl, 1959: 222 (*Bathycallisoma pacifica* Dahl, 1959, monotypy).

Type species. *Callisoma hopei* Costa, 1851-1853, selected by Boeck, 1876.

Diagnosis. Of scopelocheirin form. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome slightly dominant in size and projection, blunt. Incisor ordinary, molar simple, large, conicolaminate or subconical, setulose; palp attached opposite molar. Inner plate of maxilla 1 strongly setose medially; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 elongate or short, nearly simple, palm oblique, articles 5 and 6 subequal, dactyl vestigial, shrouded in setae; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 almost aequiramous, ordinary, peduncle ordinary, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Inner plate of maxilla 2 strongly setose medially; outer plate of maxilla 2 narrower than inner (or not broader).

Sexual dimorphism. Male article 1 on primary flagellum of antenna 1 with callynophore.

Variables. Epistome not protruding (*S. pacifica* = *S. schellenbergi*, etc.); maxilla 1 possibly with special seta of *Aroui* (*S. polymedus*); apex of outer plate on maxilliped naked (type, etc.), widely setose (*S. pacifica* = *S. schellenbergi*); coxae 1-4 shortened (*S. schellenbergi*); gnathopod 1 elongate (*S. hopei*, etc.), short (*S. schellenbergi*), lengths of articles 5-6 on gnathopod 1 variable (see Lincoln, 1979a); article 4 of pereopod 5 broad (*S. hopei, S. crenata*), slender (*S. schellenbergi*); article 2 of pereopods 6-7 excavate posteroventrally (*S. abyssi*); rami of uropods 1-2 much shorter than peduncle (*S. schellenbergi*); telson shorter than type (*S. schellenbergi*).

Relationship. *Aroui* differing from *Scopelocheirus* in presence of large ciliate seta on palp apex of maxilla 1, outer plate of maxilla 2 much broader than inner plate and apex truncate; in adults coxae 1-4 densely and finely setose ventrally, apices of these setae hooked (and see Stroobants, 1976).

Differing from *Eucallisoma*, *Paracallisoma* and *Paracallisomopsis*, in the chelate gnathopod 2.

Species. See Gurjanova (1962); *S. abyssi* Oldevig, 1959 [202A]; ?*S. armata* Ledoyer, 1986 [618B]; *S. hopei* (Costa, 1851) (= *S.barthelemyi* Costa, 1851-1853) (= *S. branickii* Wrzesniavsky, 1874) (= *S. crenatus* Bate, 1857d, = *S. breviatus* Bate, 1856, = *S. serra* Meinert, 1893, see Sars, 1895; Chevreux, 1935; Gurjanova, 1951) (= *S. kroyeri* Bruzelius, 1859, see Sars, 1895) (Chevreux & Fage, 1925) (Schellenberg, 1942) (Gurjanova, 1951) (Stroobants, 1976) (Lincoln, 1979a) (Sekiguchi & Yamaguchi, 1983) [200 + B]; *S. polymedus* Bellan-Santini, 1984 [302A]; ?*S. schellenbergi* Birstein & Vinogradov, 1958, 1964 (= species, Schellenberg, 1955) (= *S. pacifica* Dahl, 1959) [420A].

Habitat and distribution. Marine, cosmopolitan, cold shallow water or deep sea, bathy- and abyssopelagic, 20-6000+ m (wire out 0-7000, 0-8000 m, etc.), 5 species.

Septcarnes n.gen.

Type species. *Socarnes septimus* Griffiths, 1975, here selected.

Etymology. From roots of *Socarnes* and *septimus.*

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome not differentially produced, prominent, separate, both produced together, blunt. Incisor ordinary, molar weakly triturative, or simple, large, somewhat conicolaminate, and setulose; palp attached proximal to molar. Inner plate of maxilla 1 [?weakly (?2)] setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with small to large notch. Uropod 3 ordinary, peduncle elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Bottom of head truncate; article 1 of primary flagellum short, without callynophore; article 1 of mandibular palp slightly elongate; peduncle of both uropods 2 and 3 expanded and plate-like.

Relationship. Differing from *Socarnes* and *Socarnopsis* in the incised inner ramus of uropod 2, and the plate-like peduncle of uropod 3. From *Concarnes* in the elongate, deeply cleft telson.

Species. *Septcarnes septimus* (Griffiths, 1975) [743].

Habitat and distribution. Marine, South Africa, 48 m, 1 species.

Shackletonia K.H. Barnard

Shackletonia K.H. Barnard, 1931a: 425.–K.H. Barnard, 1932: 29.–Lowry & Stoddart, 1983a: 285.

Type species. *Shackletonia robusta* K.H. Barnard, 1931a, original designation.

Diagnosis. Of conicostomin form. Mouthparts forming conical bundle, some styliform. Labrum and epistome continuous, not differentially produced, coalesced, blunt. Incisor ordinary, molar simple, small, conicolaminate or subconical, setulose; palp attached slightly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly and outer plate of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, but tapering, exceeding coxae 2-3. Gnathopod 1 short, simple, [?articles 5 and 6, subequal], dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, outer ramus 1-articulate. Telson ordinary, deeply cleft, flat.

Additional characters. Head visible; rakers absent; inner plate of maxilliped small, styliform; article 2 of pereopods 5-7 strongly expanded posteriorly.

Relationship. Very close to *Acidostoma* but palp of maxilla 1 not reduced, outer ramus of uropod 3 lacking article 2, and coxa 1 slightly elongated and exceeding coxae 2-3.

Species. *Shackletonia robusta* K.H. Barnard, 1931a, 1932 [890B].

Habitat and distribution. Marine, South Shetland and South Georgia, 250- 342 m, 1 species.

Sheardella Lowry

Sheardella Lowry, 1984b: 54.

Type species. *Sheardella kapala* Lowry, 1984b, original designation.

Diagnosis. Of pachynin form. Mouthparts forming quadrate bundle, some parts styliform. Labrum and epistome [?continuous], not differentially produced, not prominent, blunt. Incisor ordinary, molar absent; palp attached slightly proximal to middle of body. Inner plate of maxilla 1 moderately (5) setose; palp 1 or 2-articulate, small. Inner poorly and outer plates of maxilliped well developed, palp not exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 enlarged, poorly subchelate, palm oblique, article 5 very short, narrow, with long posterior protrusion, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle ordinary, inner ramus absent, outer ramus 1-articulate. Telson short, entire.

Additional characters. Base of flagellum on antenna 1 articular; mandible lacking toothed blade, with rakers, lacinia mobilis absent; outer plate of maxilla 1 spines sculptured, palp with terminal setae, plates of maxilla 2 slender, very unequal; coxa 4 with large posteroventral lobe; gnathopod 1 palm defined by simple spine; pereonite 5 lacking dorsal tooth.

Variables. Palp of maxilla 1 1- or 2-articulate.

Relationship. Differing from *Drummondia* and

Prachynella in the presence of a palp on maxilla 1, raker spines on the mandible, lack of dorsal tooth on pereonite 5 and lack of inner ramus on uropod 3.

Species. *Sheardella kapala* Lowry, 1984b [784]; *S. tangaroa* Lowry, 1984b [782].

Habitat and distribution. Marine, south-eastern Australia from Port Jackson to Western Port, 3-92 m, 2 species.

Shoemakerella Pirlot

Shoemakerella Pirlot, 1936b: 264 [but based on *cubensis* by Pirlot on assumption *cubensis* is junior synonym to *nasuta*].

Type species. *Lysianassa nasuta* Dana, 1853, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small, conicolaminate, subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 not setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp article 2 not exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 with large notch. Uropod 3 almost aequiramous, short, peduncle expanded, outer ramus 1-articulate. Telson ordinary, entire.

Additional characters. *Shoemakerella cubensis* outer plate of maxilla 1 shown to have only 7 spines (but needs confirmation); gills pleated on *S. cubensis*; terminal male uropod 3 with notch on peduncle.

Sexual dimorphism. Not studied.

Variables. Not studied.

Relationship. Differing from *Aruga* and *Lysianopsis* in broad inner plate of maxilla 2, and no article 2 on uropod 3 outer ramus. From *Lysianassa* in lack of tooth on antenna 1.

There are no confirmed differences from *Arugella*.

Species. *Shoemakerella cubensis* (Stebbing, 1897) (? = *S. nasuta*) (including *Lysianopsis alba* identifications of Pearse, 1912, Shoemaker, 1921; including *S. nasuta* identifications of Pirlot, 1936b, 1939, Shoemaker, 1948) (Shoemaker, 1935a) (Hurley, 1963) [470]; ?*S. nasuta* (Dana, 1853) (Hurley, 1963) [751].

Habitat and distribution. Marine, *S. nasuta* type locality = Rio de Janeiro; *S. cubensis* = Cuba; Caribbean and Gulf of Mexico, 7-18 m, ?2 species.

Socarnella Walker

Socarnella Walker, 1904: 239.

Type species. *Socarnella bonnieri* Walker, 1904, monotypy.

Diagnosis. Mouthparts forming [?quadrate bundle]. Labrum and epistome [?continuous, not differentially produced, not prominent, coalesced, blunt]. Incisor [?ordinary, if 'as in *Amaryllis*' then minutely toothed; molar simple, small, setulose]; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner poorly and outer plate of maxilliped well developed, palp strongly exceeding outer plate, dactyl small to vestigial. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 with small or no notch. Uropod 3 almost aequiramous, ordinary, peduncle slightly elongate, outer ramus 1-articulate. Telson ordinary, weakly cleft or emarginate.

Additional characters. Article 1 of antenna 1 with weak apicoventral tooth; inner plate of maxilliped with at least one large apical tooth, dactyl reduced; notch on inner ramus of uropod 2 in type reduced but with large spine; uropod 2 with many spines on outer ramus (type).

Sexual dimorphism. Male eyes enlarged; articles 4-5 of peduncle on antenna 2 thick, flagellum elongate and calceolate; uropod 3 setose and article 2 on outer ramus vestigial or absent.

Relationship. Poorly described. Differing from *Socarnoides* in the weak or absent notch on the inner ramus of uropod 3. From *Socarnes* in the 1-articulate outer ramus of uropod 3, poor cleft of telson, and weak dactyl of the maxilliped. From *Socarnopsis* in the poorly cleft telson; and different properties of mandibular palp (see Hurley, 1963). From *Lysianassa* in the reduced dactyl of the maxillipedal palp. See *Bonassa*.

Species. *Socarnella bonnieri* Walker, 1904 (Nayar, 1967) (Sivaprakasam, 1968a) [670 + I].

Habitat and distribution. Marine, Sri Lanka (= Ceylon) and south-east India, shallow water, 1 species.

Socarnes Boeck

Socarnes Boeck, 1871b: 99.-Lincoln, 1979a: 96.

Type species. *Lysianassa vahlii* Krøyer, 1838b, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small, subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 covered by large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate or chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Article 1 of primary flagellum on antenna 1 not longer than article 3 of peduncle (versus *Menigrates*); ratio of mandibular palp articles 1-3 = about 33-155-90 (type) (versus type of *Socarnopsis*); outer plate of maxilliped not exceeding article 2 of palp (versus *Socarnopsis*); gills heavily pleated.

Sexual dimorphism. Male antenna 2 elongate, articles 4-5 of peduncle thick and short, some species like *S. allecta* and *S. dissimulantia* males with article 1 of primary flagellum antenna 1 elongate and rest of flagellum heavily armed.

Variables. Mandibular palp only slightly proximal (*S. hartmani*); mandibular palp aberrant, ratio = 5:13:19 (*S. morhibanensis*); inner plate of maxilla 1 with only 1 seta (*S. hartmani*); gnathopod 2 chelate (*S. hartmani*); epimeron 3 broadly rounded-truncate (type) with large tooth bearing basal notch (*S. hartmani*); uropod 2 inner ramus slightly incised (*S. b. japonicus*).

Relationship. Differing from *Lysianassa* in the deeply cleft telson. From *Ichnopus* in lack of setal brush on dactyl of gnathopod 1, proximal position of mandibular palp and well-developed labral dominance. From *Socarnella* and *Socarnopsis* (but Lincoln, 1979a, says = 2) in outer ramus of uropod 3 = 2-articulate. From *Socarnopsis* in longer article 2 of mandibular palp. From *Waldeckia* in pleated gills. From *Menigrates* in deeply cleft telson, much shorter article 1 of primary flagellum on antenna 1 in female and prominent prebuccal process. From *Concarnes* in lack of incision on inner ramus of uropod 2 and non-expanded peduncle of uropod 3. See *Septcarnes*.

Problems. Resolution of the *Socarnes-Socarnoides-Socarnella-Socarnopsis* problem elucidated by Hurley (1963) not yet concluded; *Socarnes bidenticulatus japonicus* bearing weak incision on inner ramus of uropod 2, contrary to diagnosis; *Socarnopsis* = ?*Socarnes* because Lincoln (1979a) showing article 2 of uropod 3 outer ramus present but Chevreux & Fage (1925) showing it absent.

Removals. *Socarnes allecta* Andres, 1981a, to *Socarnopsis*; *S. concavus* Shoemaker, 1933a, to *Concarnes*; *S. dissimulantia* Imbach, 1969, to *Socarnopsis*; *S. filicornis* Heller, 1867 (= *S. schmardae* Heller, 1867) (= *S. crenulata* Chevreux, 1911) to *Socarnopsis*; *S. illudens* Hurley, 1963, returned to *Socarnoides* where originally placed; *S. obesa* Chevreux, 1927, to *Socarnopsis*; *S. septimus* Griffiths, 1975, to *Septcarnes*; *S. unidentatus* Schellenberg, 1931, to *Socarnoides*.

Distribution note. Largely Northern Hemisphere south to South Africa, replaced in Antarctica by very closely related *Waldeckia*.

Species. See Stephensen (1935a); *S. bidenticulatus* (*S. bidenticulata*) (Bate, 1858b) (= *S. ovalis* Hoek, 1882) (Sars, 1885) (= *S. b. ochotica* Gurjanova, 1962) [200], *S. b. japonicus* Gurjanova, 1962 [391]; *S. erythrophthalmus* Robertson, 1892 (Chevreux & Fage, 1925) (Lincoln, 1979a) [350]; *S. hartmani(ae)* Hurley, 1963 [373]; ?*S. morhibanensis* Bellan-Santini & Ledoyer, 1974 [851]; *S. vahlii* (Krøyer, 1838b) (Sars, 1895) (Stephensen, 1944a) (Gurjanova, 1951, 1962) (Dunbar, 1959) (Nagata, 1965a) [200]; ?species, (= *S. obesa* of Ledoyer, 1979a, not Chevreux, pereopods 3-4 with only 1 locking spine) (possibly not *Socarnes*) [698].

Habitat and distribution. Marine, northern hemisphere south to Dakar and California, 0-265 m, ?5 species.

Socarnoides Stebbing

Figs 88E, 89M

Socarnoides Stebbing, 1888: 690.–Stebbing, 1906: 47.–Lowry & Stoddart, 1983a: 285.
Acidostomella Schellenberg, 1926c: 197 (*Acidostoma cultrifera* Schellenberg, 1926c, monotypy).

Type species. *Socarnoides kergueleni* Stebbing, 1888, monotypy.

Diagnosis. Said to be of conicostomin form. Mouthparts said to be forming 'conical bundle'. Labrum and epistome prominent, separate, both large and strongly projecting, blunt. Incisor ordinary, molar weakly triturative, to some extent conicolaminate, setulose, palp attached strongly proximal to molar. Inner plate of maxilla

1 weakly (0-1) setose; palp 2-articulate, large. Inner poorly and outer plate of maxilliped well developed, palp not exceeding outer plate, dactyl small. Coxa 1 large and visible, slightly tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl small; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with large notch. Uropod 3 short, peduncle elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, longer than broad, flat, weakly cleft.

Additional characters. Head visible; rakers present; palp of maxilla 1 well developed but 1-articulate; outer plates of maxilliped acutely pointed; peduncle of uropod 3 forming apicolateral plate.

Variables. Upper lip projecting beyond epistome, latter not lobate (*S. illudens, S. eugenovi*); maxillipedal palp exceeding outer plate (*S. illudens, S. eugenovi*); carpus of gnathopod 1 weakly lobate (*S. illudens, S. eugenovi*); telson cleft halfway (*S. illudens, S. eugenovi*).

Relationship. Difficult to judge as a conicostomatin because of the plate-like peduncle of uropod 3, 2-articulate outer ramus of uropod 3, prebuccal shape, and notched inner ramus of uropod 2. The 'conical' condition of the mouthpart bundle not very strongly developed in Stebbing (1888: plate 25) but Lowry (*in litt.*) states mouthparts are strongly subconical and maxilla 1 and maxilliped fit the conicostomin mode 1 but in a position as a 'sister taxon'.

Differing from *Acidostoma* in the more strongly produced epistome, 1-articulate palp of maxilla 1 and distinctive telson.

Very close to the Lysianassa group in prebuccal shape, mandible, gnathopod 1, telson and uropod 3. Differing from *Lysianassa* in the deeper incision of the telson and the short maxillipedal palp.

Species. *Socarnoides eugenovi* Gurjanova, 1934a, 1951, 1962 [292 + 280]; *S. illudens* Hurley, 1963 (J.L. Barnard, 1971b) [379]; ?[*S. indentata* Ledoyer, 1986, poorly described, not this genus [698N]]; *S. kergueleni* Stebbing, 1888 (= *S. cultrifera* Schellenberg, 1926c) (Schellenberg, 1931) (Andres, 1983) [880 + B]; *S. unidentatus* (Schellenberg, 1931) [864].

Habitat and distribution. Marine, type species: Antarctica, and Kerguelen, 5-325 m; others: Magellanic, 9 m; North Pacific and Kara Sea, 37-156 m; 4 species.

Socarnopsis Chevreux

Socarnopsis Chevreux, 1911d: 164.

Type species. *Socarnopsis crenulata* Chevreux, 1911d, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, both produced together, blunt. Incisor ordinary, molar weakly or not triturative, large, slightly conicolaminate, also setulose, palp attached slightly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle slightly elongate, outer ramus 2-articulate [confirmed by Dr R. Lincoln]. Telson elongate, deeply cleft.

Additional characters. *Epistome protruding over upper lip; antenna 1 primary flagellum base with callynophore in both sexes; mandibular palp ratio = 30-90-60 (versus *Socarnella*, *Socarnopsis*, *Socarnes*) (*Socarnes* = 33-155-90); *outer plate of maxilliped reaching well along article 3 of palp (versus *Socarnes*); * gills strongly pleated or lobulate marginally. (* = different from *Socarnes*).

Sexual dimorphism. Male antenna 2 peduncular articles 4-5 thick and short, flagellum elongate.

Variables. Head abnormal, ventrally truncate (*S. dissimulantia*), article 2 of mandibular palp not elongate (*S. dissimulantia*).

Relationship. *Differing from *Socarnes* (See 'Additional characters').

See *Waldeckia*.

Species. *Socarnopsis allecta* Andres, 1981a [677B]; ?*S. dissimulantia* Imbach, 1969 [655]; *S. filicornis* (Heller, 1867) (= *S. schmardae* Heller, 1867) (= *S. crenulata* Chevreux, 1911d; Chevreux & Fage, 1925; Lincoln, 1979a) (Krapp-Schickel, 1974) (Ledoyer, 1977) [352]; *S. obesa* Chevreux, 1927 (? = *S. filicornis*) (= ?*Orchomene* species, Ledoyer, 1972) (?Ledoyer, 1973a, 1986) [401B + ?348 + ?698].

Habitat and distribution. Marine, East Atlantic, Mediterranean, Red Sea to South China Sea, 20-1544 m, 4 species.

Sophrosyne Stebbing

Fig.92L

Sophrosyne Stebbing, 1888: 652.–Stebbing, 1906: 21.–Lincoln, 1979a: 52.

Paropisa Stebbing, 1899a: 206 (*Opisa hispana* Chevreux, 1887c, monotypy).

Type species. *Sophrosyne murrayi* Stebbing, 1888, monotypy.

Diagnosis. Mouthparts forming quadrate bundle, some styliform. Labrum and epistome differentially produced, epistome dominant in size and projection, blunt. Incisor ordinary or very minutely toothed; molar absent; palp attached distally. Inner plate of maxilla 1 weakly (1-2) setose; palp 2-articulate, large. Inner very poorly and outer plates of maxilliped poorly developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, but tapering. Gnathopod 1 enlarged, strongly chelate, article 5 shorter than 6, lobate, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus grossly chelate or barely subchelate, article 7 large to small. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, outer ramus 1 or 2-articulate. Telson ordinary, deeply cleft.

Additional characters. Head small, thus lateral surface about same as lateral surface of peduncle on antenna 1; outer plate of maxilla 1 with 2 main spines, others vestigial; inner plate of maxilla 2 short and thin, outer longer and broad; inner plate of maxilliped small, outer smaller than normal of family, largely bearing only setae, palp very large, dactyl elongate; article 2 of pereopod 7 large and shield-like (versus *Kyska*, etc.).

Sexual dimorphism. Male of *S. robertsoni* with callynophore on primary flagellum on antenna 1, basal article of accessory flagellum elongate; mandibular palp more setose.

Variables. Article 1 of antenna 1 cristate (*S. hispana*), slightly cristate (*S. robertsoni*), not cristate (*S. murrayi*); incisor with 2 small middle teeth (*S. hispana*); dactyl of gnathopod 1 fitting palm, gape absent (*S. robertsoni*), gape present (type, etc.); propodus of gnathopod 2 broad, palm large, concave, gaping, dactyl large (type); propodus thin, palm obsolescent, dactyl small (*S. hispana*); intermediate (*S. robertsoni*); outer ramus of uropod 3 2-articulate (?*S. hispana*), 2-articulate with article 2 elongate (*S. robertsoni* of California only).

Relationship. Characterised by the small plates of the maxillipeds, poorly spinose outer plate of maxilla 1, chelate gnathopod 1 with coxa 1 unreduced, telson cleft, and molar absent.

Differing from following genera in unreduced coxa 1: *Aristiopsis, Cheirimedon, Euonyx, Hirondellea, Opisa, Schisturella*. From following genera in well-cleft telson *Figorella, Koroga, Pachychelium, Pachynus, Prachynella*.

The following genera have reduced maxillipedal palp or indentured article 2 of pereopod 5: *Normanion, Podoprion, Podoprionella, Podoprionides*.

Differing from *Valettia* in the weak plates of the maxillipeds, poorly spinose outer plate of maxilla 1, much larger gnathopod 1, and lack of molar. From *Gainella* in the long equal rami of uropod 3, broad palp of maxilliped, poor spination on the outer plate of maxilla 1 and the subequal rami of uropod 3. From *Prachynella* and *Figorella* in the well-developed palp of maxilla 1, cleft telson, small head, equal rami of uropod 3, small outer plate of the maxilliped and the long palp. From *Pachynus* in the cleft telson and broad palp of the maxillipeds. From *Koroga* in the small head, small plates of the maxillipeds, cleft telson, and distal position of the mandibular palp. From *Kyska* in the small head, small outer plate of the maxilliped, poorly spinose outer plate of maxilla 1, larger palm of the chela on gnathopod 1 and the shield-like article 2 of pereopod 7.

Species. *Sophrosyne hispana* (Chevreux, 1887c, 1900a) (Ruffo, 1975b) (Ledoyer, 1977) [330 + B]; *S. murrayi* Stebbing, 1888, 1906 [851]; *S. robertsoni* Stebbing & Robertson, 1891 (J.L. Barnard, 1966a) (Lincoln, 1979a) (Moore, 1983c) [239 + 310B].

Habitat and distribution. Marine, probably cosmopolitan (but so far in warm east Atlantic, Kerguelen, and Californian bathos), ?5-1298 m, 3 species.

Stephensenia Schellenberg

Stephensenia Schellenberg, 1928a: 285.–Schellenberg, 1931: 11.

Type species. *Stephensenia haematopus* Schellenberg, 1928a, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?continuous, not prominent, coalesced, blunt]. Incisor ordinary, molar triturative, large; palp absent. Inner plate of maxilla 1 weakly (3) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 slightly elongate, nearly simple, palm transverse, article 5 much longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, outer ramus 1-articulate. Telson elongate, deeply cleft.

Additional characters. Callynophore absent on flagella of antenna 1; peduncle of antenna 2 with long fossorial spination; inner plate of maxilliped strongly spinose; anterior coxae heavily setose; pereopods 3-7 of fossorial form, heavily setose and spinose, thus articles 4-5 of pereopods 5-6 expanded, article 4 of pereopod 4 expanded, articles 5-6 of pereopod 3 elongate, of pereopod 4 much shorter, pereopod 7 elongate; rami of uropod 3 lanceolate, setose.

Sexual dimorphism. Calceoli present in male.

Relationship. Characterised by fossorial pereopods, thus strongly setose and spinose, some articles expanded, pereopod 7 elongate, uropod 3 with long lanceolate, setose rami; head small, anterior coxae very long, setose; mandibular palp absent.

Differing from *Hippomedon* in loss of mandibular palp. From *Waldeckia* in small head, fossorial pereopods, lack of article 2 on outer ramus of uropod 3, and loss of mandibular palp. From *Orchomene* in small head, setose coxae, lack of mandibular palp, and no callynophore on flagellum on antenna 1. From *Paronesimus* in large spines on outer plate of maxilliped, small head, no callynophore on flagella on antenna 1, and long setose rami of uropod 3. From *Socarnes* group in the poorly developed prebuccal mass, small head, and the fossorial pereopods.

Species. *Stephensenia haematopus* Schellenberg, 1928a, 1931 (Escofet, 1977) [864I + 862].

Habitat and distribution. Marine, Magellanic and South America north to Valdes Peninsula, Argentina, sand beaches, burrower, 1 species.

Stomacontion Stebbing

Figs 89S, 95K

Stomacontion Stebbing, 1899a: 205.–Stebbing, 1906: 16.–Lowry & Stoddart, 1983a: 286.

Type species. *Acontiostoma pepinii* Stebbing, 1888, original designation.

Diagnosis. Of conicostomin form. Mouthparts forming conical bundle, some styliform. Labrum and epistome [?continuous, not differentially produced, prominent, coalesced, blunt]. Incisor ordinary, molar simple, small, conicolaminate or subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 weakly (0-1) setose; palp 1 or 2-articulate, large or small or absent. Inner poorly and outer plate of maxilliped well developed, palp scarcely exceeding outer plate, dactyl vestigial or absent. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 short, peduncle short, with 1 small ramus or none. Telson hemiacetabulate, incised.

Additional characters. Head visible; accessory flagellum 2-articulate; flagella of antennae 1-2 with few articles and very short; rakers present; inner plate of maxilliped narrow, styliform (versus *Acontiostoma*), outer plate tapering distally, palp thin; article 4 of pereopods 5-7 strongly expanded posteriorly; article 5 of pereopods 3-7 very short.

Sexual dimorphism. At least 1 species a protandrous hermaphrodite but genus also with secondary males in 2 species; male article 1 of primary flagellum with callynophore; incisor reduced and sharp or tapered; outer plate of maxilla 1 with spines reduced in size; outer plate of maxilliped smoother, tapering evenly; telson deeply incised. Oostegites in reproductive female absent (*S. pepinii*).

Variables. Palp of maxilla 1 small and 1-articulate (*S. acutibasalis*), small and 2-articulate (type), large, swollen and 2-articulate (*S. hurleyi, S. pungapunga*), tiny and 2-articulate (type), absent (*S. capense*); outer plate of maxilla 1 with only ?3 very thick spines (*S. acutibasalis*); plates of maxilla 2 reduced and poorly setose (*S. insigne*); palp of maxilliped with vestigial dactyl (type, etc.), absent (*S. hurleyi*); coxa 1 triangular (*S. capense*); article 5 of gnathopod 1 longer than 6 (*S. insigne*); uropod 3 lacking rami (type), with rami (*S. pungapunga*, etc.); telson with large spines (*S. pepinii, S. pungapunga*), without large spines (*S. acutibasalis, S. insigne*).

Relationship. Differing from *Acontiostoma* in the visible head, styliform inner plate of maxilliped and shape of gnathopod 2 palm which is not bowl-shaped (chelate) but ordinarily chelate. From *Scolopostoma* in the shape of inner plate of the maxilliped and maxilla 2. From *Conicostoma* by the vestigial uropod 3 and hemiacetabulate telson.

Removal. *Stomacontion prionoplax* Monod, 1937, to *Scolopostoma.*

Species. See Lowry & Stoddart, 1983a for all species; *S. acutibasalis* (Bellan-Santini & Ledoyer, 1974) [851]; *S. capense* K.H. Barnard, 1916, ?1937, 1940 (Griffiths, 1975, 1976a) [743 + ?672]; *S. hurleyi* Lowry & Stoddart, 1983a [840]; *S. insigne* K.H. Barnard, 1932 [833s]; *S. pepinii* (Stebbing, 1888) (= *S. kergueleni* Stebbing, 1888) (?Schellenberg, 1931) [835]; *S. pungapunga* Lowry & Stoddart, 1983a [840].

Habitat and distribution. Marine, mostly austral, weakly antarctic, 0-177 m, often in sponges and ascidians, 6 species.

Thoriella Stephensen

Fig.94H

Thoriella Stephensen, 1915: 39.

Type species. *Thoriella islandica* Stephensen, 1915, original designation.

Diagnosis. Of cyphocarin form, head deformed, coxae 1-4 all small but because coxae 3-4 small, smallness of coxae 1-2 de-emphasised. Antennae of medium length, subequal, peduncles short, their articles almost as short as thick bead-like flagellar articles, flagellum of antenna 2 thick; accessory flagellum absent. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome strongly dominant in size and projection, blunt. Incisor ordinary, small; molar obsolescent; smooth; palp absent. Inner plate of maxilla 1 strongly (5) setose; setae medial and thick; palp 2-articulate, large. Inner and outer plates of maxilliped poorly developed, palp strongly exceeding outer plate, 2-articulate, article 2 mostly fused to article 1. Gnathopod 1 short, simple, articles 5 and 6 subequal, short, dactyl large (relatively); article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus simple, article 7 tiny. Inner ramus of uropod 2 without notch. Uropod 3 vestigial. Telson absent.

Additional characters. Setae on inner plates of maxillae 1-2 medial, very thick; outer plate of maxilla 1 with 5 spines; setae on outer plate of maxilla 2 very small. Inner and outer plates of maxilliped subequal, subconical, palp composed of large helmet with lateral incision, apex of proximal lobe marked off by incision with weak articulate apical nipple on one side only. Coxae mostly discontiguous. Article 2 of gnathopod 1 swollen, remainder of gnathopod very short, articles 4 and 5 with setal brushes posteriorly. Pereopods 3-7 weakly prehensile; article 2 of pereopods 5-7 thin.

Urosome composed of 2 segments, third fused to second and with 2 small peduncles of uropod 3, rami fused to peduncles. Telson absent.

Variable. Inner rami of uropods 1-2 shorter than outer (Shoemaker, 1945a).

Relationship. Differing from *Chevreuxiella* in the small discontiguous coxae, long inner rami of uropods 1-2, thick medial setae on inner plates of maxillae 1-2, and presence of urosomite 3 (albeit minus telson and most of uropod 3).

Remarks. K.H. Barnard's Gulf of Oman specimen is young and may not be this species.

Notes on distribution. The '2800 m' record is 'wire out' with depth of capture unstated (K.H. Barnard, 1937).

Species. *Thoriella islandica* Stephensen, 1915 (Schellenberg, 1927) (?K.H. Barnard, 1937) (Shoemaker, 1945a) (Gurjanova, 1962) [423B?A].

Habitat and distribution. Marine, North Atlantic and ?Gulf of Oman, 1646-?2800 m, 'parasitic', 1 species.

Tmetonyx Stebbing

Hoplonyx Sars, 1895: 91 [homonym, Coleoptera] (*Oniscus cicada* O. Fabricius, 1780, original designation).

Tmetonyx Stebbing, 1906: 73 (new name).

Type species. *Oniscus cicada* O. Fabricius, 1780, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, not differentially produced, epistome slightly dominant in size. Incisor ordinary, molar simple, large, almost conicolaminate, setulose, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 variable, either shortened, often tapering and partly covered by coxa 2, or large and visible, not tapering. Gnathopod 1 subchelate, palm oblique, articles 5 and 6 subequal, *article 3 elongate*, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 almost aequiramous, ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, deeply cleft.

Sexual dimorphism. Weak, male slightly more armed and antenna 2 slightly longer than in female.

Variables. Coxa 1 not reduced (*T. cicada*, etc.), reduced (*T. similis*, etc.).

Relationship. Differing from *Tryphosella* (= *Tryphosa* auct.), *Uristes*, *Anonyx*, *Caeconyx* and *Hippomedon* in the elongate article 3 of gnathopod 1.

Said to differ from *Anonyx* by the inner tooth on the dactyl of gnathopod 1.

Removal. *Tmetonyx caecula* Sars, 1895, to *Caeconyx*.

Species. See Stephensen, 1935a; *T. acuta* (Sars, 1895) (Gurjanova, 1951) [240B]; *T. albida* (Sars, 1895) (Gurjanova, 1951) [240B + I]; *T. cicada* (O. Fabricius, 1780) (= *T. norvegicus* Liljeborg,1852a) (= *T. bruzelii* Boeck, 1861) (Sars, 1895) (Chevreux & Fage, 1925) (Stephensen, 1925a, 1944a) (Lincoln, 1979a) [200 + A]; *T. gulosa* (Krøyer, 1845) (Shoemaker, 1930b) [unclarified] [216 + B]; *T. leucophthalma* (Sars, 1895) (Enequist, 1950) [216 + B]; *T. nardonis* (Heller, 1867) (= *T. exiguus* Chevreux, 1901c, Chevreux & Fage, 1925) (Krapp-Schickel, 1979) Ruffo, 1985b) [340]; *T. rotundata* (Chevreux, 1926a, 1935) (Gurjanova, 1951) [218B]; *T. similis* (Sars, 1895) (Chevreux & Fage, 1925) (Krapp-Schickel, 1974) (Lincoln, 1979a) [200 + BA].

Habitat and distribution. Marine, arctic-boreal in North Atlantic, 8-3230 m, 8 species.

Trischizostoma Boeck

Figs 87D, 89O, 90B, 91H, 92H, 93C, 95U

Guerinia Costa, 1851-53: 1 (homonym, Diptera) (*Guerinia nicaeensis* Costa, 1851-53, monotypy).
Trischizostoma Boeck, 1861: 637.-Stebbing, 1906: 12, 717.
Guerinella Chevreux, 1905b: 6 (*Guerinia nicaeensis* Costa, 1851-53, original designation).

Type species. *Trischizostoma raschii* Boeck, 1861, original designation.

Diagnosis. Mouthparts forming conical bundle, styliform. Labrum and epistome continuous, not differentially produced, coalesced, blunt. Incisor styliform; molar absent; palp attached strongly proximal. Inner plate of maxilla 1 not setose; palp 2-articulate, small. Inner and outer plates of maxilliped poorly developed, styliform, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 strongly enlarged, strongly subchelate, palm oblique, article 5 much shorter than 6, eusirid, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, expanded, propodus subchelate. Inner ramus of uropod 2 with or without notches. Uropod 3 ordinary, peduncle ordinary, inner ramus scarcely shortened, outer ramus 2-articulate. Telson short, entire.

Additional characters. Head with long rostrum; eyes immense; article 1 of accessory flagellum expanded and plate-like; primary flagellum on antenna 1 with callynophore in both sexes, more so in male; mandibular lobes of lower lip obsolete, primary lobes acutely pointed; maxilla 1 styliform, outer plate with 5 or fewer spines; plates of maxilla 2 styliform; plates of maxilliped styliform, palp styliform, geniculate, dactyl elongate; coxae 2-3 diverse; carpus of gnathopod 1 of eusirid character allowing reversibility of propodus, palm heavily spinose in some adults but not juveniles; propodus of gnathopod 2 expanded, suborbicular; uropods 1-2 flabellate, rami often with large notches; gills often plaited; oostegites broad.

Sexual dimorphism. Male callynophore on primary flagellum of antenna 1 somewhat more elongate and more brushy; flagellum of antenna 2 more elongate, calceolate.

Variables. Rostrum weak (*T. remipes, T. paucispinosum*); palp of maxilla 1 1-articulate (*T. denticulatum*); inner plate of maxilla 2 much shorter than outer (type), both plates extending equally (other species); plates of maxilliped broader and less styliform (*T. denticulatum*); coxae very short (type); shape of coxae 1-4 and article 6 of gnathopod 1 variable; dactyl of gnathopod 1 with inner denticles (*T. serratum*); article 4 of pereopods 3-4 expanded or not; pereopods 5-7 prehensile (*T. remipes*); telson cleft (*T. remipes, T. paucidespinosum, T. circulare*, young *T. raschi*).

Relationship. Differing from *Normanion* in the styliform mouthparts arranged in a conical bundle, especially the maxilliped, lower lip and mandible, in the reversed propodus and dactyl of gnathopod 1, the large rostrum and the short peduncle of uropod 3. From *Opisa* in the non-excavate palm of gnathopod 1, the more styliform outer plate of the maxilliped, the diverse coxae 2-3, and the short telson which is either entire or not deeply cleft. From *Euonyx* in the immense gnathopod 1 and diverse coxae 2-3. From *Podoprion* and *Podoprionella* in the diverse coxae 2-3, small outer plate of the maxilliped, non-indurated article 2 of pereopods 5-7 and the immense gnathopod 1.

Species. *Trischizostoma circulare* J.L. Barnard, 1961a (Griffiths, 1973) [701B]; *T. denticulatum* Ledoyer, 1978a, 1986 [621B]; *T. longirostre* Chevreux, 1919-1920, 1927 [401B]; *T. nicaeense* (Costa, 1851-1853) (Sexton, 1908) (Chevreux & Fage, 1925) (Schellenberg, 1927) (Gurjanova, 1951) (Ledoyer, 1977) [355 + BI]; *T. paucispinosum* K.H. Barnard, 1916, 1926 (Griffiths, 1975) [701B]; *T. raschi* Boeck, 1861 (Sars, 1895) (Sexton, 1908) (Schellenberg, 1927) [240 + BI]; *T. remipes* Stebbing 1908b, (K.H. Barnard, 1926) (Griffiths, 1974b,c, 1975) [74? + B]; *T. serratum* K.H. Barnard, 1926 (Griffiths, 1974b,c 1975) [743]; species, Griffiths, 1973 [741].

Habitat and distribution. Marine, probably cosmopolitan, but not recorded in Pacific Ocean, mostly pelagic or bathypelagic, 22-3655 m, 'often predatory on fishes' (?possibly moribund), 8 species.

Tryphosella Bonnier

Figs 89A, 90G, 92R, 94C

Tryphosella Bonnier, 1893: 170.–Thurston, 1974b: 16.–Lincoln, 1979a: 82.
not *Tryphosa* Boeck, 1871b: 117 (= *Orchomene*).
Tryphosa.–Gurjanova, 1951: 248 (key).
Lepidepecreopsis Stephensen, 1925a: 119 (*Lepidepecreopsis biloba* Stephensen, 1925a, monotypy).

Type species. *Tryphosella sarsi* Bonnier, 1896, selected by J.L. Barnard, 1969c.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome slightly to strongly dominant in size and projection, blunt. Incisor ordinary, molar simple, small, setulose; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened, tapering, and partly covered by coxa 2. Gnathopod 1 subchelate, palm oblique, or transverse, articles 5 and 6 subequal or 5 longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary (type) or elongate, deeply cleft.

Sexual dimorphism. Male eyes slightly enlarged; antennae 1-2 more armed; antenna 2 with elongate and calceolate flagellum; urosomal ornaments if present more accentuated; uropod 3 larger and more setose.

Variables. Head intermediate in size between *Uristes* and *Tryphosa* forms (*T. laevis*); lateral lobe of head sharp (*T. angulata*, etc.), rounded (type of *Tryphosella*, etc.); epistome with sharp point (*T. coxalis*, *T. oxystoma*, *Tryphosa serrata*); coxa 1 scarcely reduced (*T. paramoi*, *Tmetonyx serrata*); article 5 of gnathopod 1 much longer than article 6 (*Lepidepecreopsis biloba*), only slightly longer (*T. caecoides*); palm of gnathopod 1 weak (*T. index*), scarcely subchelate (*T. marri*); dactyl of gnathopod 1 with inner tooth (*T. exiguus*, etc.); epimeron 3 strongly serrate (*T. paramoi*, *Tmetonyx serrata*, *Tryphosa serrata*, all these possibly not *Tryphosella-Uristes*); urosomite 1 elongate (*T. minima*); peduncle of uropod 2 expanded dorsoventrally (*T. groenlandica*); telson slightly elongate (*T. horingi*, *T. insigniodes*, etc.).

Relationship. Not distinct from *Uristes*; these genera require pooling and revision.

Differing from *Tryphosites* in the reduced coxa 1 and lack of notch on the inner ramus of uropod 2. From *Anonyx* and *Hippomedon* in the tapering and reduced coxa 1. From *Tmetonyx* in the short article 3 of gnathopod 1.

Removals. *Tryphosella acuta* Sars, 1895, to *Tmetonyx*; *T. albida* Sars, 1895, to *Tmetonyx*; *T. bruuni* Dahl, 1959, to *Bruunosa*; *T. bruuni*, Reid, 1951, to *Hippomedon*; *T. caeculus* Sars, 1895, to *Caeconyx*; *T. carinata* Schellenberg, 1926a, 1931, to *Parschisturella* ; *T. cicadoides* Stebbing, 1888, to *Cicadosa*; *T. exiguus* Chevreux, 1901c, to *Tmetonyx nardonis*; *T. leucophthalma* Sars, 1895, to *Tmetonyx*; *T. major* K.H. Barnard, 1932, to *Hippomedon*; *T. nardonis* Heller, 1867, to *Tmetonyx*; *T. similis* Sars, 1895, to *Tmetonyx*.

Species. See Enequist (1950); Gurjanova (1951); Schellenberg (1925a); Shoemaker (1930b); Stephensen (1923a, 1925a, 1935a, 1944a); *T. abyssalis* (Stephensen, 1925a) (Gurjanova, 1951) (?Bryazgin, 1974a) [240A + ?286]; *T. analogica* (K.H. Barnard, 1932) (Andres, 1983) [833]; *T. angulata* (Sars, 1895) (Stephensen, 1935a) (Gurjanova, 1951) [240]; *T. barentsi* (Gurjanova, 1929b, 1929a, 1951, as *Tmetonyx*) (Stephensen, 1935a) [220A]; *T. biloba* (Stephensen, 1925a, as *Lepidepecreopsis*) (J.L. Barnard, 1962d) [426BA]; *T. bispinosa* (Schellenberg, 1931) (Ruffo, 1949) (Bellan-Santini, 1972b) (Andres, 1983) [880 + B]; *T. caecoides* (J.L. Barnard, 1962d) [701B]; *T. camelus* (Stebbing, 1910a) [revived] [781]; *T. castellata* K.H. Barnard, 1932 [864]; *T. cicadopsis* (Schellenberg, 1926a, as *Tmetonyx*) [881]; *T. compressa* (Sars, 1895) (Stephensen, 1935a) (Gurjanova, 1951) [250B]; *T. coxalis* (J.L. Barnard, 1962d) [702A]; ?*T. cucullata* (Walker, 1904) (Nayar, 1967) [coxa 1 not reduced, antenna 1 carinate, mouthparts unknown] [665]; [*T. erosa* (Meinert, 1893) [dubious] [236]]; *T. gracilipes* (Stephensen, 1925a, as *Tmetonyx*) (Gurjanova, 1951) [209B]; *T. groenlandica* (Schellenberg, 1935b) (Stephensen, 1944a) (Shoemaker, 1955a) [220]; *T. horingi* (Boeck, 1871b) (Sars, 1895) (Lincoln, 1979a) [200 + B]; *T. index* (J.L. Barnard, 1966a) [310B]; *T. insignioides* (Stephensen, 1925a) (Gurjanova, 1951) [209B]; *T. insignis* (Bonnier, 1896) (Chevreux, 1935) [303BA]; *T. intermedia* (Schellenberg, 1926a) [881B]; *T. laevis* (Bonnier, 1896, as *Orchomenella*) (Stephensen, 1925a) [216B]; *T. longichela* (Stephensen, 1925a) [209B]; *T. longidactyla* Ruffo, 1985b [348]; *T. longitelson* (K.H. Barnard, 1932) (Ruffo, 1949) (Andres, 1983) [890B]; *T. macropareia* (Schellenberg, 1926a) (Dahl, 1954) [870B]; *T. marri* Thurston, 1974a [870]; *T. metacaecula* J.L. Barnard, 1967a [309B]; *T. miersi* (Stebbing, 1888, as *Tmetonyx*) [783]; *T. minima* (Chevreux, 1911d) (Chevreux & Fage, 1925) (Ledoyer, 1968) (Ruffo, 1985b) [352]; *T. mucronata* (Pirlot, 1936b, as *Tmetonyx*) [597]; *T. murrayi* (Walker, 1903, 1907) (Hurley, 1965a) (Bellan-Santini, 1972a,b) [870 + B]; *T. nanoides* (Liljeborg, 1865a) (Sars, 1895) (Lincoln, 1979a) [200 + B]; *T. orana* J.L. Barnard, 1972a [787]; *T. orchomenoides* (Stephensen, 1925a, as *Tmetonyx*) (Dunbar, 1954) [220 + BA]; *T. oxystoma* (Stephensen, 1925a) (Gurjanova, 1951) [253]; *T. palpiserrata* (Bellan-Santini, 1984) (Ruffo, 1985b) [302A]; ?*T. paramoi* (Schellenberg, 1931) [?864]; *T. propinqua* (Chevreux, 1926a, 1935) (Gurjanova, 1951) [216B]; *T. pusilla* (Sars, 1879, 1885) (Gurjanova, 1951) [220B]; *T. quadrata* (J.L. Barnard, 1962d) [702A]; *T. rotundata* (Stephensen, 1925a) (Gurjanova, 1951) [209B]; *T. sarsi* Bonnier, 1893 (= identification of *T. nana* by Sars, 1895) (= *T. grandimana* Chevreux & Fage, 1925) (Stephensen, 1935a) (Lincoln, 1979a) [216]; *T. schneideri* (Stephensen, 1921, 1925a, 1935a, 1944a) (Gurjanova, 1951) (Bushueva, 1977) [216]; *T. serans* Lowry & Stoddart, 1983a [840]; ?*T. serrata* (Schellenberg, 1931, as *Tryphosa*) [867]; *T. serrata* (Schellenberg, 1931, as *Tmetonyx*) (Ruffo, 1947d) [866]; *T. simillima* Ruffo, 1985b [348]; *T. spitzbergensis* (Chevreux, 1926a, 1935) (Stephensen, 1944a) (Gurjanova, 1951) [220]; [*T. stephenseni* (Chevreux, 1935) [*nomen nudum*]]; *T. triangula* (Stephensen, 1925a, 1940b) (Gurjanova, 1951) [220 + B]; *T. triangularis* (K.H. Barnard, 1932) (Thurston, 1974a) [833]; *T. trigonica* (Stebbing, 1888) [851]; *T. trionyx* (Stephensen, 1925a, 1940b) [246]; *T. triplans* (J.L. Barnard, 1962d) [416A]; ?*T. tuberculimana* (Lagardere, 1968) [possibly = *Uristes*] [295].

Habitat and distribution. Marine, cosmopolitan, mostly cold water and submergent, 0-4380 m, 54 species.

Tryphosites Sars

Figs 89J, 93K, 95A

Tryphosites Sars, 1895: 91.–Stebbing, 1906: 77.–Lincoln, 1979a: 80.

Type species. *Anonyx longipes* Bate & Westwood, 1863, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, epistome strongly dominant in size and projection, sharp. Incisor ordinary, molar triturative, large, also setulose; palp attached slightly proximal to molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, strongly subchelate, palm oblique, article 6 shorter than 5, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Pereopod 5 much shorter than pereopods 6-7.

Sexual dimorphism. Male eyes enlarged; flagellum of antenna 1 elongate; antenna 2 elongate and with calceoli, peduncle with anterior setae, peduncular articles 4-5 thickened; uropod 3 setose in both sexes.

Variables. Article 2 of pereopod 7 strongly serrate (*T. chevreuxi*); epimeron 3 with large posteroventral tooth (type), evenly serrate, no large projection (*T. chevreuxi*); apex on each lobe of telson with 1-3 spines and dorsum of each lobe with spines in type species.

Relationship. Characterised by sharp epistome, incised inner ramus of uropod 2, and deeply cleft telson. See *Parschisturella*.

Differing from *Tryphosella* and *Gronella* in sharp epistomal cusp and unreduced coxa 1. From *Paralysianopsis* in elongate, deeply cleft telson.

Removal. *Tryphosites capadarei* Hurley, 1965a (= *T. stebbingi* identification of Chilton, 1912) to *Parschisturella carinata*.

Species. See Stephensen (1925a); Chevreux (1935); Enequist, 1950 (habits); *T. alleni* Sexton, 1911b,c (Chevreux, 1927) (Bellan-Santini, 1984) [352B]; *T. chevreuxi* Stebbing, 1914b (Schellenberg, 1931) [866]; *T. longipes* (Bate, 1862) (Bate & Westwood, 1863) (Sars, 1895) (Chevreux & Fage, 1925) (Schellenberg, 1942) (Gurjanova, 1951) (Lincoln, 1979a) [352 + B].

Habitat and distribution. Marine, mostly cold water, Atlantic Arctic to Mediterranean and Magellan-Falkland province, 0-1210 m, 3 species.

Tryphosoides Schellenberg

Tryphosoides Schellenberg, 1931: 38.

Type species. *Tryphosoides falcata* Schellenberg, 1931, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Epistome not produced. Incisor ordinary, molar triturative, small; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp [?strongly exceeding outer plate, dactyl well developed]. Coxa 1 large and visible, slightly tapering. Gnathopod 1 short, poorly subchelate, palm oblique, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, article 2 of outer ramus vestigial. Telson elongate, deeply cleft.

Additional characters. Accessory flagellum 2-articulate; article 3 of mandibular palp slender (versus *Tryphosella*), ratio of articles 1-3 = 25-140-115 (versus 30-140-76 in *Tryphosella*); outer plate of maxilliped with medial armaments (teeth and spines) large (versus *Paronesimus*); articles 5-6 of gnathopods 1-2 thick; urosomite 1 with deep narrow notch.

Relationship. Differing from *Tryphosella* and *Uristes* in unproduced epistome; 2-articulate accessory flagellum; less tapering coxa 1; 'slender article 3 of mandibular palp'; 'broad [and setose] rami of uropod 3'; vestigial article 2 of uropod 3 outer ramus; thick gnathopods; and better triturative molar. From *Orchomene* in distal position of mandibular palp. From *Paronesimus* in large teeth and spines on outer plate of maxilliped, reduced accessory flagellum, unexpanded coxa 1, and deeply cleft telson. See 'Sexual dimorphism' in *Uristes*.

Species. *Tryphosoides falcata* Schellenberg, 1931 [864I]. Possibly *Tryphosella paramoi*.

Habitat and distribution. Marine, Magellanic, Paramo, shallow water, 1 species.

Uristes Dana

Figs 86D, 92Y

Uristes Dana, 1849: 136.–Dana, 1852a: 209.–Hurley, 1963: 91. *Pseudotryphosa* Sars, 1895: 83 (*Ichnopus umbonatus* Sars,

1883, monotypy).
Uristoides Schellenberg, 1931: 27 (*Uristoides subchelatus* Schellenberg, 1931, monotypy).

Type species. *Uristes gigas* Dana, 1849, 1852a, 1853, monotypy.

Diagnosis. Based on *Uristes antennipotens*. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in projection, blunt. Incisor ordinary, molar weakly triturative, and/or setulose, large, weakly conicolaminate, palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl well developed. Coxa 1 slightly to strongly shortened and partly covered by coxa 2. Gnathopod 1 short, nearly simple, or poorly subchelate, palm oblique, article 6 longer than 5, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, propodus minutely subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle weakly elongate, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Sexual dimorphism. Some males with elongate flagellum of antenna 2 and calceoli on antennae 1-2, but calceoli also on female of type species; urosomite 1 with deep notch or slit, (*Tryphosoides falcata* and also *Tryphosella paramoi*); uropod 3 more setose in males; article 2 of outer ramus on uropod 3 obsolescent (female *Tryphosoides falcatus* and also *Tryphosella paramoi*); oostegites thin.

Variables. Head of intermediate size between *Uristes* and *Tryphosella* (*U. entalladurus*); epistome poorly protuberant (most *Uristes*); molar weakly triturative (*U. barbatipes*); dactyl of maxilliped slightly reduced but not as much as in *Centromedon* (*U. sulcus*); coxa 1 scarcely tapering or reduced (*U. velia, U. entalladurus*); carpus of gnathopod 1 medium (*U. barbatipes*), very short (*U. albinus, U. serratus*), slightly longer than hand *T. murrayi*); inner ramus of uropod 3 slightly reduced (*U. barbatipes*); telson not very elongate (*U. mediator, U. perspinis, U. velia*).

Remarks. *Uristes* and *Tryphosella* have been distinguished previously by various workers on the basis of (1) small head in *Uristes*, large in *Tryphosella* (*Tryphosa* auct.); (2) short carpus of gnathopod 1 in *Uristes*, longer in *Tryphosella*; and (3) small and ordinary prebuccal region in *Uristes*, large and protuberant epistome in *Tryphosella*. We have also tried sharp ocular lobe for *Uristes* and blunt or rounded for *Tryphosella* but this also clearly does not work as there are 'sister' or 'cousin' species that have blunt and sharp heads (such as *T. angulata* and *T. horingi*). Until better characters can be found, the clusters of species in these genera should be pooled to await a new analysis.

Removals. *Uristes induratus* K.H. Barnard, 1926, to *Procyphocaris*; *U. lepidus* J.L. Barnard, 1964a, to *Lepiduristes*; *U. martensi*, Goes, 1866, to *Martensia*; *U. murrayi* Walker, 1903, to *Tryphosella*.

Species. See K.H. Barnard (1930, 1932); Nicholls (1938); Schellenberg (1926a); Walker (1907); *U. abyssalis* (Stephensen, 1925a, as *Orchomene*) (Gurjanova, 1951) [211A]; *U. abyssi* (Norman, 1900a) (Stephensen, 1925a) [209B]; *U. adarei* (Walker, 1903) (Hurley, 1965a) (Andres, 1983) [800 + B]; *U. albinus* (K.H. Barnard, 1932, as *Tryphosella*) (Andres, 1983) [871B]; *U. antennibrevis* J.L. Barnard, 1962d [701B]; *U. barbatipes* (Stebbing, 1888) [851B]; *U. californicus* Hurley, 1963 (J.L. Barnard, 1966a) [310B]; *U. cansadus* J.L. Barnard, 1961a [715B]; *U. dawsoni* Hurley, 1963 [310B]; *U. entalladurus* J.L. Barnard, 1963, 1964e, 1969b [370]; *U. georgianus* (Schellenberg, 1931, as *Tryphosella*) (Hurley, 1965a) (Andres, 1983) [800 + B]; *U. gigas* Dana, 1849, 1852a,b, 1853 (= *U. antennipotens* Stebbing, 1888) (Nicholls, 1938) (Andres, 1983) [800 + B]; *U. latipes* Ledoyer, 1986 [693]; *U. mediator* J.L. Barnard, 1962d [735AB]; *U. natalensis* K.H. Barnard, 1916 (Griffiths, 1974b,c) [probably = *Hippomedon*] [743]; *U. perspinis* J.L. Barnard, 1967a [309B]; *U. serratus* Schellenberg, 1931 [866]; *U. stebbingi* (Walker, 1903) (Hurley, 1965a) [878]; *U. subchelatus* (Schellenberg, 1931, as *Uristoiodes*) [864]; *U. sulcus* Griffiths, 1974c [743]; *U. umbonatus* (Sars, 1883, 1895, as *Pseudotryphosa*) (Stephensen, 1923a,b, 1935a, 1940b) (Shoemaker, 1930b) (Gurjanova, 1951) [200 + B]; *U. velia* J.L. Barnard, 1961a [717B].

Habitat and distribution. Marine, arctic-boreal; antarctic-austral, and cold deep waters, rarely shallow water of low latitudes (*U. entalladurus*), 1-3015 m, 22 species.

Valettia Stebbing

Fig.92S

Valettia Stebbing, 1888: 723.–Stebbing, 1906: 22.

Type species. *Valettia coheres* Stebbing, 1888, monotypy.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome [?separate, neither dominant in size nor projection, blunt]. Incisor widely toothed, molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 moderately (5) setose apically; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 enlarged, poorly chelate, palm transverse, weakly chelate, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 slightly shorter than article 5, ordinary, propodus strongly chelate, dactyl and palm large. Inner ramus of uropod 2 with large notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, deeply cleft.

Additional characters. Outer plate of maxilliped with sharp apicomedial cusp; coxae 1-4 short, thus coxae 1-2 similar in shape and shorter than normal for family, coxa 2 subrounded.

Relationship. Differing from *Valettiopsis* and *Valettietta* in the equally short and subrounded coxae 1-2 and the poorly setose inner plates of maxillae 1-2. Gnathopod 1 of *Valettia* has a weakly chelate palm unlike the other 2 genera.

Species. *Valettia coheres* Stebbing, 1888, 1906 [807A].

Habitat and distribution. Marine, antarctic abyss north of Shackleton ice shelf (Davis Sea area), 3612 m, 1 species.

Valettietta Lincoln & Thurston

Valettietta Lincoln & Thurston, 1983: 89.

Type species. *Valettietta lobata* Lincoln & Thurston, 1983, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate but neither dominant in size nor projection, blunt. Incisor widely toothed; molar triturative, large, palp attached opposite molar. Inner plate of maxilla 1 strongly setose medially; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 slightly shortened, but visible,weakly tapering. Gnathopod 1 short, strongly subchelate, palm oblique, articles 5 and 6 subequal, dactyl large; article 6 of gnathopod 2 equal to article 5, ordinary, both elongate, propodus subchelate (type) or simple. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, inner ramus scarcely shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional character. Inner plate of maxilla 2 with strong facial row of setae.

Variables. Article 3 of gnathopod 1 slightly elongate (*V. gracilis*); gnathopod 2 simple (*V. gracilis*).

Relationship. Like *Valettiopsis* but latter with coxa 1 much more reduced and urosome bearing sharp tooth.

Species. *Valettietta anacantha* (Birstein & Vinogradov, 1963) [601B]; *V. gracilis* Lincoln & Thurston, 1983 [350A]; *V. lobata* Lincoln & Thurston, 1983 [350A]; *V. punctata* Bellan-Santini, 1984 [301B].

Habitat and distribution. Marine, Atlantic and Pacific Oceans, abyssal, 3970-4300 m (Pacific depth open trawl 0-5300 m), coming to bait, 4 species.

Valettiopsis Holmes

Figs 90R, 92F

Valettiopsis Holmes, 1908: 494.

Type species. *Valettiopsis dentata* Holmes, 1908, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome separate, labrum slightly dominant in size, blunt. Incisor widely toothed; molar triturative, small; palp attached slightly distal to molar. Inner plate of maxilla 1 strongly setose medially; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 elongate, strongly subchelate, palm almost transverse, articles 5 and 6 subequal, dactyl small; article 6 of gnathopod 2 almost equal to article 5, both very elongate and linear, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, inner ramus not shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Article 3 of gnathopod 1 slightly to greatly elongate; posteroventral lobe on coxa 4 weak; pereopods 5-7 elongate; pleonite 4 carinate (versus *Paralicella*).

Variables. Pleon and pereon carinate (*V multidentata*); propodus of gnathopod 2 expanded (*V. macrodactyla*).

Relationship. Differing from *Valettia* in coxa 1 being shorter than coxa 2, the elongate rectangular coxa 2, and the fully setose inner plates of maxillae 1-2; in *Valettia* coxae 1-2 are both short together and the inner plates of the maxillae are setose mostly terminally. From *Paralicella* in the more elongate gnathopod 1, serrate incisor, smaller coxa 1 tapering distally, poorly developed posteroventral lobe on coxa 4, and carinate pleonite 4. From *Eurythenes* in the more elongate coxa 1, serrate incisor, poorly developed lobe on coxa 4, facial row of setae on the inner plate of maxilla 2, and the unswollen article 1 of antenna 2. From *Tryphosella*, *Ambasia*, *Tmetonyx*, and relatives in the densely setose maxillae 1-2. From *Aristias* in the elongate, strongly subchelate gnathopod 1 with elongate article 3 and the better developed inner plates of the maxillipeds. From

Onesimoides in the reduced and tapering coxa 1, medially setose maxillae 1-2, elongate gnathopod 1 with elongate article 3, and the large inner ramus of uropod 3. From *Aristiopsis* in the elongate gnathopod 1 with elongate, unlobate carpus and the multisetose maxillae 1-2.

See *Valettietta*.

Removal. *Valettiopsis anacanthus* Birstein & Vinogradov, 1963, to *Valettietta*.

Species. *Valettiopsis dentata* Holmes, 1908 (Gurjanova, 1962) (J.L. Barnard, 1967a) [310B]; *V. macrodactyla* Chevreux, 1909, 1935 (Lincoln & Thurston, 1983) [240BA]; *V. multidentata* J.L. Barnard, 1961a [715B].

Habitat and distribution. Marine, demersal cosmopolitan, 183-4300 m, coming to baited traps, 3 species.

Ventiella Barnard & Ingram

Ventiella Barnard & Ingram, 1990: 31.

Type species. *Ventiella sulfuris* Barnard & Ingram, 1990, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, prominent, separate, labrum strongly dominant in size and projection, blunt. Incisor ordinary, molar triturative, small; palp attached opposite molar. Inner plate of maxilla 1 weakly (2) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp strongly exceeding outer plate, dactyl well developed. Coxa 1 strongly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, poorly subchelate, palm oblique, article 5 longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson ordinary, short, weakly cleft.

Additional characters. Antenna 1 base of primary flagellum with callynophore and thin; inner plate of maxilla 2 basalmost medial seta largest; dactyl of gnathopod 1 with inner tooth.

Sexual dimorphism. Male antenna 1 accessory flagellum basal article as long as callynophore of primary flagellum (shorter in female).

Relationship. Differing from *Ambasiopsis* in the thinner gnathopod 1, presence of 11 spines on outer plate of maxilla 1 (versus 7), presence of 1 major and 2 appressed spines on apex of inner plate on maxilliped (intermediated by *A. tumicornis*), short gape-cleft of telson, major inner seta on inner plate of maxilla 2 basalmost, non-pubescent molar with strong ridges, and appressed lobes of lower lip. From *Galathella* in the unproduced epistome. From *Schisturella* in the more compressed apex of inner plate on maxilliped, bearing lateral acclivities, uropod 2 inner ramus not incised, and telson with short gape-cleft. From *Cedrosella* in article 5 of gnathopod 1 being longer than article 6, better triturative molar, weakly cleft telson and oblique palm of gnathopod 1.

Species. *Ventiella sulfuris* Barnard & Ingram, 1990 [540A].

Habitat and distribution. Marine, deep sea sulphurated hydrothermal vent communities, eastern Pacific Ocean, 2450-2676 m, 1 species.

Vijaya Walker

Vijaya Walker, 1904: 241.–Gurjanova, 1962: 45.

Type species. *Vijaya tenuipes* Walker, 1904, monotypy.

Diagnosis. Probable description, poorly described. Mouthparts forming quadrate bundle. Labrum and epistome continuous, blunt. Incisor widely toothed; molar simple, small, setulose; palp attached in middle of mandible. Inner plate of maxilla 1 weakly setose; palp 1-articulate, small. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl vestigial. Coxa 1 slightly shortened and partly covered by coxa 2, tapering. Gnathopod 1 short, elongate, slender, simple, article 6 much longer than 5, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus minutely chelate. Inner ramus of uropod 2 with notch. Uropod 3 aequiramous, ordinary, peduncle ordinary, outer ramus 1-articulate. Telson ordinary, cleft one third.

Additional characters. Article 2 of antenna 1 half as long as article 1 (versus *Bathyamaryllis*); anteroventral corner of coxa 4 sharply attenuate (versus *Amaryllis*); article 3 of gnathopod 1 elongate.

Relationship. Differing from *Amaryllis* in the acute anteroventral angle of coxa 4 and the much more elongate article 3 of gnathopod 1. From *Bathyamaryllis* in article 2 of antenna 1 being half the length of article 1.

Species. *Vijaya tenuipes* Walker, 1904 (Nayar, 1967) [665].

Habitat and distribution. Marine, Sri Lanka (= Ceylon), shallow water, 1 species.

Waldeckia Chevreux

Ephippiphora White, 1847b: 226 [homonym, Lepidoptera] (*Ephippiphora kroyeri* White, 1847b, monotypy).
Charcotia Chevreux, 1905d: 163 [homonym, Mollusca].
Waldeckia Chevreux, 1906a: 13 (new name).

Type species. *Charcotia obesa* Chevreux, 1905d, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome prominent, separate, both well projecting, blunt. Incisor ordinary, molar simple, large, conicolaminate or subconical, setulose; palp attached strongly proximal to molar. Inner plate of maxilla 1 moderately to weakly (2-6) setose (spinose); palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp slightly exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, simple (type), or poorly subchelate, article 5 shorter than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Pereopod 5 same length as pereopod 4 (versus *Ichnopus*); apices of telson usually with large spines; gills not pleated (versus *Socarnes*) but see 'Variables'.

Sexual dimorphism. Male antenna 1 primary flagellum with callynophore, base elongate; antenna 2 flagellum elongate, articles 3-5 of peduncle widely expanded with male tufts; some females with setose uropod 3.

Variables. Article 3 of mandibular palp short (*W. kroyeri* fide Hale, 1929); inner plate of maxilla 1 with setation variable (*W. obesa*, see Thurston, 1974a); plate width of maxilla 2 reversed from type (*W. chevreuxi*), thus outer plate broader; gnathopod 1 with small palm (*W. elephas*), often sharp (*W. kroyeri, W. australiensis*), propodus shorter than type (*W. kroyeri*, see Chilton, 1921d); palm of gnathopod 2 broadly and bluntly chelate (*W. kroyeri*), chelate palm hollow, with spine, dactyl small (*W. elephas*); urosomite 1 with large process (type, etc.), or absent (*W. kroyeri*, etc.); article 2 on outer ramus of uropod 3 obsolescent (*W. enoi*).

Identification problem. Pleated gills present on *W. kroyeri* fide Chilton (1921d).

Relationship. Differing from *Lysianassa* in deeply cleft telson. From *Socarnes* in non-pleated gills, very obese body, high coxal plates, much more proximal mandibular palp, and outer plate of maxilliped exceeding apex of article 2 on palp. From *Socarnopsis* in the short carpus of gnathopod 1. From *Socarnoides* in simple inner ramus of uropod 2. From *Socarnella* in the 2-articulate outer ramus of uropod 3. From *Menigrates* in large uropod 3, long and deeply cleft telson, prominent prebuccal mass, and presence of accessory lobes on branchiae. From *Ichnopus* in similar lengths of pereopods 6-7, unpleated gills, proximal mandibular palp, no brush on gnathopod 1 dactyl, no tooth on antenna 1, and non-sickle-shaped mandibular palp article 3. From *Lepidepecreum* in poorly carinate antenna 1, greater dominance of upper lip in prebuccal mass, and simple gnathopod 1.

Distribution note. To confirm identifications of *W. chevreuxi* outside of southern Australia; to confirm identifications of *W. kroyeri* outside of northern Australia and validate subspecies: thus question marks on certain taxa and distributions.

Species. *Waldeckia australiensis* (Haswell, 1879b, 1885b) (Stebbing, 1910a) (J.L. Barnard, 1974b) [781]; *W. chevreuxi* Stebbing, 1910a (Chilton, 1921d, 1922b) (Hale, 1927, 1929) (?Bellan-Santini & Ledoyer, 1974) [780]; *W. elephas* Hirayama & Kikuchi, 1980b [395]; *W. kroyeri* (White, 1847b) (Bate, 1862) (Chilton, 1921d) (Hale, 1929) [780]; ?*W. k. crenulata* Pirlot, 1936b [640]; ?*W. k. enoei* Stephensen, 1931c, Pirlot, 1936b [640]; ?*W. k. kroyeri* (White, 1847b, Pirlot, 1936b) [640]; *W. nitens* (Haswell, 1879a, 1882) (?= *W. affinis* Haswell, 1879a) (?*W. chevreuxi* identification of Stebbing, 1910a) (J.L. Barnard, 1974b) [781]; *W. obesa* (Chevreux, 1905d, 1906a) (Walker, 1907) (Schellenberg, 1926a) (K.H. Barnard, 1930) (Nicholls, 1938) (Bellan-Santini, 1972b) (Thurston, 1974a) (Andres, 1983) [870 + B].

Habitat and distribution. Marine, Australia, Indonesia, Japan, New Zealand, Kerguelen, Antarctica, 0-550 m, 6 species.

Wecomedon Jarrett & Bousfield

Wecomedon Jarrett & Bousfield, 1982: 113.

Type species. *Hippomedon wecomus* J.L. Barnard, 1971b, original designation.

Diagnosis. Mouthparts forming quadrate bundle. Labrum and epistome differentially produced, separate, labrum slightly dominant in projection, blunt. Incisor ordinary, molar triturative, large; palp attached opposite molar. Inner plate of maxilla 1 moderately to weakly (2-5) setose; palp 2-articulate, large. Inner and outer plates of maxilliped well developed, palp scarcely exceeding outer plate, dactyl well developed. Coxa 1 large and visible, not tapering. Gnathopod 1 short, strongly to poorly subchelate, palm oblique, article 5 longer than 6, dactyl large; article 6 of gnathopod 2 greatly shorter than article 5, ordinary, propodus subchelate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary, peduncle ordinary, inner ramus slightly shortened, outer ramus 2-articulate. Telson elongate, deeply cleft.

Additional characters. Head 'small'; article 1 of antenna 1 weakly carinate apically; article 1 of flagellum longer than articles 2 or 3 of peduncle; female antenna 2 less than twice as long as antenna 1; pereopod 5 shortened, pereopod 6 longest; gill 7 absent.

Sexual dimorphism. Flagella of male antennae 1-2 elongate, calceoli occasionally present on antenna 2; uropod 3 slightly more setose.

Variables. Inner plate of maxilla 1 with 2-5 setae; palm of gnathopod 1 indistinct (*W. boreopacificus*); telsonic lobes with 1-5 apical spines and 0-4 lateral spines.

Taxonomy. Attempts to make this genus separable from various non-Pacific species of *Hippomedon* will require more subdivisions of the genus.

Relationship. Differing from *Hippomedon* in not having a callynophore on the primary flagellum of antenna 1 and the lack of gill 7. From *Paratryphosites* in the deeper cleft of the telson, presence of gill 7 and shorter antenna 2. From *Psammonyx* in the longer article 1 on the primary flagellum of antenna 1, with pereopod 6 being longest of pereopods 5-7, also with pereopod 5 not being 25% shorter than pereopods 6-7. From *Elimedon* and *Paracentromedon* in the long article 3 on the mandibular palp.

Species. See Gurjanova (1962); *W. boreopacificus* (Gurjanova, 1962) [280]; *W. minusculus* (Gurjanova, 1938, 1951) [280]; *W. similis* Jarrett & Bousfield, 1982 [275 south to 271]; *W. wecomus* (J.L. Barnard, 1971b) (Jarrett & Bousfield, 1982) [268]; *W. wirketis* (Gurjanova, 1962) (Jarrett & Bousfield, 1982) [280].

Habitat and distribution. Marine, boreal Pacific and Bering Sea, south to Japan and Oregon, 0-100 m, 5 species.

Incertae Sedis

Alibrotus Milne Edwards

Alibrotus Milne Edwards, 1840: 23.

Type species. *Alibrotus chauseicus* Milne Edwards, 1840, monotypy.

Remarks. Possibly can be identified now that west European species are well worked up.

Species. *Alibrotus chauseicus* Milne Edwards, 1840 [?242].

Habitat and distribution. Marine, Iles Chauseay.

Stenia Dana

Stenia Dana, 1849: 136, *nomen nudum* [homonym, Lepidoptera].–Dana, 1852a: 209.

Type species. *Stenia magellanica* Dana, 1852a, monotypy.

Remarks. Rather well described anteriorly but unidentifiable to genus because of lack of detailed information on epimeron 3, uropods 2-3 and telson. Flagella of antenna 1 long; epistome and upper lip separate, neither dominant, both weakly produced; mandible well illustrated, molar large, of conicolaminate form, palp attached opposite molar, incisor untoothed, article 3 of palp short. Maxillae and maxillipeds ordinary; lateral cephalic lobe with identifiable shape; coxa 1 ordinary; gnathopod 1 slender, articles 3,5,6 slightly elongate (but not like *Pseudorchomene*), carpus not lobate, hand with well-developed oblique palm; remainder of body ordinary. Like a large *Anonyx*. Possibly identifiable by Magellan specialist based on excellent anterior details.

Species. *Stenia magellanica* Dana, 1852a (= *S. fuegiensis* Dana, 1853) [864].

Habitat and distribution. Marine, Tierra del Fuego, Good Success Bay.

MACROHECTOPIDAE Sowinsky, 1915

[see Barnard & Barnard (1983)]

MAXILLIPIIDAE Ledoyer, 1973b

Diagnosis. Body depressed; head weakly depressed, eyes weakly bulging. Antenna 2 longer than 1, articles 1-3 of antenna 1 short and progressively shorter; accessory flagellum absent. Mandibular incisor present, molar large, weakly triturative, rakers present, palp vestigial or absent. Maxillae ordinary, palp of maxilla 1 uniarticulate. Inner plates of maxillipeds very small or slender, poorly armed, outer plates very large, palp huge. Coxa 1 vestigial, hidden by coxa 2, other coxae very short, overlapping. Gnathopods feeble, poorly setose, scarcely subchelate, but gnathopod 1 broader and shorter than 2. Article 2 of pereopod 5 unexpanded or weakly lobate, of pereopods 6-7 expanded and lobate. Pereopod 6 enormously elongate, articles 6-7 forming long whip. Peduncle of uropod 3 elongate, rami longer than peduncle. Telson short, apparently not fleshy, much broader than long, uncleft.

See Amphilochidae, Colomastigidae, Dexaminidae, Dulichiidae, Melphidippidae and Pardaliscidae.

Description. Body weakly carinate on pleon. Head with medium rostrum, eyes bulging, bilateral, ommatidial, medium to large. Article 1 of antenna 1 short. Incisors extended, toothed, laciniae mobiles present, 2-3 rakers present; molar large, maul-shaped, weakly triturative, palp absent or represented by hump and seta. Outer lobes of lower lip appressed, inner lobes small and plastered to outer lobes, or large and fleshy, mandibular lobes sharp and broad. Inner plate of maxilla 1 small, naked, outer plate with 8-10 spines, palp long and 1-articulate. Plates of maxilla 2 slender, apically setose, inner plate occasionally with 1-2 medial setae. Inner plates of maxillipeds narrow, small, with 2-3 apical setae each, outer plates with oblique apicomedial margin bearing pairs or singles of thin diverse armaments, palp article 2 flabellate, sparsely setose-spinose medially, article 3 curved, dactyl unguiform.

Article 2 of gnathopods 1-2 slender, article 3 short; article 4 of gnathopod 1 weakly lobate, carpus longest, broadest, lobate or not, propodus short, broadly ovate, mittenform, palm oblique or vestigial, setose, dactyl large to small, simple; article 4 of gnathopod 2 short, carpus elongate, unlobed, propodus elongate, rectangular, slightly shorter and/or much narrower than carpus, palm minute or absent, transverse, posterior margin of propodus poorly armed, straight, dactyl stout, curved, sharp.

Pereopods 3-4 slender, article 4 very short, article 2 of pereopod 5 unexpanded, of pereopods 6-7 moderately expanded, with sharp posteroventral lobe. Oostegites huge, on coxae 2-4. Epimeron 2 larger than 3. Urosomites separate, 1 largest. Rami of uropods 1-3 lanceolate, outer rami of uropods 1-2 shortened. Peduncle of uropod 3 elongate, rami (almost) as long as peduncle or longer, simple. Telson very short, broad, entire, with 2 apical setule notches.

Sexual dimorphism. Male unknown.

Relationship. Similar to Melphidippidae but coxa 1 vestigial, telson much broader than long, mandibular palp absent and palp of maxilliped very broadened.

Like Colomastigidae but urosomites separate, gnathopod 1 dominant, antennal flagella well developed, palp of maxilliped expanded (versus outer plate and its article expanded in Colomastigidae).

Differing from Dexaminidae in the separated urosomites, vestigial coxa 1 and short uncleft telson. From Pardaliscidae in the large molar. From Stilipedidae (= Astyridae) in the large molar, lack of mandibular palp and severe reduction of coxae. From Amphilochidae in the severe reduction of coxae and short telson. From Dulichiidae in the short peduncle of antenna 1, weak, simple gnathopod 2 and large uropod 3. From Iciliidae in the elongate peduncle of uropod 3 with equal rami, reduced coxa 1 covered by coxa 2, short peduncle of antenna 1, lack of mandibular palp, uniarticulate palp of maxilla 1, and feeble plates of the maxillipeds.

Key to Genera of Maxillipiidae

1. Gnathopod 1 carpochelate; article 1 of maxillipedal palp larger than article 2 .... *Maxillipedes*

—— Gnathopod 1 not carpochelate; article 1 of maxillipedal palp much smaller than article 2 .... *Maxillipius*

Maxillipides Ledoyer

Maxillipides Ledoyer, 1984: 86.

Type species. *Maxillipides laticarpus* Ledoyer, 1984, original designation.

Diagnosis. Gnathopod 1 not carpochelate; article 1 of maxillipedal palp much smaller than article 2.

Species. *Maxillipides laticarpus* Ledoyer, 1984 [586].

Habitat and distribution. Marine, New Caledonia, shallow water, seagrass, 1 species.

Maxillipius Ledoyer

Fig.96

Maxillipius Ledoyer, 1973b: 32.

Type species. *Maxillipius rectitelson* Ledoyer, 1973b, monotypy, probably unavailable by ICZN rules (monotypy no longer acceptable), but here so designated.

Diagnosis. Gnathopod 1 carpochelate; article 1 of maxillipedal palp with larger surface area than article 2.

Species. *Maxillipius commensalis* Lowry, 1984a [597], *M. rectitelson* Ledoyer, 1973b, 1986 [698N].

Habitat and distribution. Marine, Madagascar, seagrass bed (*Enhalus acoroides*), shallow water, to New Guinea, on gorgonian, *Melithaea* species, 2 species.

MEGALUROPIDAE Thomas & Barnard, 1986b

[see Barnard & Barnard (1983)]

MELITIDAE Bousfield, 1973

[see Barnard & Barnard (1983)]

MELPHIDIPPIDAE Stebbing, 1899a

[see Barnard & Barnard, (1983)]

MESOGAMMARIDAE Bousfield, 1977

[see Barnard & Barnard (1983)]

NAJNIDAE J.L. Barnard, 1972b

Diagnosis. Talitroidea with laterally compressed body, smooth cuticle, no bulges. Head compressed but with slight anterodorsal flattening and shift of antennae ventrally; antennae non spinose. Coxae 1-2 subpyriform. Mandibular molar replaced by 1-2 spines. Setae of brood lamellae normally curl tipped. Urosomites free. Uropod 3 with vestigial ramus.

See Hyalellidae and Hyalidae.

Description. Upper lip slightly lobate; palp of maxilla 1 present; article 4 of maxillipedal palp small, not unguiform. Telson short, broad, entire.

Relationship. Characterised by the reduction in molar combined with reduction in ramus of uropod 3; the head shape is distinctive.

Najna Derzhavin

Figs 70I, 71A

Najna Derzhavin, 1937: 97, 111.

Type species. *Najna consiliorum* Derzhavin, 1937, original designation.

Diagnosis. With characters of the family.

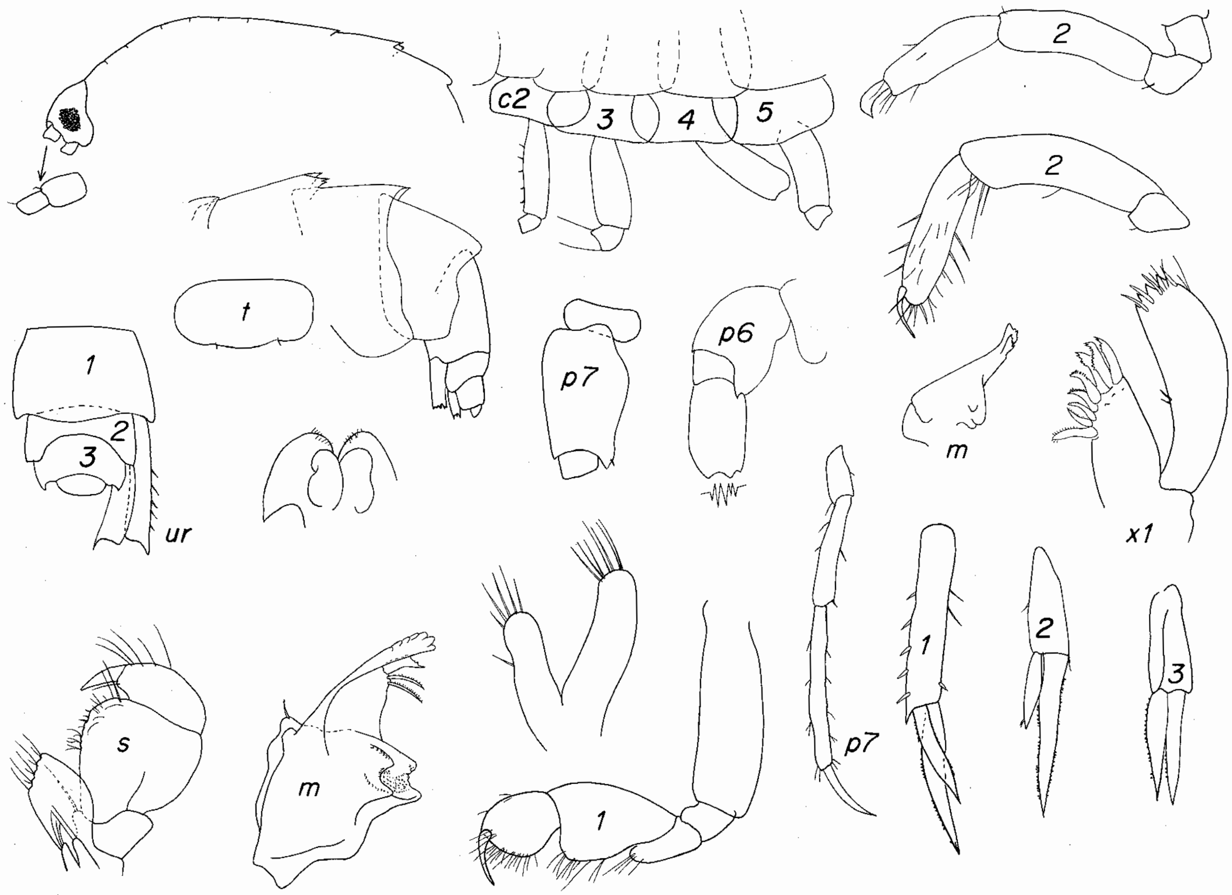


Fig.96. Maxillipiidae. *Maxillipius rectitelson.*

Species. *Najna consiliorum* Dershavin, 1937 (Gurjanova, 1951) (Bulycheva, 1957) (Kudrjaschov, 1972b) (Hirayama, 1985a) [280]; *N. kitamati* J.L. Barnard, 1979b (= *N. consiliorum* of J.L. Barnard, 1962c, 1972b) [371].

Habitat and distribution. Marine, boreal north-western and north-eastern Pacific, 0-45 m, 2 species.

NEONIPHARGIDAE Bousfield, 1977

[see Barnard & Barnard (1983)]

NIHOTUNGIDAE J.L. Barnard, 1972a

Diagnosis. Body compressed, with appearance of stenothoid or cyproidinid. Head more or less ordinary but with 4 eyes, 1 main pair and 1 pair of accessory eyes, both composed of ommatidia. Accessory flagellum obsolescent. Mouthparts styliform, especially mandible and maxilla 1; molar absent, mandibular palp present; outer plates of maxilliped large (versus Stenothoidae). Coxa 4 huge, as wide as length of 4 pereonites, covering parts of anterior coxae, coxa 1 also large but coxae 2-3 equally small or progressively smaller. Gnathopods feeble, simple. Urosomites separate. Uropod 3 uniramous, ramus biarticulate. Telson of ordinary length, entire, weakly fleshy but generally laminar.

See Stenothoidae, Amphilochidae and Pagetinidae.

Description. Head short, ocular lobes very broad dorsoventrally, main eye irregular, largely composed of dense pigment with white and red anterior ommatidia (in preservative), accessory eye small, below main eye, trabecular, with several free apical ommatidia. Antennae very short and poorly articulate. Labrum [of varying interpretation, requiring further study]. Mandibles styliform, incisor and lacinia mobilis greatly elongate; molar absent; articles 1 and 3 of palp elongate, article 2 short, setae vestigial. Labium [unknown] but possibly misinterpreted as part of maxilla 1; complex of maxilla 1 and labium with 2 lobes bearing large setae, 1 partially divided lobe with 2 rows of setules, 1 plain and 1 flagellate blade. Maxilla 2 distinct, moderately to feebly setose, lobes thin. Inner lobes of maxilliped thin, small, bearing 1-2 apical spine-setae, outer plates very large, palp of medium size, 3-articulate. Articles 5-6 of gnathopod 1 slightly elongate, article 5 broadly lobate, article 6 simple; gnathopod 2 much more elongate and like pereopods 3-4, article 5 not lobate. Article 2 of pereopods 3-6 slender, of pereopod 7 slightly expanded. Uropods 1-2 ordinary. Uropod 3 small, articles 2 and 3 short.

Relationship. This strange little group of amphipods is distinguished by the combination of uniramous uropod 3 (= stenothoid), enlarged outer plates of the maxillipeds, large coxa 4 (again stenothoid) associated with large coxa 1 but small coxae 2-3, blade-like appendage of maxilla 1 and accessory eye. The styliform (?piercing) mandible is also peculiar. The uniramous uropod 3 distinguishes Nihotungidae from Amphilochidae; the large outer plates of the maxillipeds and styliform mandible distinguish Nihotungidae from Stenothoidae and Pagetinidae. The blade-like appendage of maxilla 1 is unique in Gammaridea but Nihotungidae

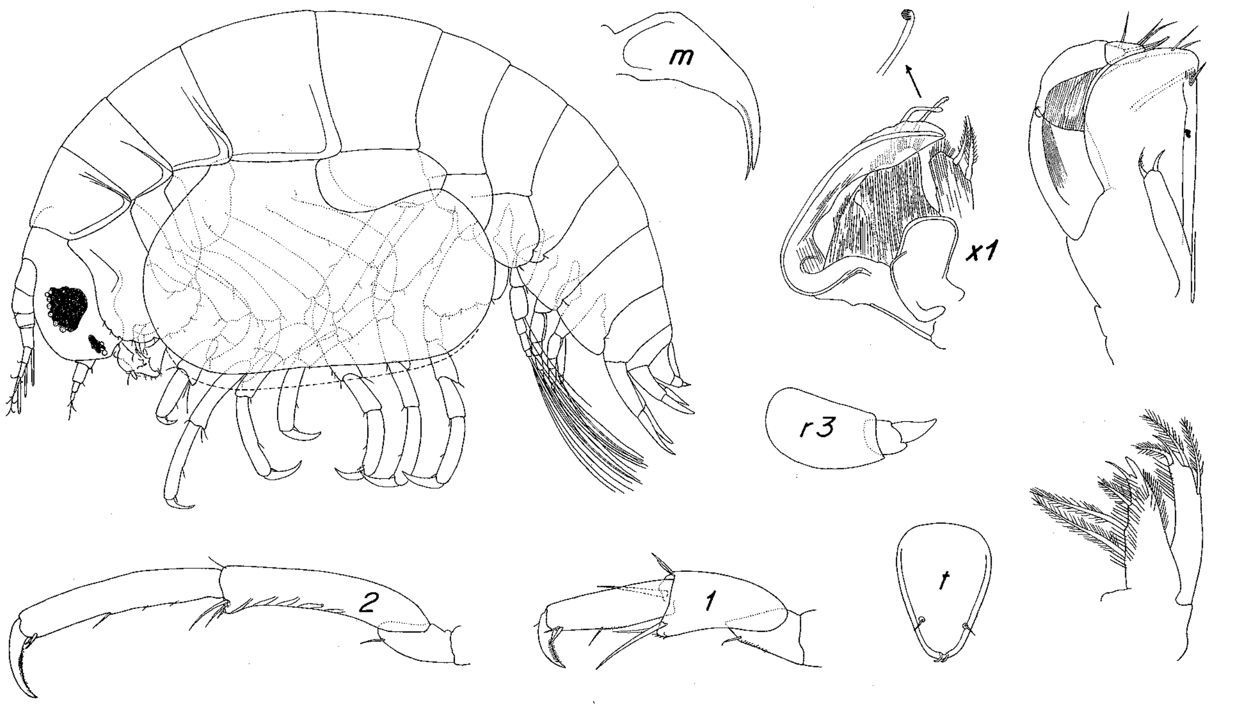


Fig.97. Nihotungidae. *Nihotunga ilika*.

as known at present are easily recognised by their extremely small size (1.25 mm long), slick suborbicular body and odd eyes. After death in formaldehyde washings of algal substrates they tend to float to the water surface and become trapped in the meniscus and must be conserved by use of very fine wire or cloth filters. Once transfered to alcohol they then tend to sink and are easy to handle. In formaldehyde the body colour often is bright non-oxidised fluorescein green but this is lost rapidly in alcohol and the body then has a greyish hue which on close view is composed of a brownish cast on a pale blue matrix.

The ommatidia not enveloped in pigment appear to be relatively constant and species-specific in number, position and colour, there generally being a few red ommatidia among the eight or so clear ommatidia.

Nihotunga J.L. Barnard

Fig.97

Nihotunga J.L. Barnard, 1972a: 278.–J.L. Barnard, 1972b: 140.

Type species. *Nihotunga iluka* J.L. Barnard, 1972a, original designation.

Diagnosis. With the characters of the family.

Description. Pattern of colour in ommatidia variable interspecifically. Coxae 3 and 4 variable in size or shape.

Species. *N. iluka* J.L. Barnard, 1972a [792]; *N. noa* J.L. Barnard, 1972b [775]; species, (USNM collections) [593].

Habitat and distribution. Marine, Australia, New Zealand, Guam, littoral, 3 species.

NIPHARGIDAE S. Karaman, 1943

[see Barnard & Barnard (1983)]

OCHLESIDAE Stebbing, 1910a

See Iphimediidae

OEDICEROTIDAE Liljeborg, 1865b

Diagnosis. Pereopods 5-6 equally short, pereopod 7 immensely elongate and of different shape than pereopods 5-6; pereopods weakly fossorial; head large, eyes when present dorsally appressed or fused together; telson short, entire or emarginate; apices of rami on uropods 1-2 naked or bearing immersed nails, no subapical spines.

Description. Head large, rostrum present or absent; mouthparts basic; coxae large; urosomites 2-3 rarely fused together; uropod 3 with elongate peduncle.

Relationship. Exoedicerotidae have subapical spines on the rami of uropods 1-2.

Paracalliopiidae always have urosomites 2-3 fused together but a few Oedicerotidae also have this character. Paracalliopiids also have distinctive gnathopods turning inward on death (see illustrations).

Remarks. Problems with *Arris sobolevi*, and *Finoculodes*, differences between *Monoculodes* and *Paraperioculodes*, and relationships within the *Arrhis-Aceroides* complex and its relationship to *Bathymedon* have not been resolved.

Removals. *Amphoediceros* Fearn-Wannan, 1968a, to *Paramoera* in Eusiridae; *Paroediceropsis* Fearn-Wannan, 1968a, to *Paracalliope* in Paracalliopiidae.

Key to Genera of Oedicerotidae

1. Molar not triturative 2
—— Molar triturative 13
2. Gnathopod 1 much larger than gnathopod 2 3
—— Gnathopod 1 not larger than gnathopod 2 4
3. Gnathopod 2 chelate .... *Synchelidium*
—— Gnathopod 2 subchelate .... *Monoculodopsis*
4. Gnathopods lacking significant carpus lobes 5
—— Gnathopods with carpus lobes 6

5. Article 1 of antenna 1 with tooth .... *Cornudilla*

—— Article 1 of antenna 1 lacking tooth .... *Aborolobatea*

6. Palp of mandible absent, gnathopods feeble .... *Machaironyx*

—— Palp of mandible present, gnathopods robust 7

7. Lobes on carpus of at least gnathopod 1 short or scarcely guarding propodus 8

—— Lobes on carpus of gnathopods both long and guarding propodus 9

8. Lobes on carpus of gnathopods subequal to each other .... *Oediceros*

—— Lobe on carpus of gnathopod 1 much smaller than on gnathopod 2 .... *Paroediceros*

9. Article 3 of mandibular palp as long as article 2 10

—— Article 3 of mandibular palp shorter than article 2 11

10. Rostrum absent, pereopods 3-4 lacking facial setal row on article 4 .... *Arrhinopsis*

—— Rostrum present, pereopods 3-4 with facial setal row on article 4 .... *Finoculodes*

11. Outer plate of maxilliped extending only to apex of palp article 1, dactyls of pereopods 3-4 longer than article 6 .... *Sinoediceros*

—— Outer plate of maxilliped extending well beyond apex of palp article 1, dactyls of pereopods 3-4 much shorter than article 6 12

12. Telson not excavate, article 1 of antenna 1 lacking tooth, incisor well toothed .... *Perioculodes*

—— Telson excavate, article 1 of antenna 1 bearing tooth, incisor not toothed .... *Perioculopsis*

13. Gnathopod 2 chelate .... *Pontocrates*

—— Gnathopod 2 subchelate 14

14. Gnathopod 1 both feeble and palm transverse .... *Carolobatea*

—— Gnathopod 1 either robust or palm oblique 15

15. Incisor poorly toothed 16

—— Incisor well toothed 21

16. Gnathopod 1 much larger than gnathopod 2, (article 3 of antenna 1 as long as article 1) .... *Monoculopsis*

—— Gnathopod 1 not larger than gnathopod 2, (article 3 of antenna 1 shorter than article 1) 17

17. Coxa 3 or 4 excavate below 18

—— Coxae 3-4 not excavate below 19

18. Article 2 of antenna 1 shorter than article 1 .... *Aceroides*

—— Article 2 of antenna 1 as long as article 1 .... *Arrhis*

19. Gnathopods robust, eyes forming dorsal ring .... *Gulbarentsia*

—— Gnathopods feeble, eyes absent or not forming dorsal ring 20

20. Eyes feeble or absent, article 2 of mandibular palp 'straight' .... *Bathymedon*

—— Eyes well developed, article 2 of mandibular palp 'curved' .... *Westwoodilla*

21. Uropod 2 reaching only to apex of peduncle on uropod 3, latter huge 22

—— Uropod 2 well exceeding apex of peduncle on uropod 3, latter ordinary 23

22. Gnathopods large, carpus short and strongly lobate .... *Halicreion*

—— Gnathopods feeble, carpus elongate, unlobate .... *Parhalimedon*

23. Article 4 of pereopod 5 enveloping article 5 posteriorly .... *Parexoediceros*

—— Article 4 of pereopod 5 not enveloping article 5 24

24. Back multicarinate 25

—— Back not multicarinate 26

25. Eyes large, appressed together dorsally, not confined to rostrum and not filling rostrum .... *Acanthostepheia*

—— Eyes absent or when present small and filling rostrum only, not on body of head .... *Oediceroides*

26. Eyes completely coalesced dorsally on head proper 27

—— Eyes absent or with small dividing raphus or filling only rostrum 28

27. Telson entire, coxa 4 with weak blunt lobe .... *Paraperioculodes*

—— Telson emarginate, coxa 4 with strong sharp lobe .... *Paroediceroides*

28. Article 1 of antenna 1 with small tooth, (coxa 4 with huge blunt lobe) .... *Oedicerina*

—— Article 1 of antenna 1 lacking tooth, (coxa 4 with medium to small blunt lobe or large sharp lobe) 29

29. Outer plate of maxilla 2 with stout spine .... *Anoediceros*

—— Outer plate of maxilla 2 lacking spine 30

30. Antenna 1 very short, scarcely or not exceeding article 5 on antenna 2, peduncle of antenna 2 enlarged and usually with long curved spines 31

—— Antenna 1 well exceeding article 5 on antenna 2, peduncle of antenna 2 lacking long curved spines 33

31. Rostrum well developed .... *Oediceroides*

—— Rostrum feeble 32

32. Articles 1-2 of antenna 1 elongate, outer plate of maxilla 2 with spine, peduncle of antenna 2 lacking long spines, coxa 4 lobe weak .... *Anoediceros*

—— Articles 1-2 of antenna 1 short, outer plate of maxilla 2 lacking spine, peduncle of antenna 2 bearing long spines, coxa 4 lobe huge .... *Oediceropsis*

33. Article 3 of antenna 1 shorter than article 1 .... *Monoculodes*

—— Article 3 of antenna 1 as long as article 1 34

34. Carpus lobes of gnathopods guarding propodus .... *Monoculopsis*

—— Carpus lobes of gnathopods not guarding propodus .... *Lopiceros*

Aborolobatea Ledoyer

Aborolobatea Ledoyer, 1984: 90.

Type species. *Aborolobatea paracheliformis* Ledoyer, 1984, original designation.

Diagnosis. Cutting edge of mandible scarcely projecting and poorly toothed; molar vestigial. Inner lobes of lower lip separate but small. Gnathopods similar to one another, feeble, subchelate, carpus not lobate; palm of both gnathopods transverse. Uropod 2 [?fully reaching end of rami on uropod 3]. Uropod 3 well developed.

Additional characters. Article 1 of antenna 1 lacking tooth; epistome not produced; incisor very broad, flat, lacking callus; articles 2-3 of mandibular palp ordinary; palp of maxilla 1 not apically expanded; outer plate of maxilla 2 broad; inner plate of maxilliped vestigial; coxa 4 as broad as long; outer ramus of uropod 1 strongly shortened.

Relationship. Differing from *Cornudilla*, which also has non-lobate carpus on the gnathopods, in the vestigial molar, ordinary coxa 4, vestigial inner plates of the maxillipeds, ordinary article 2 on the mandibular palp, and the presence of long D-setae on mandibular palp article 3.

Characterised by the long subequal gnathopods with transverse palms but lacking carpal lobes.

Species. *Aborolobatea paracheliformis* Ledoyer, 1984 [586].

Habitat and distribution. Marine, New Caledonia, shallow water in seagrass, 1 species.

Acanthostepheia Boeck

Acanthostepheia Boeck, 1871b: 163.–Stebbing, 1906: 253.

Type species. *Amphithonotus malmgreni* Goes, 1866, monotypy.

Diagnosis. Cutting edge of mandible projecting and toothed; molar large, ridged, cup-shaped, dentate. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, stout, carpus with blunt strong posterior lobe partially guarding propodus, palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Body dorsally multicarinate; articles 6-7 of pereopods 3-4 especially elongate.

Relationship. Differing from *Oediceroides* in the well-developed eyes appressed together dorsally on non-rostral part of head; genus all arctic, *Oediceroides* mostly to the south.

Species. See Gurjanova (1951); *A. behringiensi*. (Lockington, 1877) (= *A. pulchra* Miers, 1881) (Stephensen, 1938b) (Shoemaker, 1955a); *A. b. marae alba* Dementieva, 1931; *A. b. carica* Dementieva, 1931; *A. b. polaris* Dementieva, 1931 (Bulycheva, 1957c) [220]; *A. incarinata* Gurjanova, 1929b, 1930a (Birula, 1937) (Bulycheva, 1957c) [220]; *A. malmgreni* (Goes, 1866) (Stephensen, 1931a, 1938b) (Kuznetzov, 1964) (Shoemaker, 1955a) [220 + B].

Habitat and distribution. Marine, circum-Arctic, 0-550 m, 3 species.

Aceroides Sars

Figs 98F, 99I, 100G

Aceroides Sars, 1895: 340.–Stebbing, 1906: 254.–Just, 1980: 24.

(*Patoides*) J.L. Barnard, 1964a: 33 (*Oediceroides* (*Patoides*) *synparis* J.L. Barnard, 1964a, original designation) [valid subgenus].

Type species. *Halicreion latipes* Sars, 1882, monotypy.

Taxonomy. See the following discussion on the relationship of this genus to *Arrhis*, *Anoediceros* and *Patoides*.

The *Arrhis–Anoediceros–Aceroides* Problem

Several species in the total 13 of this complex are poorly described, several others have crucial omissions because of missing parts when described and many differ in important characters from the type species of the genus to which they have been assigned in the literature.

Species with missing parts are: *A. callida* and *A. edax* (antenna 1); not described for *A. sobolevi* are pereopods 3-4, mandible and palp; for *A. luthkii*, head, antenna 1, mandible and palp; for *A. synparis*, mandibular palp; for *A. sedovi*, incisor, antenna 1; for *A. limicola*, facial armament of pereopods 3-4.

Character divergence from the type species is found in: well-toothed incisor of *Aceroides kobjakovae*, *A. limicola*, *A. synparis*, *A. callida*.

Elongate article 2 of antenna 1 for: *A. kobjakovae*, *A. limicola*, *A. synparis*; vestigial carpal lobes of gnathopods: *A. sobolevi*.

Minority of character: the presence or absence of a thick spine on the outer plate of maxilla 2 in *Anoediceros* is its only distinctive generic character: this is found in the type species, *Anoediceros hanseni* and a more simple version of the spine is found in *Aceroides (Patoides) synparis*.

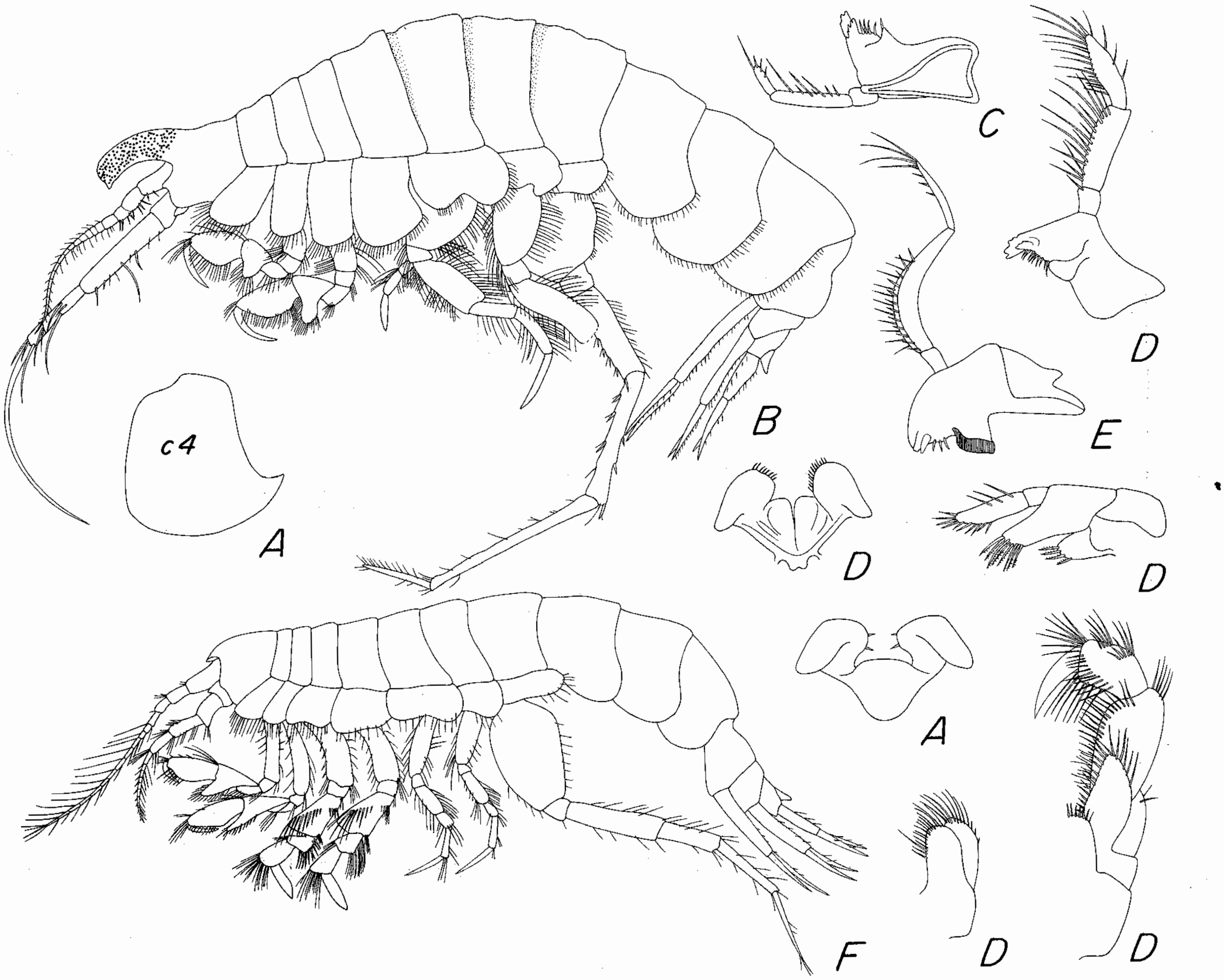


Fig.98. Oedicerotidae. A, *Perioculodes longimanus*; B, *Oediceroides apicalis*; C, *Synchelidium haplocheles*; D, *Oediceros saginatus*; E, *Westwoodilla caecula*; F, *Aceroides latipes*.

Poorly developed pereopods 3-4 are found in *Anoediceros hanseni* and *Arrhis mediterraneus*, but of the 10 other species in which pereopods 3-4 are known, only 6 of those with stout pereopods 3-4 have facial setae on article 4 (*Arrhis luthkei*, and *Aceroides latipes*, *A. goesi*, *A. callida*, *A. kobjakovae* and *Patoides edax*). The latter, having a large process on article 5, connects to *Patoides synparis* which lacks facial setae on article 4.

Taxa are grouped as in the following key:

A. Antenna 1 article 2 elongate .... *Arrhis*

1. Mandibular incisor not toothed .... *Arrhis phyllonyx* (type), *Arrhis mediterraneus*, *Anoediceros hanseni*
2. Mandibular incisor toothed .... *(Patoides) synparis*, *Aceroides kobjakovae*, *Aceroides limicola*
3. Mandibular incisor unknown .... *Arrhis sobolevi*, *Arrhis luthkei*

B. Antenna 1 article 2 short .... *Aceroides*

1. Mandibular incisor poorly toothed .... *Aceroides latipes* (type)
2. Mandibular incisor well toothed .... *Aceroides goesi*

C. Antenna 1 unknown

1. Mandibular incisor untoothed .... *Aceroides edax*, *Aceroides sedovi*
2. Mandibular incisor well toothed .... *Aceroides callida*

The various species are retained in their previously assigned genera but obviously many are improperly allocated.

Key 1 to Species of *Aceroides*, *Arrhis* and *Anoediceros*

1. Carpal lobes of gnathopods obsolescent .... *Arrhis sobolevi*

—— Carpal lobes of gnathopods well developed 2

2. Carpus of pereopods 3-4 with posterior lobe 3

—— Carpus of pereopods 3-4 without posterior lobe 7

3. Gnathopods 1-2 with large tooth on article 4 4

—— Gnathopods 1-2 without large tooth on article 4 6

4. Mandibular incisor not toothed .... *Aceroides edax*

—— Mandibular incisor toothed 5

5. Process of article 5 of pereopods 3-4 guarding article 6 .... *Aceroides synparis*

—— Process of article 5 of pereopods 3-4 not guarding article 6 .... *Aceroides limicola*

6. Gnathopod 1 palm obsolescent, lobe on article 5 not reaching dactyl hinge tangent .... *Aceroides goesi*

—— Gnathopod 1 palm well developed, lobe on article 5 reaching dactyl hinge tangent .... *Aceroides latipes*

7. Article 4 of pereopods 3-4 with lateral facial row of setae 8

—— Article 4 of pereopods 3-4 without lateral facial row of setae 11

8. Carpal lobe of gnathopod 1 reaching full length on posterior margin of article 6 .... *Aceroides sedovi*

—— Carpal lobe of gnathopod 1 not reaching full length on posterior margin of article 6 9

9. Rostrum well developed .... *Aceroides kobjakovae*

—— Rostrum poorly developed 10

10. Carpal lobe on gnathopod 2 reaching one quarter along propodus .... *Aceroides callida*

—— Carpal lobe on gnathopod 2 reaching one half along propodus .... *Aceroides luthkei*

11. Gnathopod 1 carpal lobe equals posterior margin of article 6 .... *Arrhis phyllonyx*

—— Gnathopod 1 carpal lobe not equal to posterior margin of article 6 12

12. Dactyl of pereopod 5 shorter than article 6 .... *Arrhis mediterraneus*

—— Dactyl of pereopod 5 longer than article 6 .... *Anoediceros hanseni*

Diagnosis. Cutting edge of mandible scarcely projecting and either poorly or well toothed; molar medium, ridged. Inner lobes of lower lip separate or fused. Gnathopods similar to one another, subchelate, moderately stout, carpus with sharp strong posterior lobe projecting distalwards, partially guarding propodus; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Mandibular palp article 2 usually straight (versus *Arrhis*); rostrum weak; coxae 3-4 excavate below; article 2 of antenna 1 usually shorter than article 1 (versus *Arrhis*); article 4 of pereopods 3-4 with anterior setae forming curved facial fan (versus *Arrhis*); or article 5 with weak or strong posterior or distal lobe (versus *Arrhis*).

Key to Subgenera of *Aceroides*

Pereopods 3-4 with article 5 apicoventrally lobate, article 5 thus 3 times as wide as article 6........ (*Patoides*)

Pereopods 3-4 with ordinary article 5-6 ..... (*Aceroides*)

Variables. Teeth of incisor strong or weak (type); inner lobes of lower lip separate (type) or fused; article 2 of antenna 1 as long as article 1 (*A. kobjakovae*); palp article 2 of mandible curved (*A. kobjakovae*); inner plate of maxilla 1 with 1 (type) to 6 setae; article 4 of gnathopods 1-2 with large sharp tooth (*A. sedovi*); facial fan of setae on article 4 of pereopods 3-4 absent (*A. edax*); article 4 of pereopods 3-4 usually with strong facial row of setae, articles 4 and 5 expanded or lobate or not.

Species. See J.L. Barnard (1967a, key); A. = *Aceroides*, P. = *Patoides*; *A. callida* J.L. Barnard, 1967a [309B]; *A. edax* J.L. Barnard, 1967a [309BA]; *A. goesi* Just, 1980 (= *A. obtusus* identification of Goes, 1866) [253]; *A. kobjakovae* Bulycheva, 1952 [391 + B]; *A. latipes* (Sars, 1883, 1895) (= *A. distinguendus* Hansen, 1888) (Shoemaker, 1920a, 1955a) (Stephensen, 1931a, 1938b, 1944a) (Schellenberg, 1935e) (Dunbar, 1954) (Coyle & Mueller, 1981) *A. l. latipes* Gurjanova, 1951; Just, 1970, 1980; *A. l. robusta* Gurjanova, 1933b, 1935b, 1936d, 1951 [220E]; *A. limicola* K.H. Barnard, 1926 [701B]; *A. sedovi* Gurjanova, 1946, 1951 (Gorbunov, 1946) [220]; *A.* (*P.*) *synparis* (J.L. Barnard, 1964a) [406B].

Habitat and distribution. Marine, cold water, Arctic shallows to deep austral basins and trenches, 6-2475 m, 8 species.

Anoediceros Pirlot

Anoediceros Pirlot, 1932b: 82.

Type species. *Anoediceros hanseni* Pirlot, 1932b, original designation.

Taxonomy. Not significantly distinct from the *Arrhis-Aceroides* complex; see discussion with *Aceroides*.

Diagnosis. Cutting edge of mandible projecting and untoothed; molar medium, ridged, cup-shaped, dentate. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, stout, carpus with blunt strong posterior lobe projecting distalwards at right angles, palm of both gnathopods oblique. Uropod 2 not fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Rostrum tiny; eyes absent; outer plate of maxilla 2 with thick bifid spine.

Relationship. Differing from *Oediceroides* in the vestigial rostrum.

Species. *Anoediceros hanseni* Pirlot, 1932b [602B]; *A. h. mozambis* J.L. Barnard, 1961a [618A].

Habitat and distribution. Marine, Indonesia to Kenya, 835-3960 m, 2 species.

Arrhinopsis Stappers

Arrhinopsis Stappers, 1911: 40.

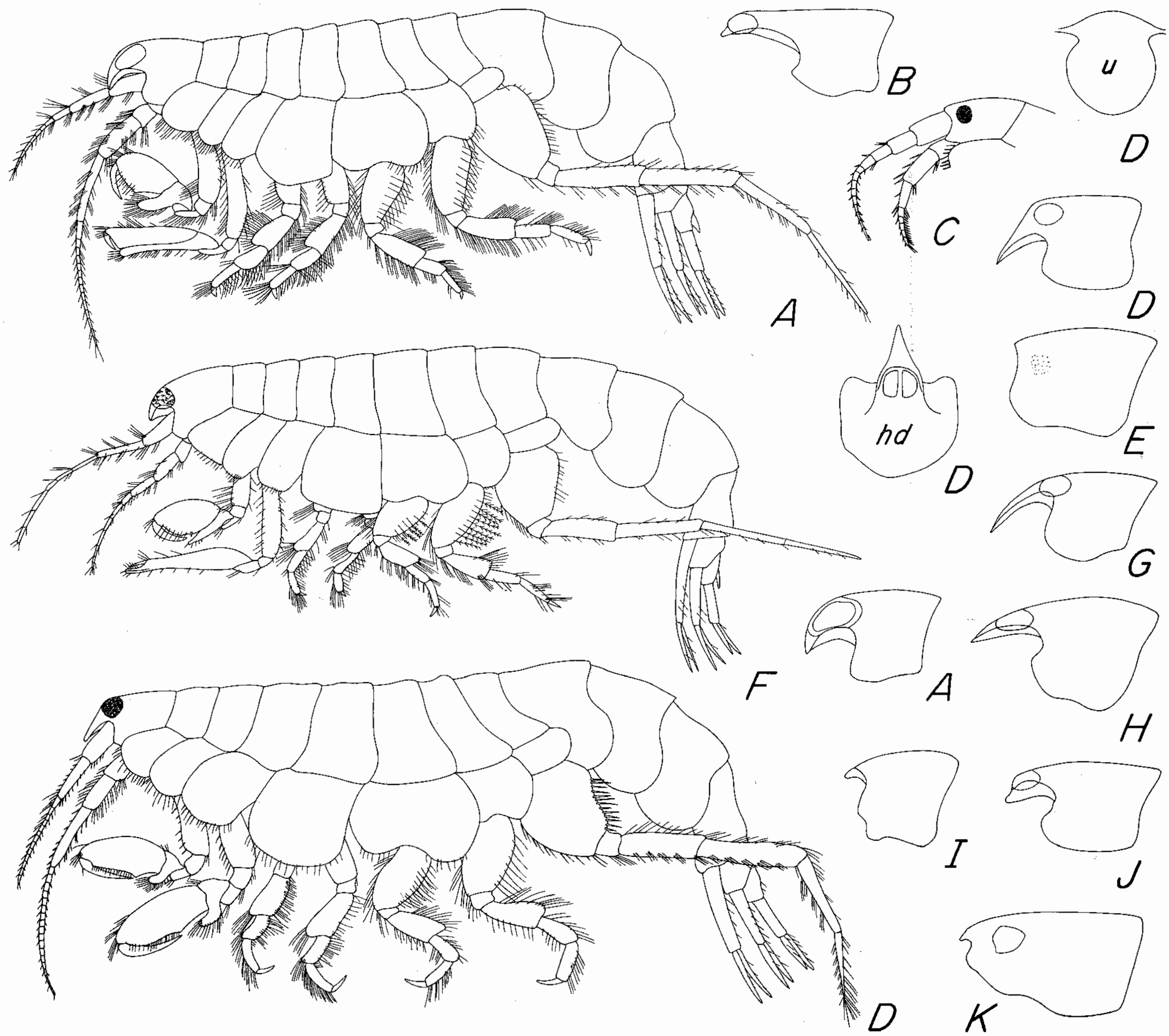


Fig.99. Oedicerotidae. A, *Monoculodes carinatus*; B, *Monoculodes longirostris*; C, *Metoediceros fuegiensis*; D, *Oediceros saginatus*; E, *Arrhis phyllonyx*; F, *Synchelidium haplocheles*; G, *Monoculodes packardi*; H, *Westwoodilla actifrons*; I, *Aceroides latipes*; J, *Westwoodilla caecula*; K, *Oediceropsis brevicornis*.

Type species. *Arrhinopsis longicornis* Stappers, 1911, monotypy.

Diagnosis. Cutting edge of mandible strongly projecting and well toothed; molar medium, lacking ridges, with apical spine, bulging, setulose. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, moderately stout, carpus with sharp strong posterior lobe guarding propodus; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Mandibular palp article 3 as long as article 2.

Sexual dimorphism. Male antenna 2 increasing in length, as long as body.

Relationship. Differing from *Finoculodes* in the weak rostrum and lack of facial setae on article 4 of pereopods 3-4. From *Oediceros* and *Paroediceros* in the long carpal lobes of the gnathopods. From the *Perioculodes* group in the long article 3 on the mandibular palp. From *Monoculodopsis* and *Synchelidium* in the equality of the gnathopods.

See *Oediceros*.

Species. *Arrhinopsis longicornis* Stappers, 1911 (Stephensen, 1938b) (Gurjanova, 1951) (Just, 1980) [220 + B].

Habitat and distribution. Marine, Arctic, Gulf of Saint Lawrence to Novaya Zemlya, 90 m, 1 species.

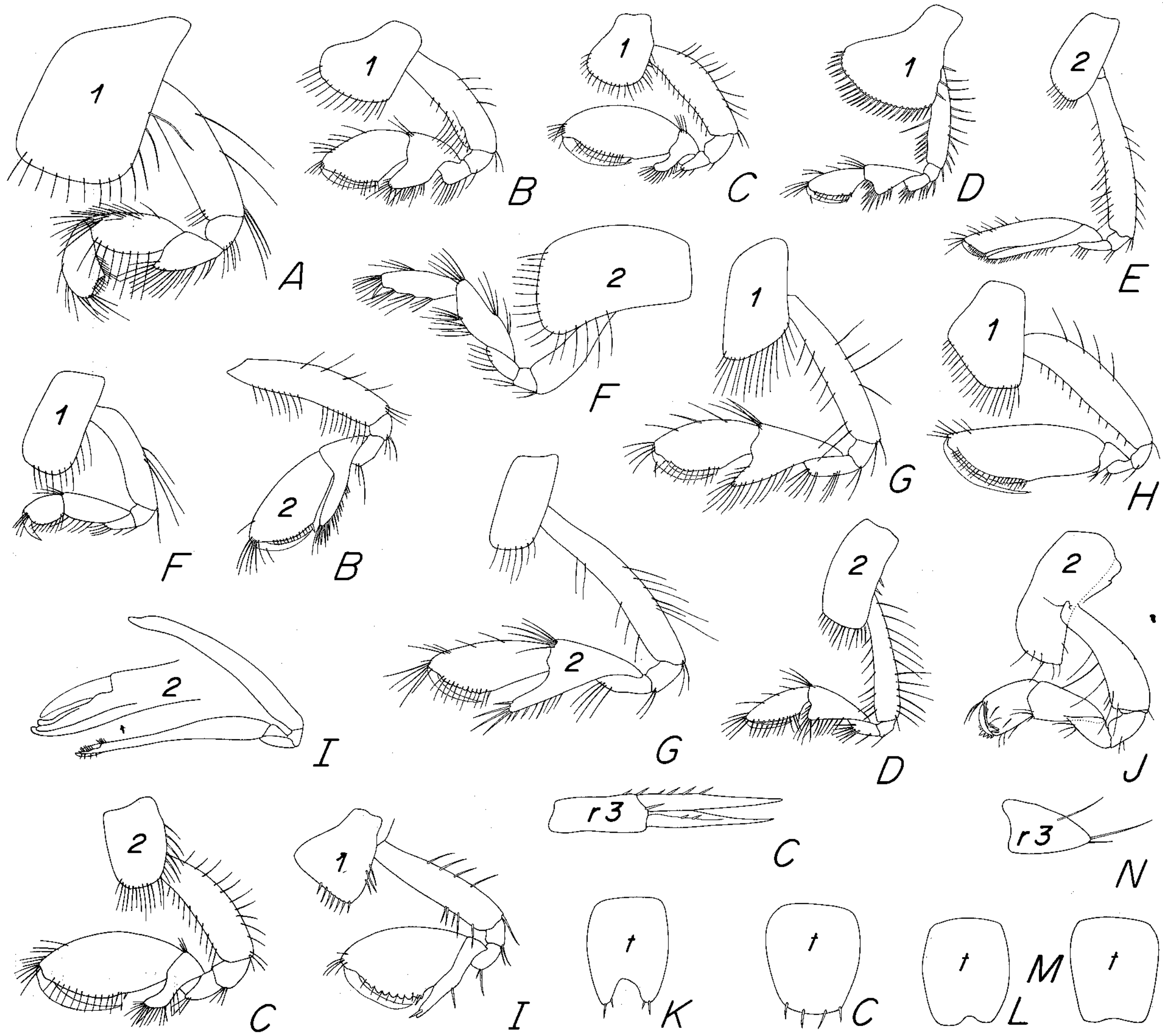


Fig.100. Oedicerotidae and Exoedicerotidae. A, *Exoediceropsis chiltoni*; B, *Monoculodes tenuirostratus*; C, *Oediceros saginatus*; D, *Westwoodilla caecula*; E, *Monoculodes carinatus*; F, *Bathyporeiapus magellanicus*; G, *Aceroides latipes*; H, *Paroediceros lynceus*; I, *Synchelidium haplocheles*; J, *Kanaloa manoa*; K, *Paroediceroides sinuata*; L, *Monoculodes tesselatus*; M, *Monoculodes borealis*; N, *Metoediceros fuegiensis*.

Arrhis Stebbing

Fig.99E

Aceros Boeck, 1861: 651 [homonym, Aves].
Aceropsis Stuxberg, 1880: 63 (*nomen nudum*, same type species).
Arrhis Stebbing, 1906: 248, 726 (new name).–Lincoln, 1979a: 356.

Type species. *Oediceros obtusus* Bruzelius, 1859, original designation.

Status. With priority, see discussion at *Aceroides* on the validity of *Aceroides* and *Anoediceros*.

Diagnosis. Cutting edge of mandible scarcely projecting and untoothed; molar medium, ridged. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, moderately stout, carpus with sharp (or blunt) strong posterior lobe projecting distalwards but partially guarding propodus (often only and especially on gnathopod 2); palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Mandibular palp article 2 strongly curved (versus most *Aceroides*); article 2 of antenna 1 longer than article 1 (versus most *Aceroides*).

Variables. Coxa 3 excavate below (type), not (*A. mediterraneus*); carpus of gnathopod 2 as short as on gnathopod 1 (*A. mediterraneus*), elongate (type); carpal lobes blunt (*A. kobjakovae*); dactyl of pereopod 5 extremely elongate (*A. mediterraneus*), dactyls of pereopods 3-5 slender (*A. mediterraneus*), spatulate (type).

Relationship. Differing from *Bathymedon*, *Westwoodilla* and the *Monoculodes* group in the ventrally excavate coxa 3 or 4.

Relationships with *Paraperioculodes* are difficult to sort out but the latter is southern and has well developed dorsally appressed eyes.

See *Aceroides*.

Species. [*Arrhis chimonophila* (Stuxberg, 1887) (Uschakov, 1931, not seen) [*nomen nudum*]]; *A. luthkei* Gurjanova, 1936d, 1951 [220]; ?*A. mediterraneus* Ledoyer, 1983 [348]; *A. phyllonyx* Sars (M. Sars, 1858) (Sars, 1895) (= *A. obtusus* Bruzelius, 1859) (Stephensen, 1931a) (Gurjanova, 1951) (Lincoln, 1979a) (Sainte-Marie & Brunel, 1983), *A. p. arcticus* Bryazgin, 1974b [200 + BA]; *A. sobolevi* Kudrjaschov, 1965c [279].

Habitat and distribution. Marine, Arctic, weakly boreal, 1 doubtful Mediterranean, 10-2465 m, 4 species.

Bathymedon Sars

Bathymedon Sars, 1895: 332.–Stebbing, 1906: 255.

Type species. *Halimedon longimanus* Boeck, 1871b, original designation.

Diagnosis. Cutting edge of mandible not projecting and untoothed; molar medium, ridged. Inner lobes of lower lip separate. Gnathopods somewhat diverse, subchelate, slender, usually gnathopod 2 more slender, carpus of gnathopod 1 with blunt moderately developed posterior lobe projecting distalwards at right angles, lobe becoming obsolescent on gnathopod 2, with carpus more elongate; palm of both gnathopods oblique. Uropod 2 almost reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Article 2 of mandibular palp not as curved as in *Westwoodilla*; eyes usually poorly developed or absent; rostrum more feeble than in *Westwoodilla*.

Variables. Rostrum reduced (*B. banyulsensis*, etc.); articles 1-2 of antenna 1 short, article 2 shorter than 1 (*B. candidus*); article 2 of antenna 1 longer than article 1 (type); article 3 of antenna 1 longer than article 1 (*B. covilhani*); male antenna 1 elongate (*B. antennarius*); articles 4-5 of antenna 2 short and stout (*B. candidus*); epistome produced (*B. covilhani*); mandible more like *Monoculodes* (*B. monoculidiformis*); incisor with weak teeth (*B. antennarius*); mandibular palp article 3 strongly curved (*B. ivanovi*); posteroventral lobe of coxa 4 sharp (*B. caino*, etc.); gnathopods 1-2 almost identical (species A, etc.); carpus of gnathopod 2 lobate and short (*B. obtusifrons*, *B. banyulsensis*), lobe on carpus of gnathopod 2, though short, slightly guarding propodus (*B. nepos*); epimera 1-3 strongly setose below (*B. candidus*); pleonite 4 with dorsal spines (*B. palpalis*); telson excavate and with 2 stout spines (*B. palpalis*).

Relationship. There is little to distinguish *Bathymedon* from *Westwoodilla*. Generally we have placed in *Bathymedon* any species with either weak rostrum, poorly developed eyes, or straight article 2 of the mandibular palp; but some of those species have mixtures of the *Westwoodilla* form of the 3 cited characters.

Usually distinguished from *Monoculodes* in the poorly developed incisor.

Differing from the *Aceroides-Arrhis* complex in the unexcavate ventral margins of coxae 3-4.

Oediceroides has distinctive spines on antenna 2.

Species. See Stephensen (1931a); *B. acutifrons* Bonnier, 1896 (Stebbing, 1906) (Ledoyer, 1983) [352BA]; *B. antennarius* Just, 1980 [253]; *B. banyulsensis* Ledoyer, 1983 [302B]; *B. caino* J.L. Barnard, 1967a [309B]; *B. candidus* J.L. Barnard, 1961a, 1967a [500A]; *B. covilhani*

J.L. Barnard, 1961a, 1966a, 1967a, 1971b [535B]; *B. flebilis* J.L. Barnard, 1967a, 1971b [379BA]; *B. gorneri* Gurjanova, 1951 [290]; *B. ivanovi* Bulycheva, 1952 [391]; *B. kassites* J.L. Barnard, 1966a [310B]; *B. langsdorfi* Gurjanova, 1951 [290+]; *B. longimanus* (Boeck, 1871b, 1876) (Sars, 1895) (Shoemaker, 1930a) (Stephensen, 1938b) (Gurjanova, 1951) (Nagata, 1965a) [200 + B]; ?*B. monoculodiformis* Ledoyer, 1983 [348 + B]; *B. nanseni* Gurjanova, 1946, 1951 (Gorbunov, 1946) [287]; *B. neozelanicus* K.H. Barnard, 1930 [779N]; *B. nepos* J.L. Barnard, 1967a [309A]; *B. obtusifrons* (Hansen, 1888) (Sars, 1895) (Stephensen, 1938b) (Gurjanova, 1951) (Dunbar, 1954) (Bulycheva,1957c) [200 + B]; *B. palpalis* K.H. Barnard, 1916 (J.L. Barnard, 1961a) [428B]; *B. pumilus* J.L. Barnard, 1962e, 1971b [379 + B]; *B. roquedo* J.L. Barnard, 1962e, 1966a [379]; *B. saussurei* (Boeck, 1871b, 1876) (Sars, 1895) (Stephensen, 1938b) (Oldevig, 1959) [216 + B]; *B. subcarinatus* Bulycheva, 1952 [391]; *B. tilesii* Gurjanova, 1951 [290]; *B. vulpeculus* J.L. Barnard, 1971b [225B]; species A, J.L. Barnard, 1971b [379BA].

Habitat and distribution. Marine, cold water Arctic shallows then submergent to deeps of tropical seas, and New Zealand surface, 4-2857 m, 24 species.

Carolobatea Stebbing

Carolobatea Stebbing, 1899a: 208.–Stebbing, 1906: 252.

Type species. *Halimedon schneideri* Stebbing, 1888, original designation.

Diagnosis. Cutting edge of mandible not projecting and toothed; molar medium, weakly ridged, cup-shaped, dentate, setulose. Inner lobes of lower lip separate. Gnathopods somewhat diverse, subchelate, slender, feeble, carpus with blunt small posterior lobe projecting distalwards but not especially guarding propodus; palm of gnathopod 1 transverse, of gnathopod 2 oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Relationship. Characterised by the transverse palm on feeble gnathopod 1.

Species. *Carolobatea schneideri* (Stebbing, 1888, 1906) [851]; ?species, J.L. Barnard, 1972b [843].

Habitat and distribution. Marine, Kerguelen and ?Auckland Island, 0 m, 1 species.

Cornudilla n.gen.

Type species. *Westwoodilla cornuta* J.L. Barnard, 1969b, here selected.

Etymology. Named for roots in *Westwoodilla* and *cornuta*.

Diagnosis. Cutting edge of mandible scarcely projecting and untoothed; molar large, lacking ridges, bulging. Inner lobes of lower lip separate. Gnathopods similar to one another, feeble, subchelate, carpus not lobate; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Article 1 of antenna 1 with tooth; epistome produced; incisor with cornified callus; article 2 of mandibular palp produced and spinose basally, article 3 with tiny D-setae; palp of maxilla 1 apically expanded; outer plate of maxilla 2 narrow, inner plate of maxilliped narrow; coxa 4 longer than broad.

Relationship. Differing from *Westwoodilla* in the items of 'Additional characters' and the large smooth molar.

Characterised as the only genus with non-triturative molar also lacking carpal lobes on the gnathopods.

Species. *Cornudilla cornuta* (J.L. Barnard, 1969b) [377].

Habitat and distribution. Marine, Pacific Mexico, Gulf of California, 19-46 m, 1 species.

Finoculodes J.L. Barnard

Finoculodes J.L. Barnard, 1971b: 49.

Type species. *Finoculodes omnifera* J.L. Barnard, 1971b, original designation.

Diagnosis. Cutting edge of mandible projecting and poorly toothed; molar small, lacking ridges, conical, with apical spine, setulose. Inner lobes of lower lip separate. Gnathopods somewhat diverse, subchelate, moderately stout, gnathopod 2 more slender, carpus with strongly developed posterior lobe projecting distalwards and guarding propodus; palm of gnathopod 1 oblique, of gnathopod 2 transverse. Uropod 2 elongate. Uropod 3 [unknown].

Additional characters. Article 3 of mandibular palp elongate (versus *Perioculodes*), article 4 of pereopods 3-4 with well-developed anterofacial row of setae.

Relationship. Differing from *Perioculodes* and *Perioculopsis* in the distinctly separated inner lobes of the lower lip, elongate article 3 of the mandibular palp and transverse palm of gnathopod 2. From *Monoculopsis* in the non-triturative molar and short article 2 of the peduncle on antenna 1.

The setae of pereopods 3-4 are possibly significant taxonomically.

Monoculodopsis and *Synchelidium* have much enlarged gnathopod 1.

See *Arrhinopsis*.

Species. *Finoculodes omnifera* J.L. Barnard, 1971b [225B].

Habitat and distribution. Marine, Oregon, 800 m, 1 species.

Gulbarentsia Stebbing

Barentsia Stebbing, 1894: 25 [homonym, Bryozoa].
Gulbarentsia Stebbing, 1894: 2 (new name).–Stebbing, 1906: 238.

Type species. *Barentsia hoeki* Stebbing, 1894, monotypy.

Diagnosis. Cutting edge of mandible projecting and poorly toothed; molar small, ridged, cup-shaped, dentate. Inner lobes of lower lip separate. Gnathopods similar to one another, stout, carpus with blunt strong posterior lobe projecting distalwards at right angles but partially guarding propodus, palm of both gnathopods oblique. Uropod 2 fully reaching exceeding end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Eyes completely fused, forming a semicircular ring (versus *Paraperioculodes*).

Relationship. Characterised by the single dorsal ring-shaped eye which is also found in some of the members of the *Perioculodes* complex. The latter have a non-triturative molar.

Removal. *Gulbarentsia larseni* Oldevig, 1960, to *Oediceroides lahillei*.

Species. *Gulbarentsia hoeki* (Stebbing, 1894, 1906) (Gurjanova, 1951) [292].

Habitat and distribution. Marine, Kara Sea, depths unknown, 1 species.

Halicreion Boeck

Halicreion Boeck, 1871b: 173.–Stebbing, 1906: 247.–Lincoln, 1979a: 358.

Type species. *Halicreion longicaudatus* Boeck, 1871b (= *Oediceros aequicornis* Norman, 1869a), monotypy.

Diagnosis. Cutting edge of mandible slightly projecting and toothed; molar medium, ridged. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, moderately stout, carpus short, with subsharp moderately developed posterior lobe partially guarding propodus; palm of both gnathopods oblique. Uropod 2 barely reaching end of peduncle on uropod 3. Uropod 3 immense.

Sexual dimorphism. Base of primary flagellum on antenna 1 with strong callynophore, densely armed.

Variables. Flagellum of antenna 1 about 32-articulate (*H. ovalitelson*) (versus 5-6 in type); of antenna 2, 84-articulate (versus about 5); telson excavate (type), not (*H. ovalitelson*).

Relationship. Characterised by the huge uropod 3. See *Parhalimedon* in Exoedicerotidae for relationships and character differences not included in diagnosis.

Species. *Halicreion aequicornis* (Norman, 1869a, 1889b) (= *H. longicaudatus* Boeck, 1871b, Sars, 1895) (Stephensen, 1938b) (Karaman & Ruffo, 1972) (Lincoln, 1979a) (Ledoyer, 1983) [355]; *H. ovalitelson* K.H. Barnard, 1916 (Griffiths, 1975) [701B]; *H. vanhoffeni* Schellenberg, 1926a [881B].

Habitat and distribution. Marine, north-western Norway to Antarctic, submergent South Africa, 55-732 m, 3 species.

Lopiceros J.L. Barnard

Oediceroides (*Lopiceros*) J.L. Barnard, 1961a: 93.

Type species. *Oediceroides* (*Lopiceros*) *forensia* J.L. Barnard, 1961a, original designation.

Diagnosis. Cutting edge of mandible projecting and well toothed; molar large, ridged. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, stout, carpus with blunt small posterior lobe projecting distalwards at right angles, palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Article 3 of antenna 1 elongate; article 1 of flagellum on antenna 2 swollen and elongate.

Relationship. Differing from *Oediceroides* and *Oediceropsis* in the large antenna 1 with long article 3. From *Monoculopsis* in the weak lobes on the carpus of gnathopods. From *Monoculodes* in the long article 3 of antenna 1.

Species. *Lopiceros forensia* J.L. Barnard, 1961a [715A].

Habitat and distribution. Marine, Tasman Sea, 3580 m, 1 species.

Machaironyx Coyle

Machaironyx Coyle, 1980: 197.

Type species. *Machaironyx muelleri* Coyle, 1980, original designation.

Diagnosis. Cutting edge of mandible scarcely projecting and untoothed; molar large, lacking ridges, cup-shaped. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, feeble, carpus with subsharp small posterior lobe projecting distalwards at right angles; palm of both gnathopods oblique. Uropod 2 exceeding end of rami on uropod 3. Uropod 3 small, biramous.

Additional characters. Mandibular palp absent; peduncle of uropod 3 short.

Relationship. Differing from *Bathymedon* in the short uropod 3 with especially short peduncle, and the absence of the mandibular palp.

Species. *Machaironyx muelleri* Coyle, 1980 [273].

Habitat and distribution. Marine, Alaska, between Nunivak Island and Unimak Island, depth unknown, 1 species.

Monoculodes Stimpson

Figs 99A,B,G, 100B,E,L,M

Monoculodes Stimpson, 1853: 54.–Stebbing 1906: 258.–J.L. Barnard, 1962e: 356 (key).–Lincoln, 1979a: 348.
Kroyera Bate, 1857d: 140 (*Kroyera carinata*, 1857d, monotypy).

Type species. *Monoculodes demissus* Stimpson, 1853, monotypy.

Taxonomy. Type obscure, diagnosis based on *M. carinatus* as depicted by Sars (1895).

Diagnosis. Cutting edge of mandible slightly projecting and toothed; molar large, ridged. Inner lobes of lower lip separate. Gnathopods diverse, gnathopod 1 stout, gnathopod 2 much more slender and longer, carpus with blunt strong posterior lobe guarding propodus, less on gnathopod 1, very strongly on gnathopod 2, palm of both gnathopods oblique. Uropod 2 almost reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Antenna 1 not longer than antenna 2, article 3 less than half as long as article 1 (versus *Monoculopsis*); antenna 2 neither enlarged nor elongate (versus *Oediceroides*).

Sexual dimorphism. Male antenna 1 often with shorter peduncle, though many species retaining elongate articles (*M. packardi*, etc.), article 2 shorter than 1, base of flagellum with weak callynophore, most basal articles heavily armed; flagellum of antenna 2 elongate, peduncle with male bristles, article 4 occasionally shortened.

Variables. Eyes absent (rare); antenna 1 very short (*M. nyei*); article 2 of antenna 1 frequently elongate; antenna 2 enlarged (*M. kroyeri*, merging to *Oediceroides*); coxa 2 with large spines (*M. crassirostris*); carpal lobes of gnathopods weak (*M. recandesco*, *M. scabriculosus*, *M. sudor*, *M. vallentini*, etc.); thus gnathopods merging to *Oediceroides*; carpus of gnathopod 1 not lobate (*M. mertensi*, etc.); carpal lobe of gnathopod 2 sharp (*M. coecus*); gnathopod 2 scarcely thinner nor longer than gnathopod 1 (*M. packardi*, *M. tenuirostratus*, etc.); propodus very stout (*M. abacus*, etc.); dactyls of pereopods 3-6 small (type, etc.), large and spatulate (*M. longirostris*, etc.), generally variable (others); telson emarginate (*M. coecus*, etc.).

Relationship. A large variable genus with several species transitional to other genera because of poorly developed carpal lobes on the gnathopods.

Lacking the typical spines on antenna 2 of *Oediceroides* and *Oediceropsis*. Lacking the ventral excavations on coxa 3-4 of the *Arrhis* complex.

With better developed teeth on the incisor than in *Bathymedon-Westwoodilla*.

See *Lopoceros*, *Monoculopsis*, *Paraperioculodes* and *Parexoediceros*.

Species. See Bulycheva (1957c); Just (1980); Stephensen (1938b, 1940b, 1944a); *M. abacus* J.L. Barnard, 1961a [715B]; *M. acutipes* Ledoyer, 1983 [348 + B]; *M. antarcticus* K.H. Barnard, 1932 [870 + B]; *M. borealis* Boeck, 1871b, 1876 (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) (Lincoln, 1979a) [200]; *M. breviops* Bulycheva, 1952 [391]; *M. carinatus* (Bate, 1857d) (= *M. affinis* Bruzelius, 1859) (= *M. stimpsoni* Bate, 1862) (Sars, 1895) (Chevreux & Fage, 1925) (Lincoln, 1979a) (Ledoyer, 1983) [352]; *M. castalskii* Gurjanova, 1951 (Kudrjaschov, 1972b) [279]; *M. chevreuxi* Carausu, 1948, 1949 [348B]; *M. coecus* Gurjanova, 1946, 1951 (Gorbunov, 1946) [291 + B]; *M. crassirostris* Hansen, 1888 (Stephensen, 1931a) (Gurjanova, 1951) (Ledoyer, 1972) [200]; *M. dembiensis* Bulycheva, 1952 [391+]; *M. demissus* Stimpson, 1853 (Bate, 1862) (Della Valle, 1893) (Stebbing, 1906) [254]; *M. diamesus* Gurjanova, 1936d, 1951 [287]; *M. diversisexus* J.L. Barnard, 1967a [309B]; *M. edwardsi* Holmes, 1905 (Shoemaker, 1926a, 1930a) (?Ledoyer, 1972) (not Bousfield, 1973) (not Dickinson *et al.*, 1980) [363]; *M. emarginatus* J.L. Barnard, 1962e, 1964b, 1966a,b, 1971b [379]; *M.*

gibbosus Chevreux, 1888b, 1900a (Chevreux & Fage, 1925) (Kaneva-Abadzheva, 1964) (Mordukhai-Boltovskoi, 1969) (Ledoyer, 1983) (Moore, 1984b) [352 + 334]; *M. glyconica* J.L. Barnard, 1962e, 1966a, 1971b [379 + B]; *M. griseus* Della Valle, 1893 (Walker, 1901) (Stebbing, 1906) (Chevreux, 1911d) (Ledoyer, 1983) [340 + B]; *M. hanseni* Stebbing, 1894, 1906 (Gurjanova, 1935b, 1951) (Gorbunov, 1946) (?Oldevig, 1959) [220]; *M. hartmanae* J.L. Barnard, 1962e, 1964e, 1964b, 1966a, 1969b [370]; *M. intermedius* Shoemaker, 1930a (Bousfield, 1973) (Just, 1980) [260]; *M. jazdzewskii* De Broyer, 1980 [838]; *M. kroyeri* Boeck, 1871b, 1876 (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) [216]; *M. latimanus* (Goes, 1866) (Boeck, 1876) (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) [200 + B]; *M. latissimanus* Stephensen, 1931a (Gurjanova, 1951) (J.L.Barnard, 1966a, 1967a) (Ledoyer, 1983) [200BA]; *M. limnophilus* Tattersall, 1922a (Spandl, 1924a) (Shen, 1955) [031EFMR], *M. l. japonicus* Nagata, 1965a (Takamaru & Ochiai, 1982) [390]; *M. longirostris* Goes, 1866 (Sars, 1895) (Stephensen, 1931a) (Dunbar, 1954) (Gurjanova, 1951) (Just, 1980) [200 + B]; *M. mertensis* Gurjanova, 1951 [290]; *M. minutus* Gurjanova, 1930a, 1951 [292]; *M. murrius* J.L. Barnard, 1962e [373]; *M. nasutus* Bulycheva, 1952 [391 + B]; *M. necopinus* J.L. Barnard, 1967a [309B]; *M. norvegicus* (Boeck, 1861, 1876) (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) (J.L. Barnard, 1966a,b) [200 + B]; *M. nyei* Shoemaker, 1933c (J.L. Barnard, 1962e) (Ortiz, 1978) [490]; *M. packardi* Boeck, 1871b (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) (Lincoln, 1979a) (Just, 1980) (Ledoyer, 1983) [200 + BA + 340]; *M. pallidus* Sars, 1895 (Stephensen, 1931a, 1938b, 1940b) (Gurjanova, 1951) [200 + B]; *M. perditus* J.L. Barnard, 1966a [373]; *M. recandesco* J.L. Barnard, 1967a, 1971b [379A]; *M. rostratus* Stephensen, 1931a [209B]; *M. scabriculosus* K.H. Barnard, 1932 (Thurston, 1974a,b) (Bellan-Santini & Ledoyer, 1974) [870]; *M. schneideri* Sars, 1895 (Shoemaker, 1930a, 1955a) (Stephensen, 1938b) (Gurjanova, 1951) (Just, 1970) [200]; *M. semenovi* Gurjanova, 1938b, 1951 [391]; *M. simplex* Hansen, 1888 (Schellenberg, 1935e) (Stephensen, 1931a, 1944a) (Gurjanova, 1951) (Oldevig, 1959) [200]; *M. spinipes* Mills, 1962b (J.L. Barnard, 1962e, 1966b, 1971b) [368]; *M. subnudus* Norman, 1889b (= *M. falcatus* Sars, 1895) (Chevreux & Fage, 1925) (Stephensen, 1931a, 1940b) (Lincoln, 1979a) (Ledoyer, 1983) [355 + B]; ?*M. sudor* J.L. Barnard, 1967a [309B]; *M. synophthalmus* Bulycheva, 1952 [391]; *M. tenuirostratus* Boeck, 1871b (Sars, 1895) (Shoemaker, 1930a) (Stephensen, 1940b) [250 + BA]; *M. tesselatus* Schneider, 1884 (Sars, 1895) (Shoemaker, 1930a) (Stephensen, 1931a, 1940b) (Gurjanova, 1951) [250]; *M. tuberculatus* Boeck, 1871b (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) (Lincoln, 1979a) [200]; *M. uncinatus* Bulycheva, 1952 [391]; *M. vibei* Just, 1980 [253]; *M. zernovi* Gurjanova, 1938b, 1951 (Mills, 1962b) (Kudrjaschov, 1972b) [230]; species, allied to *M. tesselatus* Schneider, Marine Biological Association of the United Kingdom, 1957 [242]; species, Just, 1970, 1980 [253]; species(s), Ledoyer, 1977 [348 + B]; species, (= *M. edwardsi* identification of Bousfield, 1973 and all subsequent authors based on that depiction) [361].

Habitat and distribution. Marine, cosmopolitan in the sea, rarely freshwater in east Asia, 0-2800 m, 54 species.

Monoculodopsis Ledoyer

Monoculodopsis Ledoyer, 1973a: 79.

Type species. *Monoculodopsis longimana* Ledoyer, 1973a, original designation.

Diagnosis. Cutting edge of mandible not projecting and untoothed; molar small, lacking ridges, conical, with apical spine. Inner lobes of lower lip separate. Gnathopods diverse, subchelate, second slender, first stout, carpus with sharp or blunt strong posterior lobes guarding propodus; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Relationship. Differing from *Synchelidium* in the non-chelate gnathopod 2. From the *Perioculodes* group in the size difference in gnathopods, with gnathopod 1 being enlarged.

See *Finoculodes*.

Species. *Monoculodopsis longimana* Ledoyer, 1973a, 1979a, 1986 (Griffiths, 1975) [745].

Habitat and distribution. Marine, South Africa and Madagascar, 9-49 m, 1 species.

Monoculopsis Sars

Monoculopsis Sars, 1895: 310.

Type species. *Monoculodes longicornis* Boeck, 1871b, monotypy.

Diagnosis. Cutting edge of mandible slightly projecting and poorly toothed; molar medium, ridged. Inner lobes of lower lip separate. Gnathopods diverse, gnathopod 1 stout, gnathopod 2 much more slender and longer, carpus with blunt strong posterior lobe guarding propodus, less on gnathopod 1, very strongly on gnathopod 2; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Antenna 1 longer than antenna 2, article 3 as long as article 1 (versus *Monoculodes*).

Sexual dimorphism. Male antenna 2 flagellum elongate.

Variables. Palp of maxilla 1 with setae on sides (*M. vallentini*); lobes on carpus of gnathopods very short (*M. vallentini*).

Relationship. Differing from *Monoculodes* in the elongate article 3 of antenna 1. From *Lopiceros* in the guarding of the propodus by the carpal lobes of the gnathopods.

Species. *Monoculopsis longicornis* (Boeck, 1871b) (?= *M. longicornis* of Oldevig, 1959) (Sars, 1895) (Stephensen, 1931a, 1938b, 1944a) (Gurjanova, 1951) (Bulycheva, 1957c) [220]; *M. vallentini* Stebbing, 1914b (Schellenberg, 1931) (K.H. Barnard, 1932) [866].

Habitat and distribution. Marine, bipolar only, 0-115 m, 2 species.

Oedicerina Stephensen

Oedicerina Stephensen, 1931a: 250.

Type species. *Oedicerina ingolfi* Stephensen, 1931a, monotypy.

Diagnosis. Poorly described: Cutting edge of mandible projecting and well toothed; molar large, ridged, cup-shaped. Inner lobes of lower lip separate. Gnathopods [unknown, ?similar to one another, somewhat diverse, gnathopods 1-2 simple, subchelate, slender, moderately stout, gnathopod 2 simple, subchelate, slender, moderately stout, usually gnathopod 2 much more slender, carpus with sharp blunt strong small well moderately developed posterior lobe projecting distalwards at right angles but partially not especially guarding propodus, lobe becoming obsolescent on gnathopod 2; palm of both gnathopods 1 and 2 transverse, oblique, chelate, of gnathopod 2 transverse. oblique. chelate]. Uropod 2 [unknown, ?not barely fully reaching exceeding end of peduncle on uropod 3.] Uropod 3 [unknown, well developed. vestigial].

Additional characters. Rostrum long; article 2 of antenna 1 as long as article 1, article 3 half as long, article 1 with tooth; coxa 4 with huge posterior lobe.

Relationship. With the gnathopods unknown, this genus remains obscure; characterised by the combination of the triturative molar, toothed incisor, separated inner lobes of lower lip, tooth on article 1 of antenna 1, elongate article 2 of antenna 1 and giant lobe of coxa 4.

Species. *Oedicerina ingolfi* Stephensen, 1931a (Gurjanova, 1951) [209A]; *O. megalopoda* Ledoyer, 1986 [694B].

Habitat and distribution. Marine, between Faeroes and Jan Mayen; near Madagascar; 200-1802 m, 2 species.

Oediceroides Stebbing

Fig.98B

Oediceroides Stebbing, 1888: 843.–Stebbing, 1906: 267.
Oediceropsoides Shoemaker, 1925: 27 (*Oediceropsoides abyssorum* Shoemaker, 1925, original designation).

Type species. *Oediceropsis rostrata* Stebbing, 1883, selected by Pirlot, 1932b.

Diagnosis. Cutting edge of mandible projecting and toothed; molar large, ridged. Inner lobes of lower lip separate. Gnathopods similar to one another, moderately stout, or weak, carpus with blunt, strong to small posterior lobe projecting distalwards at right angles, not guarding propodus; lobe sometimes becoming obsolescent; palm of both gnathopods oblique. Uropod 2 reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Antenna 1 small; antenna 2 usually enlarged and elongate (versus *Monoculodes*), usually with heavy spines as in *Oediceropsis*; inner plate of maxilla 1 with 3+ setae (versus *Paroediceroides*); outer plate of maxilla 2 lacking stout spine (versus *Anoediceros*).

Sexual dimorphism. Both sexes often with calceoli on flagellum of antenna 2.

Variables. Article 2 of antenna 1 longer than article 1 (*O. antennatus*); antenna 2 weak (*O. cystifera*, *O. brevirostris*); article 3 of mandibular palp long or medium; see section below on coxa 4; propodus of gnathopods 4 times as long as carpus (*O. microcarpus*); carpal lobes occasionally slightly geniculate and weakly guarding propodus (*O. wolffi*, *O. cystifera*, etc.); dactyl of pereopod 7 slender or spatulate; article 4 of pereopods 5-6 widely expanded and lobate (*O. pirloti*); telson emarginate (*O. emarginata*, *O. limpieza* only); pleon or back tuberculate and ridged or not.

Taxonomy. A section with coxa 4 bearing a large sharp lobe contains: *O. lahillei*, *O. morosa* and *O. trepadora*. Despite coxa 4, these species are not in *Paroediceroides* because they lack eyes and have the second antenna typical of *Oediceroides* and not *Paroediceroides*.

Relationship. Differing from *Paraperioculodes* in the short antenna 1, large antenna 2 with long spines and lack of eyes in the body of head; however *P. belgicae* (see) has the proper antenna 1 and antenna 2 of *Oediceroides* but bears dorsally fused eyes in the body of head; to make the generic key work *O. belgicae* is temporarily assigned to *Paraperioculodes*.

Differing from *Oediceropsis* in the well-developed rostrum. From the *Bathymedon-Westwoodilla* complex in the better toothed incisor and generally larger gnathopods with better developed carpal lobes.

Without the modification on coxae 3-4 of the *Arrhis* complex.

See *Monoculodes*, *Parexoediceros* and *Lopiceros*.

Removals. *Oediceroides (Lopiceros) forensia* J.L. Barnard, 1961a, to *Lopiceros*, valid genus; *O. brevirostris* Schellenberg, 1931, to *Paraperioculodes*; *O. cystifera* Schellenberg, 1931, to *Paraperioculodes*; *O. pirloti* Sheard, 1936a, to *Parexoediceros*; *O. sinuata* Schellenberg, 1931, to *Paroediceroides*.

Species. *Oediceroides abyssorum* (Shoemaker, 1925) (J.L. Barnard, 1967a) [309B]; *O. antennatus* K.H. Barnard, 1937 [618B]; *O. apicalis* K.H. Barnard, 1931b (= *O. ornatus* identification of Chilton, 1921d) (?J.L. Barnard, 1961a) [633B + ?715B + ?783]; *O. calmani* Walker, 1906c, 1907 (Chevreux, 1912d) (K.H. Barnard, 1930, 1932) (Nicholls, 1938) (Shoemaker, 1945d) (Bellan-Santini, 1972b) (Thurston, 1974a) [870 + B]; *O. cinderella* Stebbing, 1888 (K.H. Barnard, 1916) (Griffiths, 1975) [812B + 701B]; *O. emarginata* Nicholls, 1938 [805B]; *O. lahillei* Chevreux, 1911b (= *Gulbarentsia larseni* Oldevig, 1960, but possibly = *Paraperioculodes*) (Schellenberg, 1931) (Stephensen, 1947a) (Thurston, 1974b); *O. l. lahillei* Thurston, 1974a; *O. l. polita* Schellenberg, 1931 (Thurston, 1974a) [895]; *O. limpieza* J.L. Barnard, 1961a [715B]; *O. macrodactyla* Schellenberg, 1931 (K.H. Barnard, 1932) [890 + B]; *O. m. alcaldia* J.L. Barnard, 1961a [717B]; *O. microcarpa* K.H. Barnard, 1930 [779N]; *O. morosa* (J.L. Barnard, 1966a) [310B]; *O. newnesi* (Walker, 1903, 1907) (= *O. litoralis* Schellenberg, 1926c) (Schellenberg, 1926a, 1931) [870 + B]; *O. ornata* (Stebbing, 1883, 1888, 1910a) [780]; *O. ornithorhyncha* Pirlot, 1932b, 1936b (Imbach, 1967) [599 + B]; *O. pilosa* Ledoyer, 1983 [348 + B]; *O. plumicornis* K.H. Barnard, 1926 (?Ledoyer, 1986) [701B + ?618A]; *O. proxima* Bonnier, 1896 (Stebbing, 1906) (Chevreux, 1935) [240B]; *O. rostrata* (Stebbing, 1883, 1888, 1906) (= *O. conspicua* Stebbing, 1888) (Della Valle, 1893) [851-852B]; *O. similis* Nicholls, 1938 (Bellan-Santini, 1972b) [805B]; *O. trepadora* (J.L. Barnard, 1961a, 1966a) [535B]; *O. weberi* Pirlot, 1932b (?Ledoyer, 1986) [602B + ?618A]; *O. wolffi* J.L. Barnard, 1961a, ?1964a (?Ledoyer, 1986) [618B + 715A + ?702A + 618A]; *O. zanzibarica* K.H. Barnard, 1937 [618A].

Habitat and distribution. Marine, cosmopolitan, mostly cold deep sea, occasionally 0-120 m in low latitudes, 0-4961 m, 23 species.

Oediceropsis Liljeborg

Fig.99K

Oediceropsis Liljeborg, 1865a: 10.–Stebbing, 1906: 252.

Type species. *Oediceropsis brevicornis* Liljeborg, 1865a, monotypy.

Diagnosis. Cutting edge of mandible projecting and well toothed; molar medium, ridged. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, moderately stout, carpus with blunt strong posterior lobe projecting distalwards at right angles, not guarding propodus; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Eyes lateral and poorly developed (type); articles 4-5 of antenna 2 with several very large, thick, or elongate and curved spines (versus *Monoculodes*).

Variables. Eyes present, weak, lateral (type), absent (most species); fused dorsally (*O. sinuata*); posteroventral lobe of coxa 4 blunt (type, etc.), sharp (*O. sinuata*, etc.); telson excavate (*O. sinuata*).

Relationship. Bridged to *Paroediceroides* through *O. proxima*.

Scarcely differing from *Monoculodes*, to which there is some transition in the more right-angular direction of the carpal lobes on the gnathopods and presence of unusual spines on antenna 2.

Like *Oediceroides* but rostrum small or absent.

See comments on *Paraperioculodes belgicae* in *Oediceroides*.

Removals. *Oediceropsis morosa* J.L. Barnard, 1966a, to *Oediceroides*; *O. sinuata* Schellenberg, 1931, to *Paroediceroides*; *O. trepadora* J.L. Barnard, 1961, 1966a, to *Oediceroides*.

Species. *Oediceropsis brevicornis* Liljeborg, 1865a (Sars, 1895) (Stephensen, 1938b) (Ledoyer, 1970, 1983) [352 + B]; *O. elsula* J.L. Barnard 1966a [310B]; *O. proxima* Chevreux, 1908g, 1935 [304B].

Habitat and distribution. Marine, northern hemisphere, cold water or deep, 80-1550 m, 3 species.

Oediceros Krøyer

Figs 98D, 99D, 100C

Oediceros Krøyer, 1842: 155.–Stebbing, 1906: 243.

Type species. *Oediceros saginatus* Krøyer, 1842, monotypy.

Diagnosis. Cutting edge of mandible strongly projecting and well toothed; molar small, lacking ridges, bluntly conical, bulging. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, moderately stout, carpus with blunt strong posterior lobe projecting distalwards at oblique angles but partially guarding propodus; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Relationship. Differing from *Monoculodopsis* in the relatively even size of the gnathopods and less guardant carpal lobes; the latter is also true in distinguishing *Oediceros* from the *Perioculodes* complex, *Finoculodes* and *Arrhinopis*. In addition, *Oediceros* differs from *Arrhinopsis* in the large rostrum.

See *Paroediceros*.

Species. *Oediceros arcticus* Danielssen, 1861 [298]; *O. borealis* Boeck, 1871b, 1876 (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) (Bushueva, 1977) [220]; [*O. brandtii*] Jarzynsky, 1870, 1885 (Della Valle, 1893) [*nomen nudum*]; *O. minor* Gurjanova, 1930a, 1935b, 1951 [292]; *O. moigni* Lagardere, 1968 [295]; *O. saginatus* Krøyer, 1842 (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) (Bulycheva, 1957c) [220]; ?species, K.H. Barnard, 1935 [664]; species, Just, 1980 [253].

Habitat and distribution. Marine, Arctic, 0-140 m, 6 species.

Paraperioculodes K.H. Barnard

Paraperioculodes K.H. Barnard, 1931a: 427.–K.H. Barnard, 1932: 135.

Type species. *Paraperioculodes brevimanus* K.H. Barnard, 1931a, original designation.

Diagnosis. Cutting edge of mandible [?projecting and toothed]; molar [?large], ridged. Inner lobes of lower lip separate. Gnathopods somewhat diverse, subchelate, stout, carpus with blunt strong posterior lobe projecting distalwards at slight angle and partially guarding propodus, lobe becoming thinner on gnathopod 2; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Eyes fused and forming circular patch on top of head; antenna 1 short, not exceeding article 5 on antenna 2; peduncle of antenna 2 in type species with long spines as in *Oediceropsis* but these are absent in the other species.

Variables. Antenna 1 very short with antenna 2 enlarged and bearing long spines as in *Oediceroides* (*belgicae*); eyes with separate lateral cyst (*cystiferus*).

Relationship. Differing from the *Perioculodes* group in the triturative molar. From *Oediceroides* and *Oediceropsis* in the presence of dorsally fused eyes on the head, and presumably in the type species the long antenna 1 and lack of long spines on the peduncle of antenna 2. From *Monoculodes* there is difficulty in separating *Paraperioculodes* because many species of *Monoculodes* have weak carpal lobes as in *Paraperioculodes*. Many species of *Monoculodes* have gnathopod 1 larger or shorter than gnathopod 2. The eye fusion is poorly documented. Unfortunately, the type species of *Paraperioculodes* has gnathopod 2 slightly smaller than gnathopod 1.

Species. ?*Paraperioculodes belgicae* Ruffo, 1949 (probably in *Oediceropsis*, but see *Oediceroides*) [802B]; *P. brevimanus* K.H. Barnard, 1931a, 1932 (? = next species) [833]; *P. brevirostris* (Schellenberg, 1931) [833]; *P. cystiferus* (Schellenberg, 1931) [831]; *P. microrhynchus* Ruffo, 1949 [802B].

Habitat and distribution. Marine, Antarctic and outliers, 26-569 m, 5 species.

Parexoediceros Bousfield

Parexoediceros Bousfield, 1983: 273.

Type species. *Parexoediceros latimerus* Bousfield, 1983, original designation.

Diagnosis. Partly based on *P. pirloti*. Cutting edge of mandible slightly projecting and well toothed; molar medium, ridged. Inner lobes of lower lip separate. Gnathopods similar to one another, subchelate, stout, carpus with blunt strong posterior lobe projecting distalwards obliquely and partially guarding propodus; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Eyes appressed dorsally at base of rostrum, with raphus; antenna 1 exceeding peduncle of antenna 2, latter without spines of *Oediceroides*; article 4 of pereopod 5 expanded and lobate, enveloping article 5, partially so on pereopod 6; article 2 of pereopods 5-6 slender.

Relationship. Not distinguished from any other genus by describer and keys close to *Oediceroides* and *Monoculodes* but more details needed.

If *P. pirloti* belonging here then differing from *Oediceroides* in the paired dorsal eyes, widely expanded article 4 of pereopod 5 enveloping article 5, and lack of long spines on antenna 2.

Differing from *Oediceropsis* in the large rostrum, long antenna 1 and lack of long spines on antenna 2. From *Monoculodes* in the condition of pereopod 5.

Species. *Parexoediceros latimerus* Bousfield, 1983 [783]; ?*P. pirloti* (Sheard, 1936a) [785].

Habitat and distribution. Marine, Tasmania and South Australia, beach surf zone, 2 species.

Paroediceroides Schellenberg

Fig.100K

Paroediceroides Schellenberg, 1931: 146.

Type species. *Paroediceroides sinuata* Schellenberg, 1931, monotypy.

Diagnosis. Cutting edge of mandible projecting and well toothed; molar large, ridged. Inner lobes of lower lip separate. Gnathopods somewhat diverse, subchelate, stout, carpus with blunt strong posterior lobe projecting distalwards at less than right angles and partially guarding propodus, lobe larger on gnathopod 2; palm of both gnathopods oblique. Uropod 2 only exceeding end of peduncle on uropod 3. Uropod 3 well developed.

Additional characters. Eyes fully fused on top of head; antenna 1 reaching to end of peduncle of antenna 2 but latter not enlarged and lacking spines of *Oediceroides*; coxa 4 with strong sharp lobe; telson deeply emarginate.

Relationship. Differing from *Paraperioculodes* in the emarginate telson and large sharp lobe on coxa 4. From *Oediceropsis* and *Oediceroides* in the presence of dorsally appressed but paired eyes on body of head, and weak antenna 2 lacking long spines. From *Monoculodes* in the 'fully fused eyes dorsally' but this is a poor character unconfirmed in many species of *Monoculodes*. The combination of emarginate telson and sharp lobe of coxa 4 must suffice for the moment to distinguish *Monoculodes*.

Lopiceros has an unusual antenna 2 and elongate article 3 of antenna 1.

Species. *Paroediceroides sinuata* Schellenberg, 1931 [833 + B].

Habitat and distribution. Marine, South Georgia, 22-310 m, 1 species.

Paroediceros G.O. Sars

Fig.100H

Paroediceros G.O. Sars, 1895: 291.–Stebbing, 1906: 245.

Type species. *Oediceros lynceus* M. Sars, 1858, original designation.

Diagnosis. Cutting edge of mandible projecting and well toothed; molar medium, lacking ridges, subconical, bulging, setulose. Inner lobes of lower lip separate. Gnathopods somewhat diverse, moderately stout, large, carpus on gnathopod 2 with blunt strong posterior lobe projecting distalwards, guarding propodus, lobe becoming obsolescent on gnathopod 1; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Relationship. Differing from *Oediceros* in the shortened carpal lobe of gnathopod 1. This specifically shortened lobe distinguishes *Paroediceros* from all other genera bearing a non-triturative molar.

Nomenclature. Stephensen (1931a, 1938b, 1940b) believes Goes (1866) had *P. lynceus* when describing *P. propinquus* and therefore *P. microps* is the valid name for the *P. propinquus* concept.

Species. See Gurjanova (1951); Stephensen (1931a, 1938b); *P. curvirostris* (Hansen, 1888) (Stebbing, 1906) (?Stephensen, 1940b) [216]; *P. intermedius* Stebbing, 1906 (= *P. microps* identification of Stebbing, 1894; Hansen, 1887) (Stephensen, 1938b) (?Just, 1970) [251]; *P. lynceus* (M. Sars, 1858) (= *P. nubilatus* Packard, 1867) (G.O. Sars, 1895) (Shoemaker, 1930a) (Just, 1980) [220 + B]; *P. macrocheir* (Sars, 1879, 1885, 1886) (Oldevig, 1959) [208B]; *P. propinquus* (Goes, 1866) (= *P. microps* Sars, 1883, but see Stephensen, 1931a) (Sars, 1895) (Bulycheva, 1957c) [238].

Habitat and distribution. Marine, Arctic-boreal, 2-1836 m, 5 species.

Perioculodes Sars

Fig.98A

Perioculodes Sars, 1895: 312.–Stebbing, 1906: 237.–Lincoln, 1979a: 338.

Type species. *Monoculodes longimanus* Bate & Westwood, 1868, monotypy.

Diagnosis. Cutting edge of mandible projecting and well toothed; molar small, lacking ridges, conical, with apical spines, palp article 3 shorter than 2. Inner lobes of lower lip fused or separated by incision. Gnathopods similar to one another, slender, carpus with sharp strong posterior lobe projecting distalwards and guarding propodus; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Eyes forming dorsal ring, brows; telson entire (versus *Perioculopsis*); dactyls of pereopods 3-5 shorter than article 6.

Sexual dimorphism. Antenna 1 of male usually with article 3 elongate (if not already elongate in female), base of primary flagellum with callynophore; article 3 of mandibular palp often elongate only in males.

Variables. Rostrum elongate (*P. pallidus*); article 3 of female antenna 1 elongate (*P. longimanus*, *P. megapleon*), not (*P. aequimanus*); lacinia mobilis weak (*P. pallidus*); article 3 of mandibular palp as long as article 2 (*P. brevicarpus*); dactyl of maxilliped short (*P. pallidus*); coxa 1 posteroventrally expanded (*P. aequimanus*, *P. serra*, *P. megapleon*); coxa 3 with anteroventral point (*P. acuticoxa*); coxae 1-3 and coxae 4-7 in disjunct size groups or not; dactyls of pereopods 3-4 elongate (*P. aequimanus*, *P. brevicarpus*), short (*P. longimanus*), vestigial (*P. serra*); pereopod 6 enlarged (*P. pallidus*); pereopod 7 ?short (?aberrantly) (*P. pallidus*); outer ramus of uropod 1 very short, inner ramus serrate (*P. serra*); uropods naked (*P. pallidus*); uropods 2-3 short, rami unequal on uropod 3 (*P. pallidus*); peduncle of uropod 3 shortened (*P. cerasinus*); telson emarginate (*P. pallidus*).

Relationship. Differing from *Finoculodes* and *Arrhinopsis* in the short article 3 of the mandibular palp; *Finoculodes* also has narrowed gnathopod 2 with transverse palm.

The fused inner lobes of the lower lip and elongate gnathopods with fully guardant carpal lobes distinguish *Perioculodes* from *Oediceros* and *Paroediceros*.

See *Perioculopsis*, *Sinoediceros* and *Monoculodopsis*.

Taxonomy. There remain many doubts about identifications in *P. aequimanus* and *P. longimanus*. Distributions are therefore cited mainly for the Atlanto-Mediterranean area.

Species. *Perioculodes acuticoxa* Ledoyer, 1973d, 1986 [698]; *P. aequimanus* (Kossmann, 1880) (?= *P. longimanus* identifications of Chilton, 1921a; Nayar, 1959) (Schellenberg, 1928b) (Ledoyer, 1972b) (Diviacco, 1980) [685, 340]; *P. a. mozambicus* Ledoyer, 1986 [694]; *P. brevicarpus* Ledoyer, 1986 [698N]; *P. cerasinus* Thomas & Barnard, 1985a [460]; *P. longimanus* (Bate & Westwood, 1868) (= *P. grubei* Boeck, 1871) (= *P. aequimanus* identification of Robertson, 1888) (Sars, 1895) (Chevreux & Fage, 1925) (Miloslavskaya, 1939) (Carausu & Carausu, 1942) (Gurjanova, 1951) (Mordukhai-Boltovskoi, 1969) (?Ledoyer, 1972b, 1973d, 1986) (Lincoln, 1979a); *P. l. angustipes* Ledoyer, 1983 [352, 685, 740, ? + B]; *P. megapleon* (Giles, 1888) (Pillai, 1957) (Rabindranath, 1972a) (Ledoyer, 1973a, 1979a, 1986) [660]; *P. pallidus* Griffiths, 1975 [743]; *P. puliciformis* (Giles, 1888) [probable new genus, see coxae] [664]; *P. serra* Walker, 1904 (Nayar, 1967) (Ledoyer, 1979a, 1986) [660]; species, Movaghar, 1965 (ecology) [237].

Habitat and distribution. Marine, tropical, weakly boreal to North Sea, frequently neritic in plankton tows, 0-370 m, 9 species.

Perioculopsis Schellenberg

Perioculopsis Schellenberg, 1925a: 145.

Type species. *Perioculopsis lophopus* Schellenberg, 1925a, monotypy.

Diagnosis. Cutting edge of mandible slightly projecting and untoothed or teeth obsolescent; molar small, lacking ridges, with apical spines. Inner lobes of lower lip [?fused]. Gnathopods similar to one another, subchelate, slender, carpus with blunt strong posterior lobe guarding propodus; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Variable. Article 1 of antenna 1 with tooth (type); coxa 6 bevelled posteroventrally (type); telson emarginate (type).

Relationship. Differing from *Perioculodes* in the untoothed incisors.

Species. *Perioculopsis lophopus* Schellenberg, 1925a [445]; species, (= 'Oedicerotidae genus species' of Imbach, 1969) [655].

Habitat and distribution. Marine, Ghana and Vietnam, 13-15 m, 2 species.

Pontocrates Boeck

Pontocrates Boeck, 1871b: 171.–Stebbing, 1906: 239.–Lincoln, 1979a: 340.

Type species. *Oedicerus* (sic) *norvegicus* Boeck, 1861, selected by Boeck, 1876 (= *Kroyera arenaria* Bate, 1858a).

Diagnosis. Cutting edge of mandible projecting and well toothed; molar medium, ridged. Inner lobes of lower lip poorly developed but separated from each other by incision, outer lobes thus widely gaped. Gnathopods diverse, gnathopod 1 moderately stout, gnathopod 2 slender, carpus of both pairs with sharp strong posterior lobe projecting distalwards but partially (gnathopod 1) or especially (gnathopod 2) guarding propodus; palm of gnathopod 1 oblique, of gnathopod 2 chelate. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Variables. Coxa 2 strongly tapering distally (*P. arenarius*).

Relationship. This is the only other genus besides *Synchelidium* with chelate gnathopod 2; differing from *Synchelidium* in the triturative molar and free lobe of carpus on gnathopod 2.

Species. *Pontacrates altamarina* (Bate & Westwood, 1863) (= *P. arenarius* identification of Chevreux & Fage, 1925) (Sars, 1895, supplement pl. 7) (Schellenberg, 1942) (Nagata, 1960) (Lincoln, 1979a) [240 + 395]; *P. arcticus* Sars, 1895 (= *P. norvegicus* identification of Sars, 1895: pl. 111) (Stephensen, 1931a, 1938b, 1940b) (Gurjanova, 1951) (Bulycheva, 1957c) [220]; *P. arenarius* (Bate, 1858a) (= *Oedicerus* (sic) *norvegicus* Boeck, 1861; Chevreux & Fage, 1925) (Sars, 1895, suppl. pl. 6-7) (Schellenberg, 1942) (Gurjanova, 1951) (Lincoln, 1979a) [352 + 391].

Habitat and distribution. Marine, Arctic-boreal, 3-100 m, 3 species.

Sinoediceros Shen

Sinoediceros Shen, 1955: 85, 97.

Type species. *Sinoediceros homopalmatus* Shen, 1955, original designation.

Diagnosis. Cutting edge of mandible not projecting and poorly toothed, teeth obsolescent; molar small, lacking ridges, bulging, with apical spines. Inner lobes of lower lip fused. Gnathopods similar to one another, subchelate, slender, carpus with sharp strong posterior lobe guarding propodus, palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Relationship. Differing from *Perioculodes* and *Perioculopsis* in the outer plate of the maxilliped reaching only to the apex of palp article 1 and by the elongate dactyls of pereopods 3-4.

All other oedicerotids with non-triturative molar have separated inner lobes on the lower lip.

Species. *Sinoediceros homopalmatus* Shen, 1955 [397E].

Habitat and distribution. Marine, China, near Shanghai, shallow mud and neritic, 1 species.

Synchelidium Sars

Figs 98C, 99F, 100I

Synchelidium Sars, 1895: 317.–Stebbing, 1906: 241.–Lincoln, 1979a: 344.

Type species. *Kroyeria haplocheles* Grube, 1864c, selected by Chevreux & Fage, 1925.

Diagnosis. Cutting edge of mandible projecting and well toothed; molar small, lacking ridges, conical, with apical spine(s), setulose. Inner lobes of lower lip separate but poorly developed and separated by incision, outer lobes widely gaped. Gnathopods diverse, gnathopod 1 stout, gnathopod 2 slender, carpus with sharp strong posterior lobe projecting distalwards and guarding propodus, lobe becoming less appressed to propodus on gnathopod 1, and fused to propodus on gnathopod 2; palm of gnathopod 1 transverse or oblique, of gnathopod 2 chelate. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Carpus of gnathopod 2 actually formed of articles 4-5 or one of these obsolescent, lobe mostly fused to propodus.

Variables. Pleonites 1-3, especially 3, reduced (*S. micropleon*).

Relationship. Besides *Pontocrates*, this is the only other genus with chelate gnathopod 2. Differing from *Pontocrates* in the non-triturative molar and amalgamation of the carpal lobe on gnathopod 2 to the propodus.

Species. *Synchelidium americanum* Bousfield, 1973 (Fox & Bynum, 1975) (Camp, Whiting & Martin, 1977) (Dickinson, *et al.*, 1980) [361]; *S. a. latipalpum* Hirayama, 1986 [394]; *S. bulytschevae* Kudrjaschov & Tzvetkova, 1975 [391]; *S. gurjanovae* Kudrjaschov & Tzvetkova, 1975 [391]; *S. haplocheles* (Grube, 1864c) (= *S. brevicarpa* Bate & Westwood, 1868, Sars, 1895) (Chevreux & Fage, 1925) (Schellenberg, 1942) (Lincoln, 1979a) [352 + 743 + ?665]; *S. intermedium* Sars, 1895 (Stephensen, 1938b) (Enequist, 1950) [238 + B]; *S. longidigitatum* Ruffo, 1947a [345]; *S. maculatum* Stebbing, 1906 (Chevreux & Fage, 1925) (Carausu & Carausu, 1942) (Mordukhai-Boltovskoi, 1969) (Lincoln, 1979a) [352]; *S. micropleon* J.L. Barnard, 1977a (= species M. J.L. Barnard, 1969a) [370]; *S. miraculum* Imbach, 1967 [655]; *S. m. lenorostralum* Hirayama, 1986a [394]; *S. rectipalmum* Mills, 1962b (J.L. Barnard, 1966a, 1969a,b) (Reish & Barnard, 1967) [535]; *S. shoemakeri* Mills, 1962b (J.L. Barnard, 1966a,b, 1969a, 1971b) (Reish & Barnard, 1967) (Coyle & Mueller, 1981) [379]; *S. tenuimanum* Norman, 1895 (= *S. haplocheles* identifications of Boeck, 1876, Carus, 1885, Chevreux, 1887b, Robertson, 1892, Sars, 1895) (Stephensen, 1938b) (Enequist, 1950) (Griffiths, 1975) [238 + B + 743]; species, Stephensen, 1938b [238]; species(s), Ledoyer, 1977 [348 + B]; species, Takamaru & Ochiai, 1982 [395]; species G., J.L. Barnard, 1969b [377]; species, (= *S. haplocheles* identification of Chilton, 1921a) [664].

Habitat and distribution. Marine, cosmopolitan, tropical to boreal, 0-800 m, 12 species.

Westwoodilla Bate

Figs 98E, 99H,J, 100D

Westwoodia Bate, 1857d: 139 (homonym, Hymenoptera) (*Westwoodia caecula* Bate, 1857d, monotypy).
Westwoodilla Bate, 1862: 102 (new name).–Stebbing, 1906: 249.–Lincoln, 1979a: 354.
Halimedon Boeck, 1871b: 169 (*Halimedon mulleri* Boeck, 1871b, selected by Boeck, 1876).

Type species. *Westwoodia caecula* Bate, 1857d, monotypy.

Diagnosis. Cutting edge of mandible not projecting and untoothed; molar large, ridged. Inner lobes of lower lip separate. Gnathopods similar to one another, feeble, subchelate, carpus with blunt small posterior lobe projecting distalwards at right angles, lobe becoming obsolescent on gnathopod 2; palm of both gnathopods oblique. Uropod 2 fully reaching end of rami on uropod 3. Uropod 3 well developed.

Additional characters. Article 2 of mandibular palp more strongly curved than in *Bathymedon.*

Relationship. Difficult to separate from *Bathymedon* except that most species of *Westwoodilla* have well-developed eyes and large rostra. Most species of *Bathymedon* are said to have an uncurved article 2 on the mandibular palp.
See *Bathymedon* for relationships to other genera.

Removal. *Westwoodilla cornuta* J.L. Barnard 1969b, to *Cornudilla.*

Species. *Westwoodilla abyssalis* Gurjanova, 1951 [290A]; *W. asinuata* Bulycheva, 1952 [391]; *W. brevicalcar* (Goes, 1866) (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) (Just, 1980) [220]; *W. caecula* (Bate, 1857d, 1862) (= *W. hyalina* Bate, 1862) (= *W. parvimanus* Bate & Westwood, 1863) (= *W. mulleri* Boeck, 1871b, Sars, 1895) (= *W. megalops* Sars, 1883, 1895) (= *W. acutifrons* Sars, 1895) (? = *W. longidactyla* Carausu, 1949) (Chevreux & Fage, 1925) (Stephensen, 1931a) (Gurjanova, 1951) (Lincoln, 1979a) (= *W. c.* forma *acutifrons* Sars of J.L. Barnard, 1966a; Ledoyer, 1983) [200+ B]; ?*W. longidactyla* Carausu, 1948, 1949 (? = *W. caecula*, see Ledoyer, 1983) [348B]; *W. longimana* Shoemaker, 1934b [404B]; *W. manta* Griffiths, 1974c, 1975 [743]; *W. oxyrhyncha* Bulycheva, 1952 [391 + B]; *W. rectangulata* Bulycheva, 1952 [391]; *W. rectirostris* Della Valle, 1893 (Chevreux, 1911d) (Chevreux & Fage, 1925) (Ledoyer, 1983) [330 + B].

Habitat and distribution. Marine, cosmopolitan, preferring cold or deep water, 2-2900 m, 10 species.

PAGETINIDAE K.H. Barnard, 1931a

Diagnosis. Body moderately compressed, subcylindrical. Inner (and often outer) plates of maxilliped reduced. Coxae small but touching, coxa 1 expanded and with posteroventral lobe (sharp or blunt). Urosomites 2-3 coalesced. Uropod 3 uniramous.
See Colomastigidae, Dexaminidae, Eophliantidae, Sebidae and Stenothoidae.

Description. Lateral lobes of head poorly developed, head lacking sinus for antenna 2. Eyes present. Antennae short, accessory flagellum absent. Labrum incised. Incisor toothed, molar obsolescent, rakers weak or absent, palp 3-articulate, setae sparse or vestigial. Labium without inner lobes (or they are vestigial), outer lobes widely separated, mandibular lobes present (or ?absent). Inner plate of maxilla 1 present or absent, when present with 1 seta, outer plate with 2-6 spines (often thin and seta-like), palp small or large, 1-articulate. Plates of maxilla 2 feeble, plates expanded and subcircular, or slender and trapezoidal, setae weak or absent. Inner plates of maxillipeds absent or vestigial, outer plates well developed or absent.
All coxae short and similar, coxa 4 not excavate, coxa 5 as long as 4. Gnathopods feeble, alike but gnathopod 2 slightly larger, carpus short, unlobate, propodus trapezoidal, weakly geniculate, expanding apically, palms slightly oblique, dactyls thick and overlapping palms or not. Pereopods short, article 2 of pereopods 5-7 scarcely expanded.
Uropods 1-2 without spination or with embedded apical spines on rami, lengths of rami slightly diverse. Uropod 3 small, naked, of embryonic blunt thick form, ramus about as long as peduncle, 1 to 2-articulate. Telson short, entire.

Variables. Plates of maxillae and maxillipeds variable in size, presence, and setation, thus inner plate of maxilla 1 present or absent, palp small or large; plates of maxilla 2 subcircular or slender-trapezoidal. Palp of maxilliped 3 or 4-articulate. Dactyls of gnathopods overlapping palms or not. Outer ramus of third uropod 1 to 2-articulate.

Relationship. Differing from Colomastigidae and Eophliantidae in the presence of mandibular palp and reduced inner plates on the maxillipeds. From Dexaminidae in the uniramous uropod 3, odd maxilliped and small, entire telson. From Stenothoidae and allies in the equality of coxae 1-3. From Sebidae in the non-chelate gnathopods and reduced plates of the maxillipeds. From Nihotungidae in the short and subequal coxae 1-4, subcylindrical body and reduced plates of the maxillipeds.

Pagetina K.H. Barnard

Fig.101

Pagetina K.H. Barnard, 1931a: 427.–Holman & Watling, 1981: 213.
Heterocressa Nicholls, 1938: 55 (*Heterocressa monodi* Nicholls, 1938, original designation).

Type species. *Pagetina genarum* K.H. Barnard, 1931a, original designation.

Diagnosis. With the characters of the family.

Species. *Pagetina antarctica* Andres, 1981b [871]; *P. genarum* K.H. Barnard, 1931a, 1932 (Bellan-Santini & Ledoyer, 1974) (Holman & Watling, 1981) [870 + B]; *P. monodi* Nicholls, 1938 [845]; *P. reducta* Holman & Watling, 1981 [831].

Habitat and distribution. Marine, Antarctica north to Falkland Islands, 1-270 m, 4 species (at least one pelagic).

PARACALLIOPIIDAE Barnard & Karaman, 1982

Diagnosis. Body plan ordinary but urosomites 2-3 amalgamated; pereopod 7 elongate and different from shorter pereopods 5-6, dactyl of pereopod 7 elongate and setose; gnathopods sexually diverse, mittenform in female, enlarged mittenform in male, with thin carpus and expanded propodus twisting inward on death. Telson of ordinary length, entire.

Additional characters. Rostrum and incision for antenna 2 ordinary, eyes paired.

Sexual dimorphism. Gnathopods diverse, large in male, small in female.

See Eusiridae, Exoedicerotidae and Oedicerotidae.

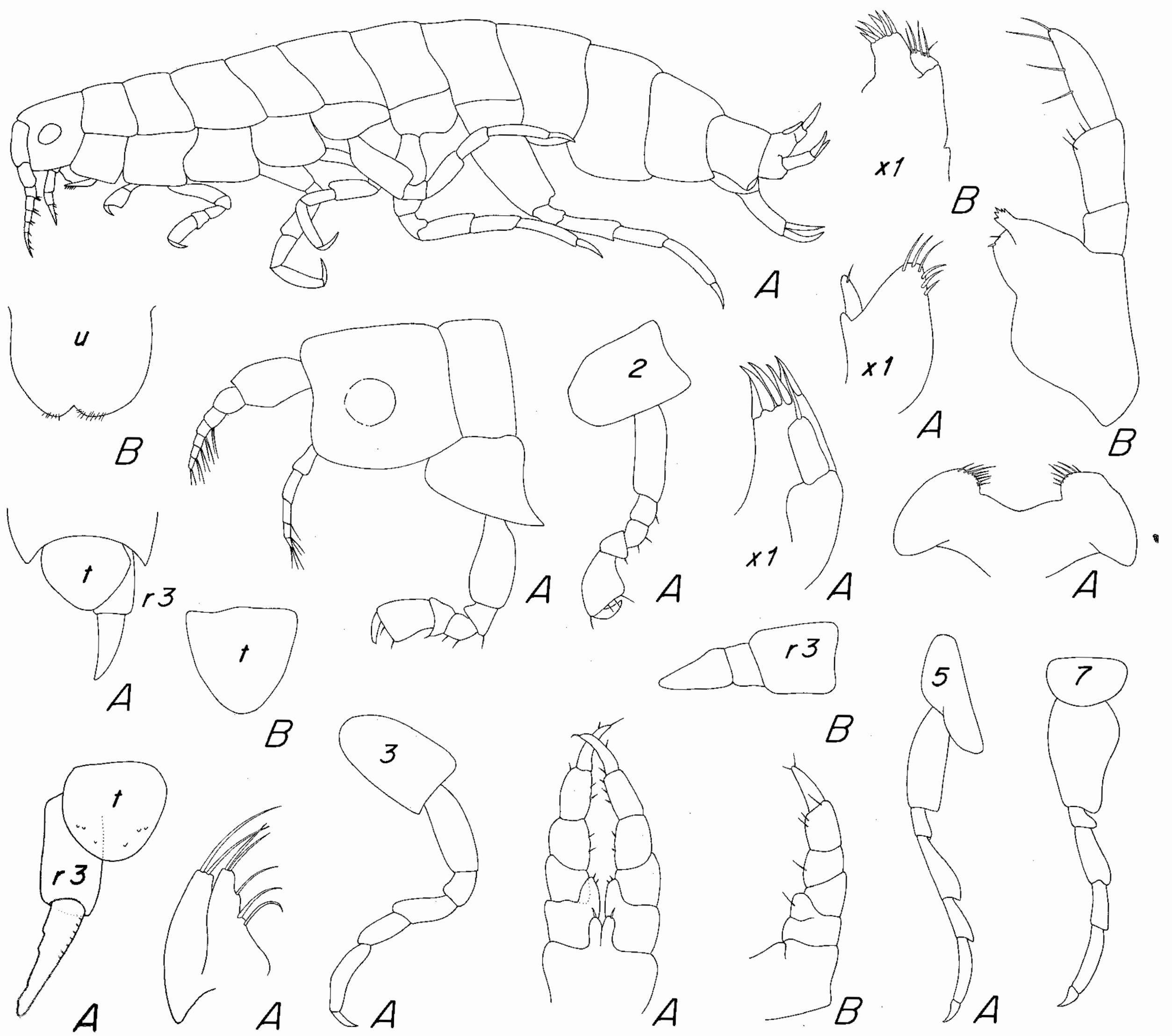


Fig.101. Pagetinidae. A, *Pagetina genarum*; B, *Pagetina* (= *Heterocressa*) *monodi*.

Relationship. Differing from Exoedicerotidae in the lack of apical spines on rami of uropods 1-2. From Oedicerotidae in the paired eyes, fused urosomites (occasionally present in Oedicerotidae) and non-galeate head and odd gnathopods. From Eusiridae-Calliopiidae in the fused urosomites 1-2 and odd gnathopods. From Dexaminidae in the greatly elongate pereopod 7 with elongate setose dactyl and the uncleft telson.

Key 1 to Genera of Paracalliopiidae

1. Palm of male gnathopod 2 with 2 thick spines, mandibular palp absent .... *Katocalliope*

—— Palm of male gnathopod 2 with 4 thick spines, mandibular palp present 2

2. Inner plate of maxilla 1 with 1 seta .... *Indocalliope*

—— Inner plate of maxilla 1 with 8+ setae .... *Paracalliope*

Key 2 to Genera of Paracalliopiidae

1. Inner plates of maxillae 1-2 densely setose medially .... *Paracalliope*

—— Inner plates of maxillae 1-2 not setose medially 2

2. Mandibular palp present, peduncle of uropod 3 elongate, epimera with small tooth, palp of maxilliped strongly exceeding outer plate .... *Indocalliope*

—— Mandibular palp absent, peduncle of uropod 3 short, epimera smooth, palp of maxilliped not exceeding outer plate .... *Katocalliope*

Key 3 to Genera of Paracalliopiidae

1. Mandible lacking palp, peduncle of uropod 3 short, palp of maxilliped not exceeding outer plate .... *Katocalliope*

—— Mandible with long palp, peduncle of uropod 3 elongate, palp of maxilliped strongly exceeding outer plate 2

2. Medial margins of maxillae 1-2 naked .... *Indocalliope*

—— Medial margins of maxillae 1-2 setose .... *Paracalliope*

Indocalliope Barnard & Karaman

Indocalliope Barnard & Karaman, 1982: 182.

Type species. *Paracalliope indica* K.H. Barnard, 1935, original designation.

Diagnosis. Inner plates of maxillae 1-2 not setose medially.

Species. *Indocalliope indica* (K.H. Barnard, 1935) (= *I. fluviatilis* identification of Chilton, 1921a) (Ruffo, 1956a) (Nayar, 1959) (Sivaprakasam, 1968a) [664].

Habitat and distribution. Marine, brackish, eastern India, 0 m, 1 species.

Katocalliope Barnard & Drummond

Katocalliope Barnard & Drummond, 1984b: 147.

Type species. *Katocalliope kutyeri* Barnard & Drummond, 1984b, original designation.

Diagnosis. Paracalliopiidae lacking mandibular palp; inner plate of maxilla 1 poorly armed (generally with 1 seta only); brood plates unexpanded; epimera rounded (lacking notches or small teeth); peduncle of uropod 3 short.

Relationship. *Katocalliope* differs from *Paracalliope* and *Indocalliope* in the lack of teeth on the epimera, the very short palp of the maxilliped, the short uropod 3 with short peduncle, and the absence of a mandibular palp. Pereopods 3 to 6 of *Katocalliope* are more markedly fossorial than those of the other 2 genera; the articles of these pereopods are thicker and shorter, and much better armed than those of *Paracalliope* and *Indocalliope*.

In addition, *Paracalliope* differs from *Katocalliope* in the medially setose inner plate of maxilla 1 and the expanded oostegites. The latter have not been described for *Indocalliope*.

The slightly tapering coxa 3 of *Katocalliope* and unshortened outer ramus of uropod 2 cannot be evaluated as generic characters until more species have been described and these differences confirmed.

There may possibly be some generic value in the greatly elongate setae of the anterior coxae on *Katocalliope*.

A few species of *Paracalliope* are known to have a vestigial accessory flagellum, but in others its presence

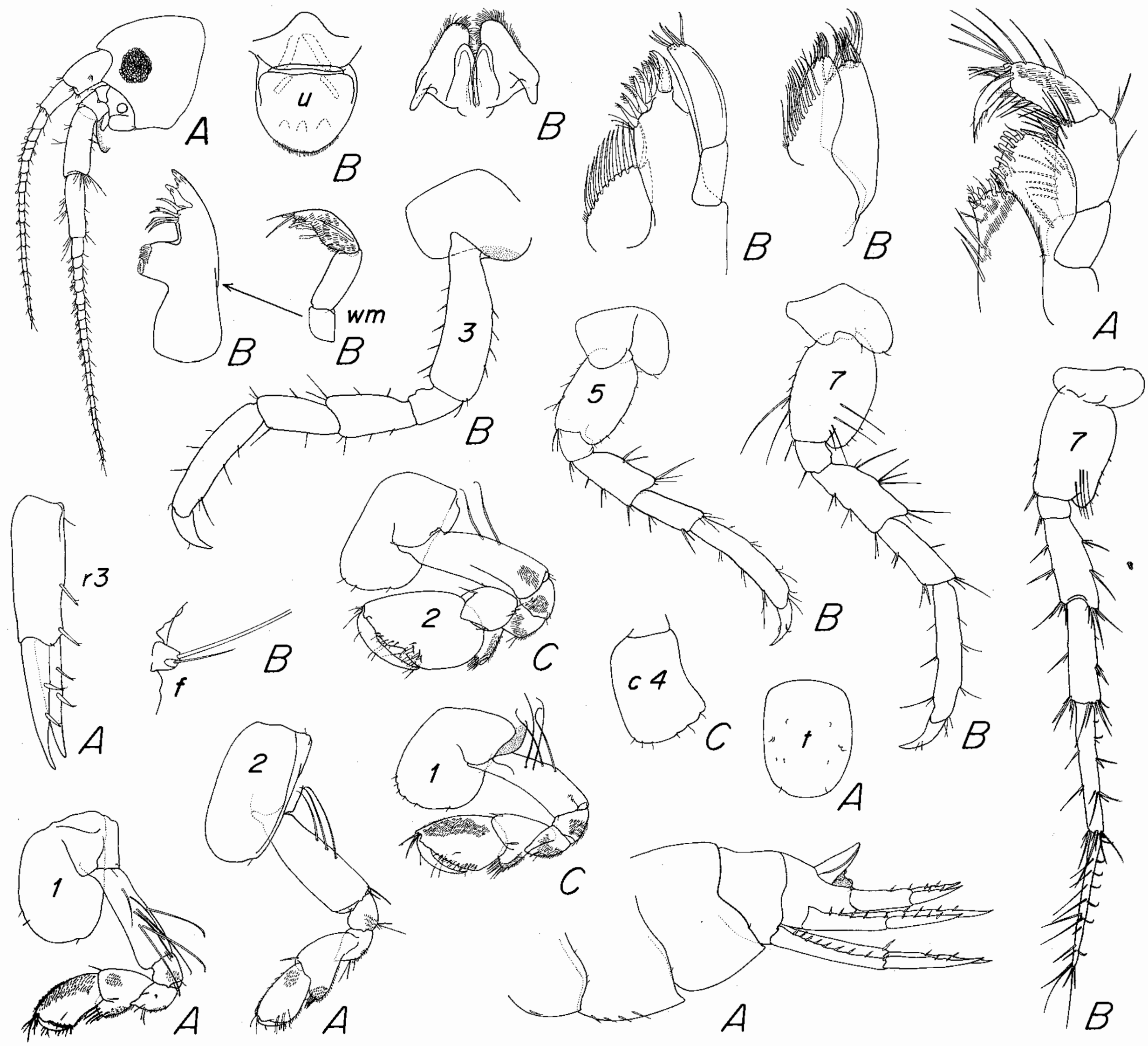


Fig.102. Paracalliopiidae. A, *Paracalliope karitane*; B, *Paracalliope novizealandiae*; C, *Paracalliope fluviatilis*.

requires confirmation. The mandible of *Katocalliope*, besides lacking a palp, is characterised by greater elongation of the molar and extension of the base of the incisor than seems to be typical of *Paracalliope*; but this character also needs further investigation in some species of *Paracalliope*. Articles 2 and 3 of antenna 1 are short and equal in *Katocalliope* and the facial row of setae on maxilla 2 is poorly developed.

The fossorial character and general facies of *Katocalliope* are distinctive within the Paracalliopiidae and bear strong resemblance to two closely allied families, Oedicerotidae and Exoedicerotidae.

Species. *Katocalliope kutyeri* Barnard & Drummond, 1984b [631].

Habitat and distribution. Marine, Australia, near Brisbane, sand beach intertidal, 1 species.

Paracalliope Stebbing

Fig.102

Paracalliope Stebbing, 1899a: 210.–J.L. Barnard, 1972a: 70.
Paroediceropsis Fearn-Wannan, 1968a: 50 (*Paroediceropsis raymondi* Fearn-Wannan, 1968a, original designation).

Type species. *Calliope fluviatilis* Thomson, 1879b, original designation.

Diagnosis. Inner plates of maxillae 1-2 setose medially.

Removal. *Paracalliope fernandoi* Wignarajah, 1958, to superfamily Talitroidea, *incertae sedis*.

Species. *Paracalliope australis* (Haswell, 1880a, 1882) (? = *P. raymondi* Fearn-Wannan, 1968a) (Della Valle, 1893 as *Pherusa australis*) (? = *P. fluviatilis* identification of Chilton, 1920a) [781 + E]; *P. fluviatilis* (Thomson, 1879b) (J.L. Barnard, 1972a) (Hurley, 1975) (Lewis, 1976) (Chapman & Lewis, 1976) [935]; *P. karitane* J.L. Barnard, 1972a (Hurley, 1975) (Lewis, 1976) (Chapman & Lewis, 1976) [936F]; *P. larai* Knott, 1975 [941F]; *P. mapela* Myers, 1985c [576]; *P. novaecaledoniae* Ruffo & Paiotta, 1972 [933]; *P. novizealandiae* (Dana, 1852a, 1853) (= *P. neozelanicus* Thomson & Chilton, 1886) (Chilton, 1909b) (J.L. Barnard, 1972a) [775]; *P. raymondi* (Fearn-Wannan, 1968a) [782E]; species (= *P. fluviatilis* identification of Chilton, 1921c) [982].

Habitat and distribution. Marine, New Zealand, Australia, New Caledonia, Philippines, Fiji, weakly marine, mostly estuarine to freshwater, 0 m, 8 species.

PARACRANGONYCTIDAE Bousfield, 1982

[see Barnard & Barnard (1983)]

PARALEPTAMPHOPIDAE Bousfield, 1983

See Eusiridae

PARAMELITIDAE Bousfield, 1977

[see Barnard & Barnard (1983)]

PARDALISCIDAE Boeck, 1871b

Diagnosis. Body laterally compressed; coxae short; accessory flagellum well developed; molar absent, incisor and body of mandible flat, inner plates of maxillipeds short to evanescent.

See Stilipedidae (= Astyridae), Iphimediidae.

Description. Rostrum variable but prominent; head occasionally protuberant; mouthparts rarely grouped in conical bundle; upper lip incised or rounded; mandibles flat, almost elytriform, palp 3-articulate or absent, article 3 often short; outer plates of maxillipeds often small; coxae often very short, coxa 1 not expanded distally, coxa 5 often as long as coxae 1-4; gnathopods powerful or feeble; rami of uropod 3 elongate, lanceolate or subfoliaceous, occasionally uropod 3 reduced in size; telson elongate, often short, cleft or entire.

Sexual dimorphism. Primary and accessory flagella often sexually dimorphic, enlarged or with callynophore in male; but occasional genera with callynophore also in female; teeth of urosome larger in male.

Relationship. Differing from Stilipedidae in the unexpanded coxa 1 and well-developed accessory flagellum (one exception probably an aberration, = type species of *Halicoides*). From Iphimediidae in the flat mandible, the small coxae, especially coxa 4, and in the absence of deep posterior teeth or excavations on coxa 4.

All Oedicerotidae have fossorial pereopods with pereopods 5-6 short and pereopod 7 elongate, and accessory flagellum vestigial.

Vitjazianidae have bulky mandibles, large molars and large plates on the maxillipeds.

Key to Genera of Pardaliscidae

1. Telson entire 2

—— Telson cleft 3

2. Carpus of gnathopods dominant, propodus small, dactyl serrate, uropod 3 ordinary .... *Epereopus*

—— Propodus of gnathopods dominant, carpus small, dactyl unserrate, uropod 3 reduced .... *Parpano*

3. Carpus of gnathopods strongly dominant, elongate, propodus short, (simple) 4

—— Carpus of gnathopods not strongly dominant, propodus well developed, scarcely shorter than carpus or propodus strongly dominant 7

4. Dactyl of gnathopods serrate .... *Pardalisca*

—— Dactyl of gnathopods setulose or smooth 5

5. Article 2 of antenna 1 longer than article 1, palp of maxilla 1 not expanded apically .... *Pardaliscoides*

—— Article 2 of antenna 1 shorter than article 1, palp of maxilla 1 expanded apically 6

6. Coxa 6 large and covering coxa 7, maxilla 2 vestigial .... *Necochea*

—— Coxa 6 small and not hiding coxa 7, maxilla 2 well developed .... *Princaxelia*

7. Mouthparts arranged in tightly conical bundle, some parts styliform 8

—— Mouthparts arranged in loose quadrate bundle, parts not styliform 9

8. Mandibular palp vestigial, outer plate of maxilliped huge and palp not longer than outer plate .... *Rhynohalicella*

—— Mandibular palp 3-articulate, outer plate of maxilliped medium, palp well extended beyond outer plate .... *Halicella*

9. Telson as long as broad (cleft one third or less) 10

—— Telson longer than broad (cleft one third or more) 12

10. Mandibular palp absent, uropod 3 very small, propodus of gnathopod 1 dominant .... *Tosilus*

—— Mandibular palp present, uropod 3 ordinary, carpus and propodus of gnathopod 1 of equal length 11

11. Pereopods prehensile .... *Parahalice*

— Pereopods simple .... *Halice*

12. Teeth on urosome strongly developed 13

—— Teeth on urosome vestigial or absent 16

13. Gnathopods stout, propodus and carpus expanded .... *Nicippe*

—— Gnathopods slender 14

14. Maxilla 2 short, palp of maxilla 1 apically expanded, right incisor toothed .... *Caleidoscopsis*

—— Maxilla 2 long, palp of maxilla 1 not expanded apically, right incisor smooth 15

15. Gnathopod 2 simple .... *Halice*

—— Gnathopod 2 subchelate .... *Arculfia*

16. Gnathopods stout, subchelate .... *Spelaeonicippe*

—— Gnathopods slender, simple 17

17. Primary flagellum with callynophore, accessory flagella fused in male, maxilla 1 palp not expanded apically, neither mandible deeply toothed, rostrum large (usually articles 4-5 of pereopods 3-4 expanded) 18

—— Primary and accessory flagella basally articulated in male, maxilla 1 palp expanded apically, one mandible deeply toothed, rostrum small (articles 4-5 of pereopods 3-4 not expanded) 19

18. Pereopods 3-7 simple .... *Halicoides*

—— Pereopods 3-7 prehensile .... *Parahalice*

19. Dactyl of gnathopods usually with 1+ serrations, upper lip lobes weakly asymmetrical, maxilliped outer plate narrow .... *Pardaliscella*

—— Dactyl of gnathopods lacking serrations, upper lip lobes strongly asymmetrical, maxilliped outer plate broad .... *Pardaliscopsis*

Arculfia J.L. Barnard

Arculfia J.L. Barnard, 1961a: 77.–Karaman, 1974a: 9.

Type species. *Arculfia trago* J.L. Barnard, 1961a, original designation.

Diagnosis. Rostrum well developed. Eyes absent. Ratio of peduncular articles on antenna 1 = 16:9:6, base of primary flagellum with callynophore, article 1 of flagellum much longer than peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip rounded below. Mandibles scarcely asymmetrical, incisor on both smooth, palp article 3 minute. Inner lobes of lower lip coalesced, without raphus. Palp of maxilla 1 not apically expanded. Maxilla 2 well developed, plates subequal. Inner plates of maxilliped obsolescent, outer plates medium; palp about 1.5 times as long as medial edge of outer plate. Coxae 1-4 quadrate, diverse, broader than long, coxa 1 especially short. Gnathopod 1 simple, gnathopod 2 subchelate, slender, article 6 of both gnathopods about as long as article 5, only carpus of gnathopod 2 with broad, shallow lobe; gnathopod 2 weakly subchelate; dactyls normally claw-shaped, gnathopod 2 with ?2 inner teeth. Pereopods simple. Urosomal tooth strong. Telson elongate, deeply cleft.

Relationship. The combination of short article 3 on the mandibular palp and presence of an accessory flagellum differentiate this genus from all others except *Halice*; from the latter it differs in the subchelate, albeit weak, gnathopod 2.

Differing from *Halicella* in the quadrate field of mouthparts (versus conical).

Species. *Arculfia trago* J.L. Barnard, 1961a (Karaman, 1974a) [715B].

Habitat and distribution. Marine, Tasman Sea, 610 m, 1 species.

Caleidoscopsis Karaman

Figs 103I, 104F

Caleidoscopsis Karaman, 1974a: 9.

Type species. *Pardaliscopsis copal* J.L. Barnard, 1967a, original designation.

Diagnosis. Rostrum small. Eyes absent. Ratio of peduncular articles on antenna 1 = 23:7:4, base of primary flagellum narrow, articulate, article 1 of flagellum scarcely longer than article 3 of peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Principal flagella of antennae 1-2 unusually short. Upper lip scarcely and asymmetrically incised below. Mandibles asymmetrical, incisor on left weakly toothed, on right strongly toothed, palp fully developed. Inner lobes of lower lip coalesced. Palp of maxilla 1 expanded apically. Maxilla 2 well

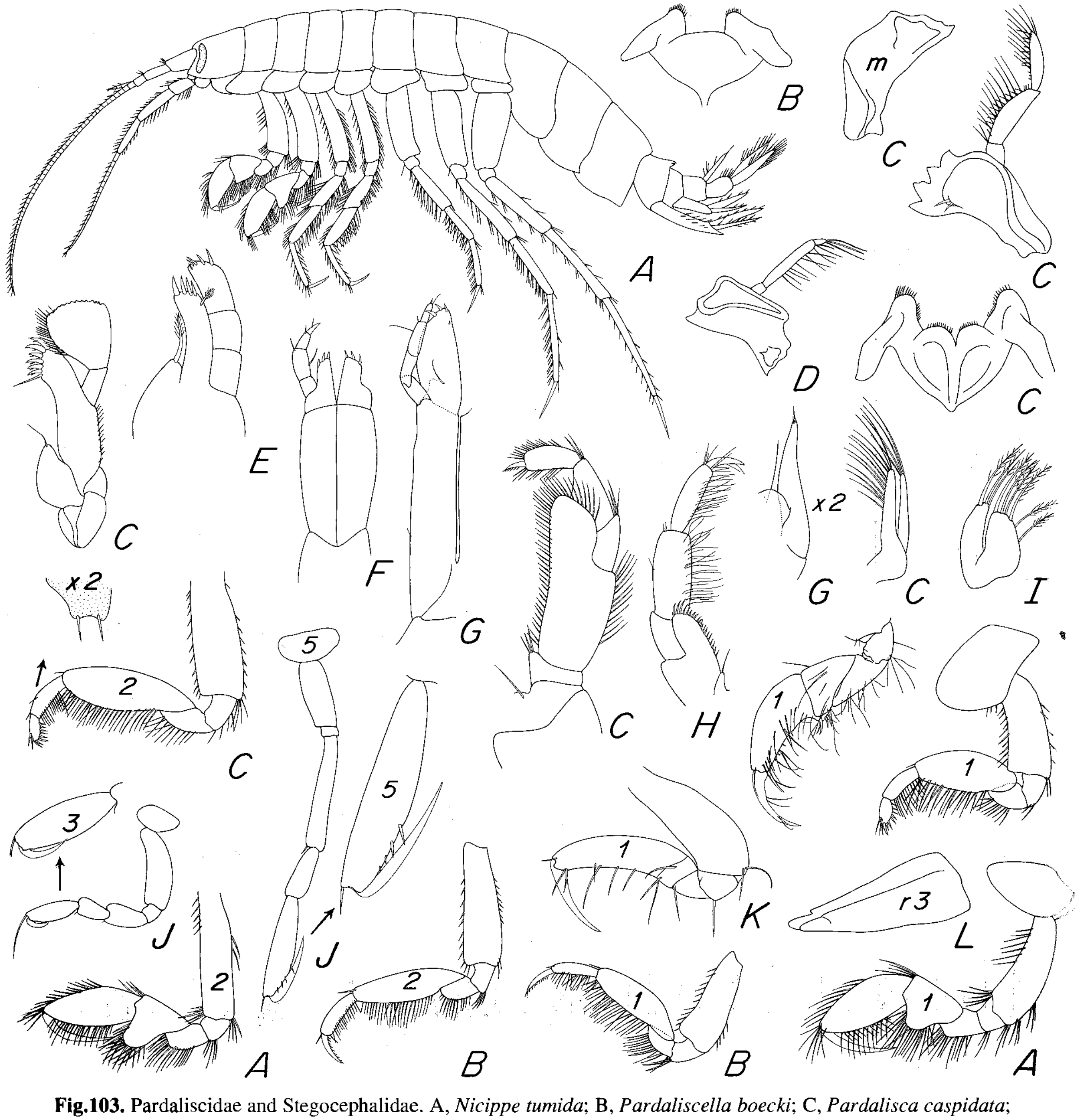


Fig.103. Pardaliscidae and Stegocephalidae. A, *Nicippe tumida*; B, *Pardaliscella boecki*; C, *Pardalisca caspidata*; D, *Halice abyssi*; E, *Epereopus abyssicola*; F, *Halicella parasitica*; G, *Rhynohalicella halona*; H, *Princaxelia abyssalis*; I, *Caleidoscopsis copal*; J, *Parahalice mirabilis*; K, *Tosilus arroyo*; L, *Stegophippsiella pacis*.

developed, plates weakly diverse. Inner plates of maxilliped small to obsolescent, outer plates medium; palp more than 2 times as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, longer than broad, Gnathopods simple, slightly stout, article 6 of both gnathopods slightly longer than article 5, carpus not lobate; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth moderate. Telson elongate, deeply cleft.

Variables. *Caleidoscopsis tikal* differing from type in: labrum more deeply asymmetrical; right mandible deeply toothed; male antenna 1 with conjoint bases on both flagella.

Relationship. Differing from *Pardaliscopsis* and *Pardaliscella* in the longer coxae 1-4 and short, broad lobes of maxilla 2. From *Halice* and *Arculfia* in the strongly toothed right incisor, the short maxilla 2 and apically expanded palp of maxilla 1.

Species. See Karaman (1974a); *C. copal* (J.L. Barnard, 1967a) [309A]; *C. simplignathia* (J.L. Barnard, 1962d) [412A]; *C. tikal* (J.L. Barnard, 1967a) [309B].

Habitat and distribution. Marine, Pacific Mexico, Cedros Trench, 1720-2475 m; Atlantic Ocean, Angola Basin, 3015 m; 3 species.

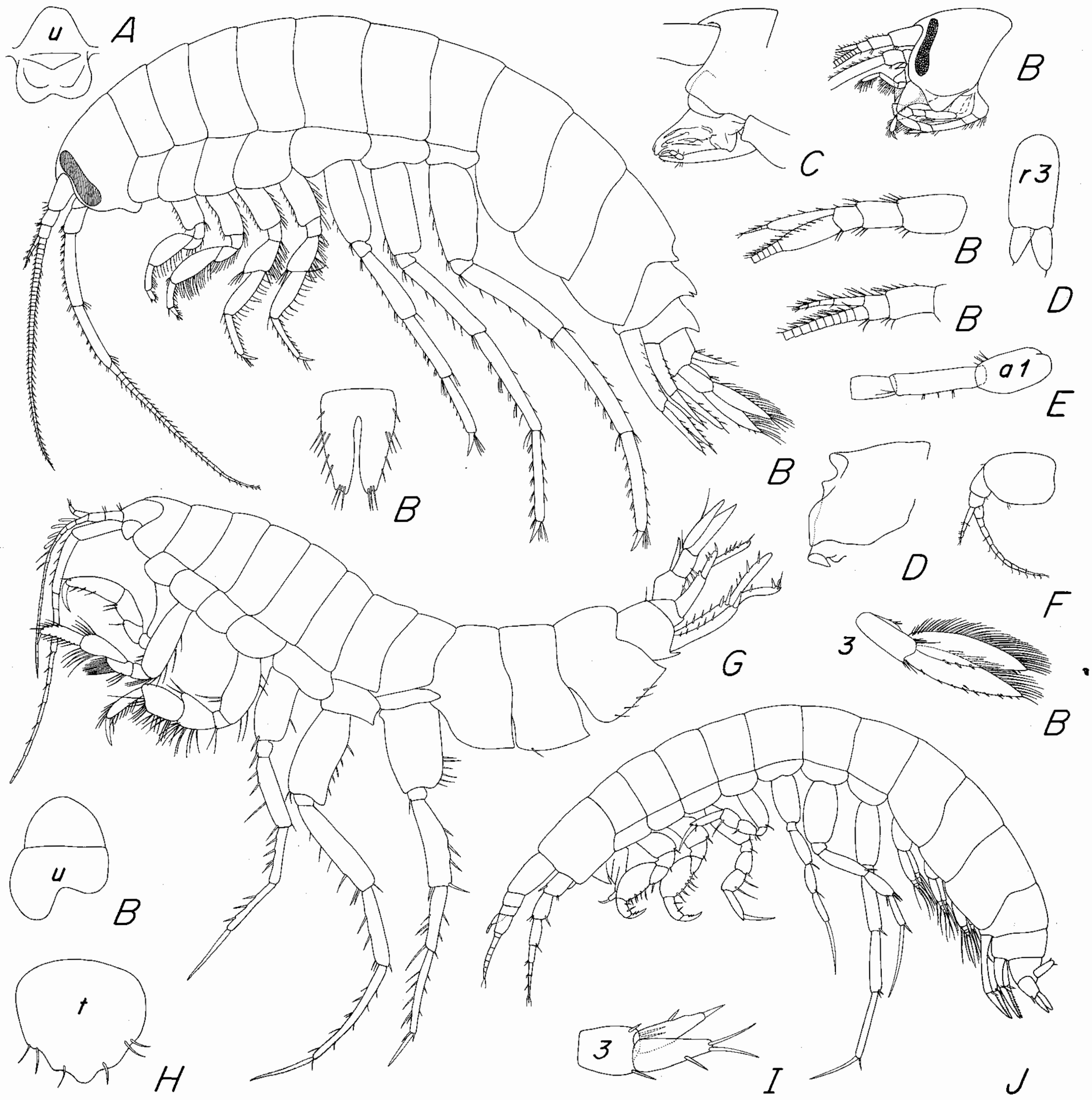


Fig.104. Pardaliscidae. A, *Nicippe tumida*; B, *Pardalisca cuspidata*; C, *Rhynohalicella halona*; D, *Tosilus arroyo*; E, *Pardaliscoides tenellas*; F, *Caleidoscopsis copal*; G, *Halicoides tambiella*; H, *Parpano cebus*; I, *Pardaliscella symmetrica*; J, *Eperopeus abyssicola.*

Epereopus Mills

Figs 103E, 104J

Epereopus Mills, 1967c: 351.–Karaman, 1974a: 10.

Type species. *Epereopus abyssicola* Mills, 1967c, monotypy.

Diagnosis. Rostrum absent. Eyes absent. Ratio of peduncular articles on male antenna 1 = 26:6:5, base of only male primary flagellum inflated with callynophore, article 1 of flagellum longer than article 3 of peduncle in male, article 2 of peduncle short; accessory flagellum present, base conjoint only in male. Mouthparts forming conical bundle below head. Upper lip asymmetrically incised. Mandibles [?asymmetrical, incisor on left unknown], on right moderately toothed, palp fully developed. Inner lobes of lower lip [unknown]. Palp of maxilla 1 not expanded apically. Maxilla 2 well developed, plates equal. Both plates of maxilliped ordinary; palp about 1.5 times as long as medial edge of outer plate. Coxae 1-4 rectangular, alike, even, very short, much broader than long. Gnathopods simple, stout, article 6 of both gnathopods much shorter and narrower than article 5, carpus not lobate; dactyls normally claw-shaped, with 2-3 inner teeth. Pereopods simple. Urosomal teeth absent. Telson short, entire.

Additional characters. Article 2 of mandibular palp especially stout; dactyls of pereopods 5-7 especially long.

Relationship. Differing from *Pardaliscella* in the short, uncleft telson and stout mandibular palp. From *Parpano* in the short propodus and long carpus of the gnathopods, thick mandibular palp and normal uropod 3.

Species. *Epereopus abyssicola* Mills, 1967c (Karaman, 1974a) [307A].

Habitat and distribution. Marine, north-western Atlantic near Bermuda, 2500-4977 m, 1 species.

Halice Boeck

Fig.103D

Halice Boeck, 1871b: 152.–Stebbing, 1906: 228.–Karaman, 1974a: 10.
Synopioides Stebbing, 1888: 999 (*Synopioides macronyx* Stebbing, 1888, monotypy).–Stebbing, 1906: 226.

Type species. *Halice abyssi* Boeck, 1871b, selected by Boeck, 1876.

Diagnosis. Rostrum well developed. Eyes absent. Ratio of peduncular articles on antenna 1 = 23:10:7, base of primary flagellum inflated in male, narrow in female, callynophore in both sexes, article 1 of flagellum almost as long as peduncle, or longer, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip weakly and asymmetrically incised. Mandibles symmetrical, incisor on left scarcely toothed, on right smooth, palp fully developed,but article 3 very short. Inner lobes of lower lip [? coalesced]. Palp of maxilla 1 not apically expanded. Maxilla 2 well developed, plates equal. Inner plates of maxilliped obsolescent, outer plates large; palp about 1.5 times as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, broader than long. Gnathopods simple, slender, articles 5 and 6 of both gnathopods subequal in length, carpus not lobate; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth strong. Telson elongate, deeply cleft.

Additional characters. Well-developed lacinia mobilis usually present on both mandibles, large on left, small on right.

Sexual dimorphism. Base of both flagella of antenna 1 conjoint in both sexes but more exaggerated in male.

Variables. Head occasionally with protuberant forehead as in certain synopiids (*H. macronyx*); base of primary flagellum in female antenna 1 without callynophore (*H. ulcisor*); mandibular palp article 3 elongate, nearly as long as article 2 (*H. shoemakeri*, *H. macronyx*, *H. secunda*), about half as long as article 2 (*H. quarta*, *H. tenella*, *H. subquarta*, *H. aculeata*) or 75% (again *H. tenella*); palp of maxilla 1 apically expanded (*H. quarta*); coxae 1-5 longer than broad, coxa 5 tapering (*H. cocalito*), coxae 1-7 very diverse (*H. macronyx*); article 6 of gnathopod 1 much longer than article 5 (*H. macronyx*); articles 4-5 of pereopods 3-4 expanded (*H. shoemakeri*, *H. cocalito*); article 4 only slightly expanded (*H. aculeata*); dactyls of pereopods 5-7 very elongate (*H. cocalito*); pereopod 6 longer than pereopod 7 (*H. sublittoralis*); telson cleft only five eighths (*H. cocalito*) only three eighths or less (*H. shoemakeri*, *H. quarta*, *H. aculeata*, *H. cocalito*), only one third (*H. aculeata*, *H. rotundata*).

Relationship. More or less the central or typical pardaliscid, with urosomal teeth, simple gnathopods with unshortened carpus, elongate deeply cleft telson and elongate maxilla 2.
See *Arculfia*.

Species. See Birstein & Vinogradov (1962a, key), Karaman (1974a); *H. abyssi* Boeck, 1871b (= *H. grandicornis* Boeck, 1871b, 1876) (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) (Karaman & Schiecke, 1973) (Ledoyer, 1977) [354 + BA]; *H. aculeata* Chevreux, 1912a, 1935 (Birstein & Vinogradov, 1958, 1960, 1964) [420BA]; *H. cocalito* J.L. Barnard, 1964a [501B]; *H. macronyx* (Stebbing, 1888) (Schellenberg, 1926c) (K.H. Barnard, 1930) (Pirlot, 1934) (Birstein & Vinogradov, 1962b, 1964)

(Thurston, 1976a) (Ledoyer, 1986) [420BA]; *H. malygini* (Gurjanova, 1936c, 1951) [207B]; *H. profundi* K.H. Barnard, 1932 [875 + B]; *H. quarta* Birstein & Vinogradov, 1955, 1958, 1960 [570A]; *H. rotundata* Birstein & Vinogradov, 1960, 1963 [570BA]; *H. secunda* (Stebbing, 1888, 1906) (= *H. macronyx* identification of Schellenberg, 1926a) (Schellenberg, 1926c) (Birstein & Vinogradov, 1958, 1960, 1962b,?1963, 1964) [600BA]; *H. shoemakeri* Birstein & Vinogradov, 1955, 1958, 1960 (= *H. aculeata* identification of Shoemaker, 1945a) [280BA]; *H. subquarta* Birstein & Vinogradov, 1960 (Kamenskaya, 1981a) [570A]; *H. sublittoralis* Lowry, 1979 [776]; *H. tenella* Birstein & Vinogradov, 1962b, 1964 [805A + 612BA]; *H. ulcisor* J.L. Barnard, 1971b [225B]; species, Kamenskaya, 1981a [325A].

Habitat and distribution. Marine, cosmopolitan, largely bathyal-abyssal, cold water, probably mostly bathypelagic and epibenthic, minimum depths in vertical trawls poorly delineated, probably also hadal in trenches, deepest confirmed minimum depth probably 4200 m, often caught in tows less than 1000 m, also surface tows at night, 0-4200 (10,500) m, 14 species.

Halicella Schellenberg

Fig.103F

Halicella Schellenberg, 1926a: 334.–Karaman, 1974a: 19.

Type species. *Halicella parasitica* Schellenberg, 1926a, monotypy.

Diagnosis. Rostrum well developed. Eyes absent. Ratio of peduncular articles on antenna 1 = 15:7:6, base of primary flagellum narrow with callynophore, article 1 of flagellum scarcely longer than article 3 of peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts forming conical bundle below head. Upper lip beaked and pointed. Mandibles symmetrical, incisors smooth, palp fully developed, but article 3 short. Inner lobes of lower lip absent, outer lobes long and slender. Palp of maxilla 1 not expanded apically. Maxilla 2 very slender, plates diverse. Inner plates of maxilliped absent, outer plates medium; palp more than 1.5 times as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, broader than long. Gnathopods simple, slender, article 6 of both gnathopods much longer than article 5, carpus not lobate; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal tooth strong. Telson elongate, deeply cleft.

Relationship. Characterised by the piercing and sucking mouthparts arranged in a cone.
See *Rhynohalicella*.

Species. *Halicella parasitica* Schellenberg, 1926a (Karaman, 1974a) [881B].

Habitat and distribution. Marine, Antarctica, *Gauss* station, 385 m, 1 species.

Halicoides Walker

Fig.104G

Halicoides Walker, 1896b: 344.–Stebbing, 1906: 221.–Thurston, 1976b: 148.
Pardisynopia J.L. Barnard, 1961a: 78 (*Pardisynopia tambiella* J.L. Barnard, 1961a, original designation).

Type species. *Halicoides anomala* Walker, 1896b, monotypy.

Diagnosis. Rostrum well developed. Eyes absent. Ratio of peduncular articles on antenna 1 = 13:5:4, base of primary flagellum inflated with callynophore in male only, article 1 of flagellum much longer than article 3 of peduncle. Article 2 of peduncle short; accessory flagellum present (aberrant in holotype of type species, see Thurston, 1976b). Mouthparts forming quadrate bundle below head. Upper lip rounded below. Mandibles symmetrical, incisors smooth, palp fully developed, article 3 about one third as long as 2. Inner lobes of lower lip coalesced, with raphus. Palp of maxilla 1 not expanded apically. Maxilla 2 well developed, plates equal. Inner plates of maxilliped small, outer plates medium; palp more than 1.5 times as long as medial edge of outer plate. Coxae 1-4 subquadrate, alike, even, broader than long. Gnathopods simple, slender, article 6 of gnathopod 1 much longer than article 5, equal on gnathopod 2, carpus not lobate; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth absent. Telson elongate, deeply cleft.

Additional characters. Urosomite 2 with long seta; apex of outer plate of maxilliped subtruncate, with 2 prominent spines disjunctly stouter than medial spines (versus more even spination size sweep around apex from medial margin).

Sexual dimorphism. Base of primary flagellum on male antenna 1 with callynophore, articulated in females.

Variables. Rostrum small (*H. anacantha*); upper lip strongly emarginate (*H. lolo*, *H. walkeri*); right lacinia mobilis broad (*H. lolo*), bifid (*H. tertia*), narrow and ragged (*H. discoveryi*); one mandible well toothed (*H. anomala*), palp article 3 half as long as article 2 (*H. walkeri*); inner plate of maxilliped obsolescent (*H. synopiae*); coxae 3-4 enlarged (*H. indica*), coxa 5 enlarged (*H. synopiae*); gnathopod 1 very thin and almost without setae (*H. indica*), slightly more setose (*H. indica*, *H. discoveryi*, etc.); articles 4-5 of pereopods 3-4 only moderately expanded (*H. anacantha*, *H. lolo*, *H. nana*); articles 5-6 of pereopod 5 and article 4 of pereopods 6-7 longer than article 2 (*H. anomala*), not so (*H.

discoveryi); epimeron 1 with tooth (*H. walkeri*); urosomites 1-2 with vestigial denticles (*H. tertia*); telsonic apices bifid (*H. synopiae*).

Relationship. Differing from *Halice* in the absence of urosomal teeth and the presence of a long seta on urosomite 2. *Halicoides* has articles 4-5 of pereopods 3-4 broadened more than most species of *Halice*. From *Pardaliscella* and *Pardaliscopsis* in the large rostrum, strong callynophore of primary flagellum on male antenna 1 (weakly in *Pardaliscella*), and expanded articles 4-5 of pereopods 3-4.

Species. See Karaman (1974a); ?*H. anacantha* (K.H. Barnard, 1926) (Griffiths, 1974a, 1975) [743 + B]; ?*H. anomala* Walker, 1896b (Chevreux & Fage, 1925) [753]; *H. discoveryi* Thurston, 1976a,b [401B]; *H. indica* Birstein & Vinogradov, 1964 [638 + B]; *H. lolo* (J.L. Barnard, 1971b) [225B]; *H. nana* Birstein & Vinogradov, 1960 [322B]; *H. synopiae* J.L. Barnard, 1962d, 1964b, 1966a,b, 1967a [370 + B]; *H. tambiella* (J.L. Barnard, 1961a) [715B]; *H. tertia* (Stephensen, 1931a) [212B]; *H. walkeri* (Ledoyer, 1973c) (Karaman & Schiecke, 1973) (Ledoyer, 1977) [340 + B].

Habitat and distribution. Marine, cosmopolitan, probably more benthically oriented than *Halice*, more dominantly shallower, 31-1720 m, 10 species.

Necochea Barnard

Necochea J.L. Barnard, 1962d: 62.–Karaman, 1974a: 20.

Type species. *Necochea pardella* J.L. Barnard, 1962d, original designation.

Diagnosis. Rostrum well developed. Eyes absent. Ratio of peduncular articles on antenna 1 = 16:8:8, base of primary flagellum narrow, articulate, article 1 of flagellum shorter than article 3 of peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip [?asymmetrically incised or rounded below]. Mandibles asymmetrical, incisor on left weakly toothed, on right strongly toothed, palp fully developed. Inner lobes of lower lip [?separate. coalesced]. Palp of maxilla 1 expanded apically. Maxilla 2 obsolescent. Inner plates of maxilliped obsolescent, outer plates medium to large; palp more than 1.5 times as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, longer than broad, Gnathopods simple, stout, article 6 of both gnathopods 1-2 much shorter than swollen article 5, carpus not lobate; dactyls normally claw-shaped, with 3 inner setae. Pereopods simple. Urosomal teeth weak. Telson elongate, deeply cleft.

Additional characters. Coxa 5 twice surface area of coxa 4, coxa 6 large and fully covering coxa 7.

Relationship. Characterised by the very large coxae 5-6 and obsolescent maxilla 2.

Species. *Necochea pardella* J.L. Barnard, 1962d (Karaman, 1974a) [801A].

Habitat and distribution. Marine, Antarctica, East Scotia Basin, 3725 m, 1 species.

Nicippe Bruzelius

Figs 103A, 104A

Nicippe Bruzelius, 1859: 99.–Stebbing, 1906: 225.–Karaman, 1974a: 21.–Lincoln, 1979a: 394.

Type species. *Nicippe tumida* Bruzelius, 1859, monotypy, see Sars, 1895.

Diagnosis. Rostrum small. Eyes present, weak pigment only. Ratio of peduncular articles on antenna 1 = 12:9:3, base of primary flagellum narrow, articulate, article 1 of flagellum scarcely longer than article 3 of peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip almost symmetrically incised. Mandibles asymmetrical, incisor on left weakly toothed, on right strongly toothed, palp fully developed. Inner lobes of lower lip coalesced. Palp of maxilla 1 expanded apically. Maxilla 2 well developed, thin, plates equal. Both plates of maxilliped small; palp almost 3 times as long as medial edge of outer plate. Coxae 1-4 subquadrate, alike, even, broader than long. Gnathopods weakly subchelate, stout, article 6 of both gnathopods longer than article 5, carpus with long, broad, lobe; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth moderate to weak. Telson elongate, deeply cleft.

Variable. Article 2 of pereopods 5-7 with several long posterior setae (*N. unidentata*).

Relationship. Characterised by large, subchelate gnathopods with expanded propodus and carpus, strong urosomal teeth, and elongate deeply cleft telson.

Species. See Karaman (1974a); *N. tumida* Bruzelius, 1859 (Sars, 1895) (Enequist, 1950) (Gurjanova, 1951) (J.L. Barnard, 1959f) (Ledoyer, 1973c) (Lincoln, 1979a) [200 + B]; *N. unidentata* K.H. Barnard, 1932 [872 + B].

Habitat and distribution. Marine, Arctic-boreal and Antarctic Palmer Archipelago, benthic, 35-1398 m, 2 species.

Parahalice Birstein & Vinogradov

Fig.103J

Parahalice Birstein & Vinogradov, 1962a: 253.–Karaman, 1974a: 21.

Type species. *Parahalice mirabilis* Birstein & Vinogradov, 1962a, original designation.

Diagnosis. Rostrum well developed. Eyes present as pigment only. Ratio of peduncular articles on antenna 1 = 20:11:11, base of primary flagellum with callynophore, article 1 of flagellum much longer than peduncle, article 2 of peduncle short; accessory flagellum present, conjoint. Mouthparts forming [?quadrate] bundle below head. Upper lip [?grossly and asymmetrically incised]. Mandibles symmetrical, incisor on both sides smooth, palp absent. Inner lobes of lower lip [?separate. coalesced]. Palp of maxilla 1 expanded apically. Maxilla 2 poorly developed, plates equal. Inner plates of maxilliped obsolescent, outer plates medium; palp 3 times as long as medial edge of outer plate. Coxae 1-4 quadrate-ovate, alike, even, broader than long. Gnathopods simple, slender, article 6 of both gnathopods about as long as article 5, carpus not lobate; dactyls normally claw-shaped, without inner teeth. Pereopods 3-7 prehensile. Urosomal teeth weak, keel-like. Telson not elongate, poorly cleft.

Additional characters. Outer plate of maxilla 1 with spines very thin and widely separated.

Relationship. Characterised by short partly cleft telson, thus differing from *Tosilus* in the ordinary uropod 3, equality of articles 5-6 on the gnathopods, presence of mandibular palp and prehensile pereopods.

Species. *Parahalice mirabilis* Birstein & Vinogradov, 1962a, 1964 (Karaman, 1974a) [616?A].

Habitat and distribution. Marine, southern Indian Ocean near Rodriguez, tows of 0-2700, 0-3300 m, 1 species.

Pardalisca Krøyer

Figs 103C, 104B

Pardalisca Krøyer, 1842: 153.–Stebbing, 1906: 221.–Karaman, 1974a: 24.

Type species. *Pardalisca cuspidata* Krøyer, 1842, monotypy.

Diagnosis. Rostrum small. Eyes present or absent. Ratio of peduncular articles on antenna 1 = 11:8:3 down to 11:5:3, base of primary flagellum in female narrow, articulate, in male callynophore present, article 1 of flagellum much longer than article 3 of peduncle in male, shorter in female, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip grossly and asymmetrically incised below. Mandibles asymmetrical, incisor on left weakly toothed, on right strongly toothed, palp fully developed. Inner lobes of lower lip separate. Palp of maxilla 1 expanded apically. Maxilla 2 well developed, thin, plates equal. Inner plates of maxilliped small to obsolescent, outer plates large; palp just as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, scarcely broader than long. Gnathopods simple, slender, but carpus stout, not lobate, article 6 of both gnathopods much shorter and thinner than article 5; dactyls either stubby or claw-shaped, with many inner teeth. Pereopods simple. Urosomal teeth strong. Telson elongate, deeply cleft.

Sexual dimorphism. Base of primary flagellum with callynophore in male, accessory flagella fused in male.

Variables. Outer plate of maxilliped short, distally truncate (*P. magellanica*); dactyls of gnathopods either unguiform or short and swollen.

Relationship. The basic member of the subgroup characterised by dominant carpus and small propodus on the gnathopods.

Differing from *Pardaliscoides* in the serrate dactyls of the gnathopods and short article 2 of antenna 1. From *Princaxelia* in the similar length of palp on maxilliped and length of medial edge on outer plate.

Species. See Karaman (1974a); Stephensen (1931a); *P. abyssi* Boeck, 1871b (= *P. cuspidata* identification of Buchholz, 1874) (Stebbing, 1888) (Sars, 1895) (Chevreux, 1935) (Gurjanova, 1951) [216 + B]; *P. abyssoides* K.H. Barnard, 1932 [872]; *P. australiensis* K.H. Barnard, 1931b, 1932 [633]; *P. brachydactyla* Bellan-Santini, 1984 [302A]; *P. cuspidata* Krøyer, 1842 (Sars, 1895) (Gurjanova, 1951) (Bushueva, 1977) [216 + B]; *P. magellanica* Schellenberg, 1931 [864]; *P. marionis* Stebbing, 1888, 1906 [799]; *P. mediterranea* Bellan-Santini, 1984 [302BA]; *P. tenuipes* Sars, 1895 (Stephensen, 1931a) (Gurjanova, 1951) (J.L. Barnard, 1962d) [200 + B]; species, J.L. Barnard, 1967a [309B]; species, Ledoyer, 1977 [348].

Habitat and distribution. Marine, cosmopolitan, warm and cold water, largely benthic, 30-1748 m, 9 species.

Pardaliscella Sars

Figs 103B, 104I

Pardaliscella Sars, 1895: 407.–Stebbing, 1906: 227.–Karaman, 1974a: 28.

Type species. *Pardalisca boeckii* Malm, 1871, monotypy.

Diagnosis. Rostrum small. Eyes absent. Ratio of peduncular articles on antenna 1 = 24:14:7, base of primary flagellum narrow, with weak callynophore, article 1 of flagellum longer than article 3 of peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip even or asymmetrically incised. Mandibles asymmetrical, incisor on left smooth, weakly toothed, on right strongly toothed, palp fully developed. Inner lobes of lower lip coalesced. Palp of maxilla 1 apically expanded. Maxilla 2 well developed, thin, plates equal. Inner plates of maxilliped small, outer plates medium; palp about 1.5 times as long as medial edge of outer plate. Coxae 1-4 subquadrate, even, broader than long. Gnathopods simple, moderately stout, article 6 of both gnathopods about as long as 5, carpus not lobate; dactyls normally claw-shaped, with 1-2 inner teeth. Pereopods simple. Urosomal teeth absent. Telson scarcely elongate, partly cleft.

Variables. Article 3 of mandibular palp with inner setae (*P. symmetrica*); outer plate of maxilliped rather broad (*P. inermis*, possibly = *Pardaliscopsis*); dactyls of gnathopods lacking tooth (*P. inermis*); urosomite 1 with weak tooth (*P. symmetrica*); telson cleft almost to base (*P. symmetrica*).

Relationship. A very plain genus lacking urosomal teeth, with unmodified antennae, basic weak gnathopods and long well-cleft telson.

Differing from *Halicoides* in unmodified antennae, small rostrum, well-toothed right mandible and apically expanded palp of maxilla 1.

See *Pardaliscopsis*.

Taxonomy. Anomaly. *P. symmetrica* is somewhat close to *Parahalice* and disjunct from *Pardaliscella* in terms of shorter than normal telson and presence of weak urosomal tooth; however, lack of prehensility on pereopods and presence of dactylar teeth on the gnathopods requires retention in *Pardaliscella*.

Removal. *Urothoe simplignathia* J.L. Barnard, 1962d, to *Caleidoscopsis*.

Species. See G.S. Karaman (1974a); ?*P. axeli* Stebbing, 1906 (Stephensen, 1926, 1928, 1929b) (validity improbable) [238]; *P. boeckii* (Malm, 1871) (Sars, 1895) (Stephensen, 1931a) (Karaman & Schiecke, 1973) [355 + B]; ?*P. inermis* Ledoyer, 1986 [618A]; *P. lavrovi* Gurjanova, 1934a, 1936b, 1951) [292]; *P. symmetrica* J.L. Barnard, 1959f, 1966a, 1971b [270 + B]; ?*P. yaquina* J.L. Barnard, 1971b [225B].

Habitat and distribution. Marine, Atlantic and eastern Pacific Oceans, cold water, 27-3015 m (?3716 m, = *P. inermis*), 6 species.

Pardaliscoides Stebbing

Fig.104E

Pardaliscoides Stebbing, 1888: 1725.–Stebbing, 1906: 224.–Karaman, 1974a: 29.

Type species. *Pardaliscoides tenellus* Stebbing, 1888, monotypy, see Stebbing, 1897.

Diagnosis. Rostrum well developed. Eyes absent. Ratio of peduncular articles on antenna 1 = 17:20:9, base of primary flagellum narrow, callynophore present, article 1 of flagellum scarcely longer than article 3 of peduncle, article 2 of peduncle elongate; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip [?grossly and asymmetrically incised, ?rounded below]. Mandibles symmetrical, incisors moderately toothed, palp fully developed. Inner lobes of lower lip [?separate. ?coalesced. ?with raphus]. Palp of maxilla 1 not expanded apically. Maxilla 2 well developed, plates equal. Both plates of maxilliped small; palp more than 3 times as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, broader than long. Gnathopods simple, gnathopod 1 slender, gnathopod 2 stouter, article 6 of both gnathopods much shorter than article 5, carpus on gnathopod 2 with broad, shallow lobe; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth vestigial. Telson elongate, deeply cleft.

Variables. Inner plate of maxilla 2 poorly developed (*P. fictotelson*); rami of uropod 3 short (*P. fictotelson*); telson poorly cleft, basally united, gaping (*P. fictotelson*), cleft 40% (*P. stebbingi*).

Relationship. Differing from *Pardalisca* in the elongate article 2 of antenna 1 and unserrate dactyls of the gnathopods.

Species. See G.S. Karaman (1974a); ?*P. fictotelson* J.L. Barnard, 1966a [310B]; *P. longicaudatus* Dahl, 1959 [570A]; *P. stebbingi* Ledoyer, 1970 [302B]; *P. tenellus* Stebbing, 1888, 1897, 1906 (not identification of Stephensen, 1931a, see *Princaxelia*) (?Ledoyer, 1977) [707A + ?302B].

Habitat and distribution. Marine, Pacific and Mediterranean, deep cold water, 218-6180 m, 4 species.

Pardaliscopsis Chevreux

Pardaliscopsis Chevreux, 1911a: 7.–Karaman, 1974a: 31

Type species. *Pardaliscopsis tenuipalpa* Chevreux, 1911a, original designation.

Diagnosis. Rostrum small. Eyes absent. Ratio of peduncular articles on antenna 1 = 23:17:11, base of primary flagellum narrow, articulate, article 1 of flagellum shorter than article 3 of peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip grossly and asymmetrically incised. Mandibles asymmetrical, incisor on left weakly toothed, on right strongly toothed, palp fully developed. Inner lobes of lower lip coalesced. Palp of maxilla 1 apically expanded. Maxilla 2 well developed, plates equal. Both plates of maxilliped ordinary; though outer plate broad, palp about as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, broader than long. Gnathopods simple, medium-stout, article 6 of both gnathopods subequal to article 5, carpus not lobate; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth weak. Telson not elongate, deeply cleft.

Additional character. Lobes of telson apically notched.

Relationship. Differing from *Pardaliscella* in the broader outer plate of the maxilliped, notched apices of the telsonic lobes, lack of any serrations on the dactyls of the gnathopods (but some *Pardaliscella* species are weak in this regard), and the strongly asymmetrical lobes of the upper lip.

Species. *Pardaliscopsis tenuipalpa* Chevreux, 1911a, 1935 (Karaman, 1974a) [221A].

Habitat and distribution. Marine, north-eastern Atlantic, Gulf of Gascogne, 4380 m, 1 species.

Parpano J.L. Barnard

Fig.104H

Parpano J.L. Barnard, 1964a: 23.–Karaman, 1974a: 31.

Type species. *Parpano cebus* J.L. Barnard, 1964a, original designation.

Diagnosis. Rostrum absent. Eyes absent. Ratio of peduncular articles on antenna 1 = 8:6:3, base of primary flagellum with callynophore in male, narrow and articulate in female, article 1 of flagellum in female scarcely longer than article 3 of peduncle, almost as long as peduncle in male, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip weakly and symmetrically incised. Mandibles asymmetrical, incisor on left weakly toothed, on right strongly toothed, palp fully developed. Inner lobes of lower lip coalesced. Palp of maxilla 1 expanded apically. Maxilla 2 well developed, plates diverse. Both plates of maxilliped small, palp more than 2 times as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, longer than broad. Gnathopods simple, slender, article 6 of both gnathopods much longer than article 5, carpus with narrow, shallow lobe; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth strong in male, absent in female. Telson short, entire.

Additional characters. Uropod 3 very small, armaments weak, outer ramus shortened.

Relationship. Like *Tosilus* but telson uncleft.

Species. See Karaman (1974a); *P. cebus* J.L. Barnard, 1964a [406A]; ?*P. composturus* J.L. Barnard, 1964a (? = *P. cebus*) [404A].

Habitat and distribution. Marine, Caribbean trenches, 2868-5451 m, 2 species.

Princaxelia Dahl

Fig.103H

Princaxelia Dahl, 1959: 228.–Karaman, 1974a: 32.

Type species. *Princaxelia stephenseni* Dahl, 1959, original designation.

Diagnosis. Rostrum small. Eyes present. Ratio of peduncular articles on antenna 1 = 9:5:2, base of primary flagellum with callynophore in male, article 1 of flagellum much longer than article 3 of peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip weakly and asymmetrically incised. Mandibles slightly asymmetrical, incisor on left almost smooth, on right weakly toothed, palp fully developed. Inner lobes of lower lip coalesced. Palp of maxilla 1 expanded apically. Maxilla 2 well developed, plates equal. Inner plates of maxilliped small, outer plates large; palp more than 3 times as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, broader than long. Gnathopods simple, stout, article 6 of both gnathopods much shorter and narrower than article 5, carpus with broad, shallow lobe; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth strong. Telson elongate, deeply cleft.

Sexual dimorphism. Antenna 1, primary flagellum with callynophore, accessory flagella conjoint basally in male, articulate in female.

Relationship. Differing from *Pardalisca* in the elongate palp of the maxilliped, and lack of teeth on the dactyls of the gnathopods.

Species. See Karaman (1974a); *P. abyssalis* Dahl, 1959

(Kamenskaya, 1981a) [570A]; *P. magna* Kamenskaya, 1977b [531A]; *P. stephenseni* Dahl, 1959 (= *P. tenellus* identification of Stephensen, 1931a) [209B].

Habitat and distribution. Marine, Atlantic-Pacific, deep water, especially trenches, 1505-8210 (8300) m, 3 species.

Rhynohalicella Karaman

Figs 103G, 104C

Rhynohalicella Karaman, 1974a: 33.

Type species. *Halicella halona* J.L. Barnard, 1971b, original designation.

Diagnosis. Rostrum well developed. Eyes absent. Ratio of peduncular articles on antenna 1 = 30:10:9, base of primary flagellum with callynophore, article 1 of flagellum much longer than article 3 of peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts styliform, forming conical bundle below head. Upper lip evenly incised. Mandibles symmetrical, incisors smooth, palp represented by tubercle with 2 setae. Inner lobes of lower lip separate. Palp of maxilla 1 not expanded apically. Maxilla 2 represented by single elongate plate. Inner plates of maxilliped absent; outer plates large; palp only as long as medial edge of outer plate. Coxae 1-4 softly subtriangular or trapezoidal, weakly diverse, broader than long. Gnathopods simple, of medium stoutness, article 6 of gnathopod 1 much longer than article 5, carpus with short, broad, shallow lobe; gnathopod 2 simple, article 5 elongate and more broadly lobate; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth strong. Telson elongate, deeply cleft.

Additional characters. Outer plate of maxilla 1 with only 5 spines; dactyl of maxilliped bluntly clavate.

Relationship. Differing from *Halicella* in the vestigial palp of the mandible, and shorter palp on the maxilliped.

Species. *Rhynohalicella halona* J.L. Barnard, 1971b (Karaman, 1974a) [268].

Habitat and distribution. Marine, north-eastern Pacific, off Columbia River, 200 m, 1 species.

Spelaeonicippe Stock & Vermeulen

Spelaeonicippe Stock & Vermeulen, 1982: 5.

Type species. *Spelaeonicippe provo* Stock & Vermeulen, 1982, original designation.

Diagnosis. Rostrum absent. Eyes absent. Ratio of peduncular articles on antenna 1 = 17:14:5, base of primary flagellum narrow, articulate, article 1 of flagellum scarcely longer than article 3 of peduncle, article 2 of peduncle as long as article 1; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip rounded below. Mandibles symmetrical, incisors almost smooth, palp fully developed. Inner lobes of lower lip coalesced. Palp of maxilla 1 slightly expanded apically. Maxilla 2 well developed, plates equal. Both plates of maxilliped ordinary; palp more than 2.5 times as long as medial edge of outer plate. Coxae 1-4 quadrate, alike, even, broader than long. Gnathopods weakly subchelate, stout, article 6 of both gnathopods much longer than article 5, carpus with broad, shallow lobe; dactyls normally claw-shaped, without inner teeth. Pereopods simple. Urosomal teeth absent. Telson elongate, deeply cleft.

Additional characters. Cephalic lobes rounded, plates of maxilliped 'broad', outer spinose (versus setose), palp of maxilla 1 with inner spines (or apex bevelled) (all versus *Nicippe*).

Relationship. Differing from *Nicippe* in the blunt cephalic lobes, shorter antenna 1, basally articulate flagella on male antenna 1, lack of dorsal teeth on the urosome; and see 'Additional characters'.
See *Parpano*.

Species. *Spelaeonicippe buchi* (Andres, 1975a) (Wilkens & Parzefall, 1974) [442Z]; *S. provo* Stock & Vermeulen, 1982 [481Z].

Habitat and distribution. Marine, sea grottos in Canary Islands, Turks and Caicos Islands, 2 species.

Tosilus J.L. Barnard

Figs 103K, 104D, 123M

Tosilus J.L. Barnard, 1966a: 81.–Karaman, 1974a: 33.

Type species. *Tosilus arroyo* J.L. Barnard, 1966a, original designation.

Diagnosis. Rostrum small. Eyes absent. Ratio of peduncular articles on antenna 1 = 28:18:10, base of primary flagellum narrow, articulate, article 1 of flagellum scarcely longer than article 3 of peduncle, article 2 of peduncle short; accessory flagellum present. Mouthparts forming quadrate bundle below head. Upper lip weakly and asymmetrically incised below. Mandibles asymmetrical, incisor on left weakly toothed, on right strongly toothed, palp fully developed. Inner lobes of lower lip coalesced. Palp of maxilla 1 expanded apically. Maxilla 2 well developed, plates equal. Inner plates of maxilliped obsolescent, outer plates small; palp [?more than 2 times as long as medial edge of outer plate]. Coxae 1-4 quadrate, alike, even, longer than broad. Gnathopods simple, slender, article 6 of both gnathopods much longer than very short article 5, carpus not lobate; dactyls normally claw-shaped, without teeth. Pereopods simple. Urosomal teeth absent. Telson short, weakly cleft.

Additional characters. Uropod 3 very small, almost embryonic, rami short and stubby.

Relationship. Differing from *Parpano* in the cleft telson. Distinguished from other genera by the small uropod 3.

Species. *Tosilus arroyo* J.L. Barnard, 1966a, 1967a (Karaman, 1974a) [309B-310B].

Habitat and distribution. Marine, southern California and Baja California, 976-1095 m, 1 species.

PERTHIIDAE Williams & Barnard, 1988

[see Barnard & Barnard (1983)]

PHLIANTIDAE Stebbing, 1899a

Diagnosis. Head very small; antenna 2 usually fused basally into head; urosomites often more or less coalesced; pleon small and flexed below body; thorax depressed, calcified, very broad, rugose; anterior coxae more or less splayed, much larger than posterior coxae. Eyes small, ommatidial. Antennae very short. Accessory flagellum absent. Mandible lacking palp, molar degraded, often styliform; maxillae feeble. Gnathopods simple or scarcely subchelate. Some peduncles of pleopods expanded. Uropod 3 with 0-1 ramus. Telson entire, laminar or appearing weakly fleshy, ovate.

See Dexaminidae, Ceinidae, Plioplateidae, Temnophliantidae, Eophliantidae, Kuriidae, Colomastigidae, Pagetinidae and Iphimediidae.

Description. Head often with broad, flat rostrum. Antennal flagella sparsely articulate. Mandibular rakers few or absent. Inner lobes of lower lip absent, fused into one small piece or otherwise weak. Inner plate of maxilla 1 vestigial, spines on outer plate usually 6 or fewer. Maxilla 2 poorly armed. Plates of maxilliped usually ordinary, palp robust, with 3-4 articles. Gnathopods like pereopods 3-4, article 3 elongate, propodus elongate, simple or rarely with prehensile adaptations. Article 2 of pereopod 5 expanded, of pereopod 6 expanded or not, of pereopod 7 usually much less expanded than on pereopod 5, occasionally very slender; article 4 of pereopods 5-7 expanded. Dorsal rugosity pattern usually with double transverse ridge or hump on pereonite 1, rugosity absent on pleonite 3 and urosomites. Peduncle of pleopod 1 usually unexpanded, that of pleopods 2-3 expanded and lobate medially, rami usually subequal on pleopods 1-2, variable on pleopod 3, inner of pleopod 3 often short or vestigial. Uropod 1 ordinary, uropod 2 occasionally with only 1 ramus (females); uropod 3 extremely small, hidden by telson or scarcely emergent, with or without small ramus. Brood plates broad, usually with curl-tipped setae.

Relationship. The Dexaminidae (Prophliantinae) have biramous third uropods, a cleft telson and often have a reduced flagellum on antenna 2.

The Plioplateidae are more apomorphic in their elongate flagella on the antennae, the long thin pleopods with thin peduncles and equal rami, the giant mandibular molar, well-developed inner lobes on the lower lip, thin palp of the maxilliped with elongate article 1, the subchelate gnathopods lacking giant setae and the cowl-like cleft telson.

The Ceinidae are even more advanced than either Phliantidae or Plioplateidae because the coxae are not splayed, the body and head are not depressed, and the body, coxae or antennae lack any complex cuspidation.

The Temnophliantidae have depressed louse-like bodies.

The Eophliantidae and Colomastigidae have cylindrioid bodies with small coxae and no ornamentation. The Kuriidae have fused urosomites.

The Pagetinidae have mandibular palps, vestigial inner plates of the maxilliped, and a conspicuous, 3-articulate uropod 3.

The Iphimediidae have normal biramous uropod 3 and a mandibular palp.

Key 1 to Genera of Phliantidae

1. Article 2 of pereopod 7 ovate .... *Iphiplateia*

—— Article 2 of pereopod 7 quadrate 2

2. Article 2 of pereopod 6 quadrate .... *Pariphinotus* (= *Heterophlias*)

—— Article 2 of pereopod 6 ovate 3

3. Inner ramus of pleopod 3 greatly shortened 4

—— Inner ramus of pleopod 3 about as long as outer ramus 5

4. Pereopods simple, body very tall .... *Quasimodia*

—— Pereopods prehensile, body very flat .... *Gabophlias*

5. Peduncles of all pleopods strongly produced medially, molar stubby, with nail .... *Iphinotus*

—— Peduncle of pleopod 1 unproduced, of pleopod 2 weakly produced, of pleopod 3 strongly produced, molar spike-like .... *Pereionotus* (= *Palinnotus*) (? = *Phlias*)

Key 2 to Genera of Phliantidae

1. Gnathopods and pereopods weakly prehensile .... *Gabophlias*

—— Gnathopods and pereopods not prehensile 2

2. Inner ramus of pleopod 3 subequal to outer ramus 3

—— Inner ramus of pleopod 3 half or less as long as outer ramus 5

3. Uropod 3 with ramus, (palp of maxilliped with 3, rarely 4, articles) .... *Iphinotus*

—— Uropod 3 lacking ramus, (palp of maxilliped with 3 articles) 4

4. Palp of maxilla 1 present, plates of maxilla 2 separate .... *Phlias* (=*Palinnotus*)

—— Palp of maxilla 1 absent, plates of maxilla 2 coalesced .... *Phlias*, *Pereionotus*

5. Inner ramus of pleopod 3 half as long as outer ramus .... *Pariphinotus* (= *Heterophlias*)

—— Inner ramus of pleopod 3 vestigial 6

6. Uropod 3 with ramus .... *Quasimodia*

—— Uropod 3 lacking ramus .... *Iphiplateia*

Gabophlias J.L. Barnard

Fig.105C

Gabophlias J.L. Barnard, 1972b: 288.

Type species. *Gabophlias olono* J.L. Barnard, 1972b, original designation.

Diagnosis. Maxilla 1 lacking palp. Palp of maxilliped 4-articulate. Gnathopods and pereopods weakly prehensile. Article 2 of pereopod 6 ovate, of 7 quadrate. Posterior pleopodal peduncles expanded, inner ramus of pleopod 3 very short. Uropod 3 with 1 ramus. Body flat (versus *Quasimodia*).

Description. Molar stylocylindrioid. Plates of maxilla 2 separate. Article 6 of gnathopods and pereopods excavate posteriorly, with armaments on hump bounding excavation. Coxae strongly splayed. Inner rami of pleopods 1-2 slightly shortened. Inner ramus of uropod 2 slightly shortened. Pereonite 1 with low hump, pereonite 7 and pleonites 1-3 carinate.

Relationship. Like *Quasimodia* in shortened inner ramus of pleopod 3 but unlike all other phliantids in the weakly prehensile gnathopods and pereopods.

Species. *Gabophlias olono* J.L. Barnard, 1972b [780].

Habitat and distribution. Marine, southern Australia, littoral, 1 species.

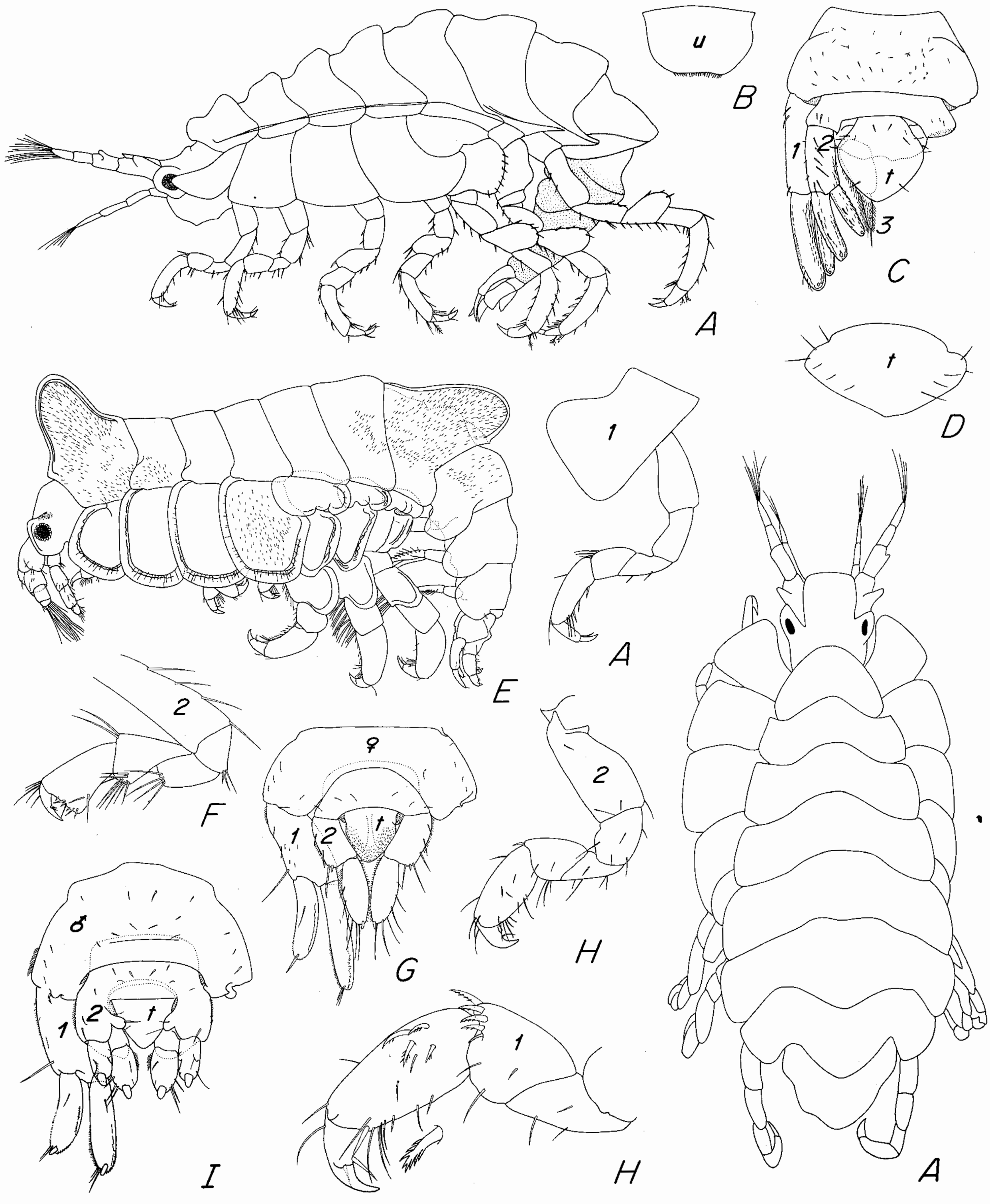


Fig.105. Phliantidae and Ceinidae. A, *Heterophlias seclusus*; B, *Pereionotus testudo*; C, *Gabophlias olono*; D, *Iphinotus typicus*; E, *Quasimodia enna*; F, *Chiltonia mihiwaka* (see also Figs 33, 34); G, *Pereionotus (= Palinnotus) thomsoni*; H, *Quasimodia barnardi*.

Iphinotus Stebbing

Figs 105D, 106E

Iphigenia Thomson, 1882: 237 [homonym, Mollusca].
Iphinotus Stebbing, 1899c: 419 (new name).

Type species. *Iphinotus chiltoni* Stebbing, 1899c, monotypy.

Diagnosis. Maxilla 1 lacking palp. Palp of maxilliped 3 or 4-articulate (correction from earlier). Gnathopods and pereopods simple. Article 2 of pereopod 6 ovate, of 7 quadrate. All pleopodal peduncles expanded, inner ramus of pleopod 3 elongate. Uropod 3 with 1 very small ramus.

Description. Molar stylocylindrioid, stubby, with nail. Plates of maxilla 2 separate. Coxae strongly splayed. Inner rami of all pleopods only slightly shorter than outer rami. Rami of uropods 1-2 extending equally. Pereonite 1 with low hump and weak nipple, pereonites 2-6 also with 1-2 nipples, pleonite 2 with hump.

Variables. Palp of maxilliped 3 or 4-articulate in same species.

Relationship. Differing from *Pereionotus* in the produced peduncle of pleopod 1.

Species. *Iphinotus typica* (Thomson, 1882) (= *I. chiltoni* Stebbing, 1899c) (Stephensen, 1927e) (J.L. Barnard, 1972b) [850].

Habitat and distribution. Marine, New Zealand, Auckland Islands, littoral, 1 species.

Iphiplateia Stebbing

Fig.106C

Iphiplateia Stebbing, 1899c: 414.–Stebbing, 1906: 203.–J.L. Barnard, 1981: 1216.

Type species. *Iphiplateia whiteleggei* Stebbing, 1899c, monotypy.

Diagnosis. Maxilla 1 lacking palp. Palp of maxilliped 4-articulate. Gnathopods and pereopods simple. Article 2 of pereopod 6 quadrate, of pereopod 7 ovate. Posterior pleopodal peduncles expanded, inner ramus of pleopod 3 vestigial. Uropod 3 lacking ramus.

Description. Molar stylocylindrioid. Plates of maxilla 2 separate. Coxae strongly splayed. Inner rami of pleopods 1-2 slightly shortened. Inner rami of uropods 1-2 slightly shortened. Pereonite 7 slightly humped, pleonite 1 projecting backward into prominent tubercle.

Relationship. Differing from other phliantids in the ovate article 2 of pereopod 7.

Species. *Iphiplateia orientalis* Tzvetkova, 1976 [391]; *I. whiteleggei* Stebbing, 1899c, 1910a (J.L. Barnard, 1981) (Ledoyer,1984) [600].

Habitat and distribution. Marine, Pacific Ocean from cold Japan Sea to New South Wales, littoral, 2 species.

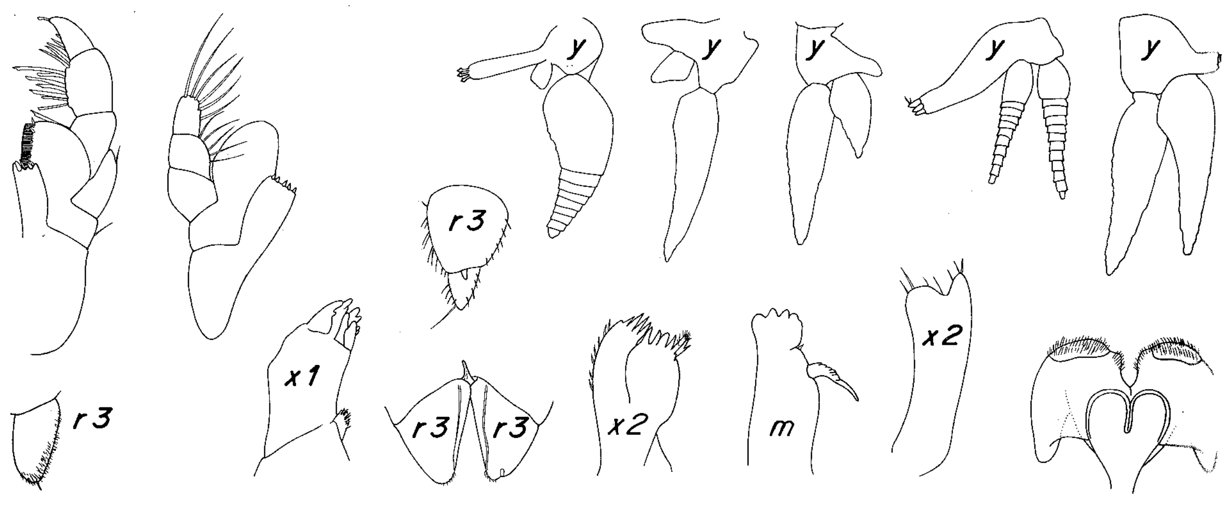


Fig.106. Phliantidae. A, *Heterophlias seclusus*; B, *Pereionotus testudo*; C, *Iphiplateia whiteleggei*; D, *Quasimodia capricornis*; E, *Iphinotus typicus*; F, *Pereionotus (Palinnotus) thomsoni*.

Pariphinotus Kunkel

Figs 105A, 106A

Pariphinotus Kunkel, 1910: 19.
Heterophlias Shoemaker, 1933c: 250 (*Heterophlias seclusus* Shoemaker, 1933, monotypy).

Type species. *Pariphinotus tuckeri* Kunkel, 1910, monotypy.

Diagnosis. Maxilla 1 lacking palp. Palp of maxilliped 4-articulate. Gnathopods and pereopods simple. Article 2 of pereopods 6-7 quadrate. Posterior pleopodal peduncles expanded, inner ramus of pleopod 3 half as long as outer. Uropod 3 without ramus.

Description. Molar stylocylindrioid. Plates of maxilla 2 separate. Coxae strongly splayed. Inner rami of pleopods 1-2 slightly shortened. Inner rami of uropods 1-2 usually shortened. Pereonites 1-7 and pleonites 1-2 with weak dorsal carina.

Relationship. Differing from *Iphiplateia* in the quadrate article 2 of pereopod 7 and then from all other phliantids in the quadrate article 2 of pereopod 6.

Species. *Pariphinotus escabrosus* (J.L. Barnard, 1962b, 1969a,b, 1979b) [370]; *P. galapagoanus* (J.L. Barnard, 1979b) [546]; *P. seclusus* (Shoemaker, 1933c) (Wakabara & Leite, 1977) (Nelson, 1979) [362]; *P. seticoxus* (Ortiz, 1976a,b, 1978) [483]; *P. tuckeri* Kunkel, 1910 [367].

Habitat and distribution. Marine, pan-America, tropics and subtropics, 0-16 m, 5 species (probably 1 superspecies).

Pereionotus Bate & Westwood

Figs 105B,G, 106B,F

Pereionotus Bate & Westwood, 1863: 226.–Chevreux & Fage, 1925: 142.–Rabindranath, 1972b: 33.–Lincoln, 1979a: 142.
Icridium Grube, 1864a: 209; 1864b: 75 (*Icridium fuscum* Grube, 1864a,b, monotypy).
Palinnotus Stebbing, 1900a: 16 (*Pereionotus thomsoni* Stebbing, 1899c, original designation).–J.L. Barnard, 1970a: 226.–J.L. Barnard, 1972a: 289 (key).

Type species. *Oniscus testudo* Montagu, 1808, monotypy.

Diagnosis. Maxilla 1 lacking palp (type) or palp spine-like. Palp of maxilliped 3-articulate. Gnathopods and pereopods simple. Article 2 of pereopod 6 ovate, of 7 quadrate. Posterior pleopodal peduncles expanded, inner ramus of pleopod 3 slightly shortened. Uropod 3 lacking ramus.

Description. Molar flagellate or spike-like. Plates of maxilla 2 separate or coalesced (*Palinnotus*). Coxae strongly splayed. Inner rami of pleopods 1-2 slightly shortened. Outer ramus of uropod 1 slightly shortened; rami of uropod 2 in male extending equally, outer ramus absent in female. Pereonites 1-7 and pleonites 1-2 with dorsal carina or humps.

Sexual dimorphism. Female lacking outer ramus of uropod 2.

Variables. *Palinnotus* distinguished from *Pereionotus* only in presence of palp on maxilla 1 and separate plates of maxilla 2; probably should be kept at subgeneric level. Maxilla 1 with flat conical palp (*P. alaniphlias*); outer plate of maxilliped very small (*P. holmesi*); coxa 7 fused to pereonite 7 (*alaniphlias*); shapes of pereopod 7 and dorsal body humps variable.

Relationship. Like *Iphinotus* in the long inner ramus of pleopod 3 but in contrast to *Pariphinotus*, *Quasimodia* and *Iphiplateia*; differing from *Iphinotus* in the presence of a ramus on uropod 3 and the unproduced peduncle of pleopod 1.

Species. *Pereionotus alaniphlias* (J.L. Barnard, 1970a) (Ledoyer, 1978b, 1979a, 1986) (Sasidharan, 1983b) [600]; *P. holmesi* (Gurjanova, 1938, 1951) (Tzvetkova, 1968) [391]; *P. japonicus* (Tzvetkova, 1968) [391]; *P. natalensis* (K.H. Barnard, 1940) (?Pillai, 1954) (Griffiths, 1974b,c) (Ledoyer, 1986) [745]; *P. testudo* (Montagu, 1808) (= *P. rissoanus* Bate, 1862) (= *P. fuscum* Grube, 1864a, 1864b, 1864) (Chevreux & Fage, 1925) (Lincoln,1979a) [330 + 677]; *P. thomsoni* Stebbing, 1899c (J.L. Barnard, 1972b) [780]; species (= *P. testudo* identifications of Walker & Scott, 1903; Rabindranath, 1972b; Ledoyer, 1979b) [600]; species, Sarma & Rao, 1981 [662].

Habitat and distribution. Marine, cosmopolitan in low latitudes, largely tropical to warm temperate, 0-25 m, 6 species (perhaps 1 superspecies).

Phlias Guerin

Phlias Guerin, 1836: page unnumbered.–Stebbing, 1906: 200.

Type species. *Phlias serratus* Guerin, 1836, monotypy.

Diagnosis. Poorly described and type locality uncertain: Maxilla 1 [unknown]. Palp of maxilliped 3-articulate. Gnathopods and pereopods simple. Posterior pleopodal peduncles [unknown], inner ramus of pleopod 3 [?as long as outer]. Uropod 3 [unknown].

Description. Molar [unknown]. Maxilla 2 [unknown]. Coxae strongly splayed. Pleopods 1-2 [unknown]. Rami of uropods 1-2 extending equally. Pereonites 1-7 with dorsal carina or humps, weaker to obsolescent on pleonites 1-2.

Remarks. Obscure genus resembling *Pereionotus* (= *Palinnotus),* possibly synonym senior to both; type locality vague, possibly collected in Australia and *P. serratus* possibly therefore senior synonym of *Palinnotus thomsoni*; discrepancies including poor dorsal carination, large article 2 of pereopod 7 and equally extending rami of pleopod 3 and uropod 1 of *P. serratus*; possibly these items misrepresented for *P. serratus.*

Species. *Phlias serratus* Guerin, 1836 [unknown].

Habitat and distribution. Type locality between Falkland Islands and Australia.

Quasimodia Sheard

Figs 105E,H, 106D

Quasimodia Sheard, 1936b: 464.–J.L. Barnard, 1972b: 298.

Type species. *Quasimodia womersleyi* Sheard, 1936b, selected by J.L. Barnard, 1969c.

Diagnosis. Maxilla 1 lacking palp. Palp of maxilliped 4-articulate. Gnathopods and pereopods simple. Article 2 of pereopod 6 ovate, of 7 quadrate. Posterior pleopodal peduncles expanded, inner ramus of pleopod 3 very short. Uropod 3 with 1 ramus. Body tall (versus *Gabophlias*).

Description. Molar stylocylindrioid. Plates of maxilla 2 separate. Coxae poorly splayed. Inner rami of pleopods 1-2 slightly shortened. Inner ramus of uropod 1 short (not 2). Pereonite 1 and occasionally pereonite 7 with very large hump, otherwise rear of pereon plus pleon weakly humped.

Sexual dimorphism. Male eyes slightly enlarged; apex of antenna 1 more strongly armed with aesthetascs; body less bulky and humps smaller; and see more minor attributes in J.L. Barnard (1972b).

Variables. Hump on pereonite 7 small (*Q. barnardi*), large (*Q. enna*); inner ramus of pleopod 3 vestigial and nonsetose (*Q. womersleyi*), small and setose (*Q. capricornis*); inner ramus of uropod 2 slightly shortened (*Q. barnardi*), very short (*Q. enna*); ramus of uropod 3 as long as peduncle (*Q. barnardi*), twice as long as peduncle (*Q. capricornis*).

Relationship. Like *Gabophlias* in the short inner ramus of pleopod 3 but pereopods and gnathopods not prehensile.

Species. *Quasimodia barnardi* Sheard, 1936b (J.L. Barnard, 1972b) [780]; *Q. capricornis* Sheard, 1936b [785]; *Q. enna* J.L. Barnard, 1972b [785]; *Q. womersleyi* Sheard, 1936b [785].

Habitat and distribution. Marine, southern Australia, littoral, 4 species.

PHOXOCEPHALIDAE Sars, 1895

Diagnosis. Rostrum like visor or absent, not cylindrical; ventral cephalic cheek weak or absent. Article 3 of antenna 1 short; article 4 of antenna 2 with facial spines (except *Joubinella*). When rostrum reduced or absent, facial spines occurring on article 4 of antenna 2 or articles 4-5 of pereopods 5-6.

Right incisor broad and 3+ toothed (generally only Tipimeginae more than 3-toothed); mandibular palp article 3 with only 0-2 sets of outer setae closely contiguous on opposite faces, never in serial ranks, apex bevelled, all other setae dominantly apical; molar, if triturative, of acetabularian (cup-shaped) form, otherwise spinose or simple. Inner plate of maxilla 1 never pointed, never with more than 2 fully medial setae, other setae apical or absent.

Coxae regular. Pereopod 5 with facial spines on articles 4-5. Pereopod 7 distinct from pereopods 5-6, much shorter than 6, article 2 broadly expanded in free, plate-like lobe. Epimeron 1 well developed. Peduncles of pleopods longer than wide. Rami of uropods 1-2 styliform. Uropod 3 biramous. Telson deeply cleft.

Description. (See Inquilines). Head usually long and rostrate in fashion of visor or hood, occasionally reduced or almost absent but rostrum never cylindrical; or head rarely grotesque; antenna 1 usually enveloped basally by rostrum.

Accessory flagellum well developed or easily visible in context of occasional reduced antennae; antenna 1 generally of pontoporeiid form, antenna 2 generally more elongate with facial armaments organised into ranks, mostly spines, on article 4, no ventral ranks of glossy spines, article 3 being very short, article 1 occasionally with tooth (ensiform); all flagella short in females. Mouthparts basic, mandibular molar triturative or usually simple, when fully triturative usually of acetabularian (cup shaped rosette) form; occasionally with partially triturative (*Leongathus*) or special spinate form (Tipimeginae). Labium with inner lobes and strong mandibular extensions. Inner plate of maxilla 1 rarely with more than 4 setae (*Pontharpinia*), often with fewer or none (especially Phoxocephalinae). Palp of maxilla 1 2-articulate or 1-articulate (Phoxocephalinae). Maxilla 2 unimportant. Plates of maxillipeds plesiomorphically well developed and setose but in Phoxocephalinae and Harpiniinae losing size and armaments; palp always well developed and 4-articulate. No baler lobes on mouthparts.

Coxae 1-4 evenly integrated and progressively enlarged, coxal gills 2-7, brood plates slender. Gnathopods variable. Pereopods 3-7 often fossorial, pereopods 3-4 often with enlarged and heavily armed articles 4-5, article 6 being very stiff, rod-like and armed with powerful spines or numerous setae, though occasionally ameliorated (harpiniins and brolgins). Pereopod 5 of haustorioid form, articles 4-5 conspicuously broadened in context and usually well spined in context, article 2 broad or thin (Harpiniinae); pereopod 6 like pereopod 5 but longer, occasionally flabellate but frequently more slender; pereopod 7 short, article 2 broadly expanded and plate-like, other articles forming stenopod.

Epimera ordinary, variable, occasionally with massive setal brushes. Uropods 1-2 usually powerful, peduncle of uropod 2 usually heavily spined, uropod 1 occasionally with inter-ramal spike or displaced giant apical spine medially or rarely laterally; setae rare (e.g. *Hopiphoxus*, *Pseudharpinia*). Uropod 3 usually of gammaroid dispariramous form with well-developed article 2 on outer ramus, inner ramus of female slightly to greatly reduced; occasionally uropod 3 reduced (see inquilinous taxa). Telson cleft, occasionally elongate, armament patterns sparse but definitive, each lobe of telson usually with dorsolateral pair of penicillate setules and at least one apical setule plus spine(s), often with supernumerary dorsolateral spines or setae. Body carinate rarely on urosomites 2 or 3.

Sexual dimorphism in males. Often pelagic, neritic or demersal. Many unknown. Often with pubescence medially or dorsally on antenna 1-2; often with calceoli on flagella or rarely peduncles; often with flagellum on antenna 2 proliferate and greatly elongate. Often losing many epimeral setae in maturations, thus keys best used in females.

Eyes often enlarged. Mouthparts rarely degenerate (*Harpinia*). Gnathopods rarely larger, more slender or less setose. Pleopods usually enlarged. Epimera usually larger or smoother. Urosome usually smaller and more rigidly formed in known pelagic males. Uropods often with more peduncular and fewer ramal spines, these often more rhombic. Uropod 3 usually much more setose, inner ramus fully elongate. Telson with rows of denticles, these often seen also on urosome.

Relationship. Similar to Gammaroids, Pontoporeiids and their allies but differing in one or more of following characters: (1) visor-like rostrum; (2) presence of facial spines on article 4 of antenna 2; (3) acetabularian kind of molar if triturative, otherwise reduced and spinose, never enlarged and grossly pubescent; (4) short article 3 of antenna 1; (5) subchelate gnathopod 1; (6) unpointed inner plate of maxilla 1 never with more than 2 medial setae; (7) never more than pair of setal groups closely contiguous on opposite faces of mandibular palp article 3; (8) deeply cleft telson. Several gammaroids or pontoporeiids may have characters 1, 2, 5 individually present but none has 5 or more simultaneously as do all phoxocephalids.

Easily distinct from Haustoriidae, Urohaustoriidae, Zobrachoidae and Phoxocephalopsidae in the characteristic pereopod 7; from the Platyischnopidae in the noncylindrical rostrum; from the Urothoidae in the weak cephalic cheek, short article 3 of antenna 1, small molars lacking gross pubescence and elongate peduncles of pleopods.

Remarks. Phoxocephalidae express general fossorial adaptations, with powerful antennae, rostra, legs, pleopods, uropods, these often armed heavily with thin spines and setae or sparsely with very heavy elements. Many, however, are so strangely adapted in these structures that they might be considered to be inquilinous (see below). Spination and powerful appendages in the deep sea become much reduced (exception, *Palabriaphoxus*), pereopods 5-6 becoming thin and poorly armed.

In the plesiomorphic state uropod 3 is of the dispariramous gammaroid form with well-developed article 2 on the outer ramus and tendency for the inner ramus to be severely reduced in females. The telson is never entire but often elongate in phoxocephalins and harpiniins.

Presence of setae on rami of uropods 1 to 2 is a feature of mostly deep-sea or cold water southern taxa in *Pseudharpinia*, *Heterophoxus* and *Hopiphoxus*.

Mouthparts are very steady, the main progression being loss of setae on maxillae and maxillipeds, and reduction of maxillipedal plates in the Phoxocephalinae and Harpiniinae, preadapting them especially to inquilinous modes and deep-sea habitats. However, minute details of molars, laciniae mobiles and palpar humps are systematically valuable.

Inquilines. The incipient inquiline state of many phoxocephalids is found in the reduced head of *Yammacoona*, *Kotla* and progressively through the 37 species of *Birubius*. The contrasting enlargement of the head by elongation or complex elaboration of rostral processes occurs in *Limnoporeia*, *Uldanamia*, *Parajoubinella*, *Mandibulophoxus* and *Leptophoxus*. The antennae are reduced in *Japara* and *Kondoleus*. Flabellate articles occur in *Yammacoona*. Male antenna 1 of *Elpeddo* assumes a prototypical lysianassid state with large callynophore on article 1 of the primary flagellum. Spines become very spheroid on the antennae of *Kondoleus* and male *Yammacoona*.

Maxillipedal 'poison' spouts occur in *Kondoleus* and article 3 of the palp is produced in *Leptophoxus*, *Leptophoxoides* and *Yammacoona*.

Thin poking gnathopods occur in *Ganba* and effectively occur in the heavily chelate *Limnoporeia* and *Uldanamia*, while other chelate gnathopods occur in *Kondoleus*. Eusirid gnathopods are very prevalent in the pelagic *Joubinella* and in the benthic or occasionally demersal *Coxophoxus*, *Eusyrophoxus*, *Japara*, *Jerildaria*, *Kondoleus* and *Kotla*.

Pygidisation occurs frequently. Dozens of species lack full articulation between urosomites 1 and 2 but *Foxiphalus vigitegus* is an extreme case. The urosome has a dorsal hook in that species and in the genera *Kulgaphoxus*, *Microphoxus* and *Tickalerus*. The inner ramus of uropod 2 becomes fused in *Kotla*, where spheroid spines occur. These rhombic or jewel-like spines also occur frequently in *Rhepoxynius*. Uropod 3 is reduced, often severely in *Japara*, *Kondoleus*, *Kotla*, *Kulgaphoxus* and *Matong*.

The cuticle is strongly frictional or nonskid in *Kondoleus* and *Matong*. Epimeron 3 is unusually serrate in *Rikkarus*, perhaps in this family the mark of strange behaviour.

Biogeography. Dominantly Australian, with the diverse *Birubius* (37+) and 25 other genera (species 90+). New Zealand has many monotypes (9+ genera). The Magellan-Palmer area retains 7+ genera with *Metharpinia* and *Fuegiphoxus* being in an ancestral position to certain Australian or North American taxa. Renewed radiation occurs in North America, with *Rhepoxynius* (15) and *Foxiphalus* (7), the North Pacific having 10+ genera.

Deep-sea radiation is another feature, with nearly 50 species in seven genera not counting North Atlantic *Harpinia*. The North Atlantic is impoverished, with 4 genera but most of the species occurring in the emergent blind *Harpinia*. The latter is assumed to have followed a bathyal pathway from the deep austral and then emerged into open niches in the North Atlantic. The western Atlantic also has this genus and three others, largely from the east Pacific via the isthmian waterways of the Miocene.

There are few tropical taxa, mostly the three genera of Madagascar plus the Indo-Pacific *Mandibulophoxus*. South Africa has three to four mostly monotypic genera.

The group clearly had a Gondwanan source but has been very hard pressed to escape into the Northern Hemisphere, though as fossorial ecotypes there has been significant descent into the deep seas.

Terms

Glabrous: the opposite is 'setose'.

Ordinary: when used for pereopod 7 the opposite is 'reduced' as seen in *Tipimegus*: when used for uropod 3 the opposites are 'enlarged' or 'reduced'.

Trichophoxin: referring to the shape of the propodus (article 6) of gnathopods 1-2 which occasionally has the shape of a goose-neck barnacle, with convex anterior margin and straight posterior margin.

Keys

Seven subfamilies of Phoxocephalidae have been described (Barnard & Drummond, 1978) as in the following keys.

Key to Subfamilies of Phoxocephalidae
(females only)

1. Article 2 of pereopod 5 of thin form, 3 times as long as broad (Fig.111C) .... Harpiniinae, Key A

—— Article 2 of pereopod 5 of broad form (Fig.111B) 2

2. Palp of maxilla 1 1-articulate .... Phoxocephalinae, Key B

—— Palp of maxilla 1 2-articulate 3

3. Article 3 of pereopod 7 enlarged, larger than article 4, mandibular molar pseudotriturative, of form C (Fig.107H) .... Tipimeginae, Key C

—— Article 3 of pereopod 7 not enlarged, mandibular molar not pseudotriturative 4

4. Mandibular molar semitriturative, of form B (Fig.107C) .... Leongathinae, Key D

—— Mandibular molar not semitriturative 5

5. Article 2 of antenna 1 especially shortened 6

—— Article 2 of antenna 1 elongate 8

6. Mandibular molar triturative, of form A (Fig.107B) .... Pontharpiniinae, Key E and Joubinellinae, Key H

—— Mandibular molar not triturative 7

7. Mandibular molar of special form E (Fig.107A) bearing 3 or fewer spines usually with common base, article 2 of pereopod 5 not tapering distally, telson lacking supernumerary dorsal spination .... Brolginae, Key F

—— Mandibular molar of form D (Fig.107G) bearing articulate spines not all organised into common base, usually 4 or more widely spread spines, article 2 pereopod 5 tapering distally, telson usually bearing supernumerary dorsal spination .... Parharpiniinae, Key G

8. Gnathopods 1 or 2 or both enlarged .... Joubinellinae, Key H

—— Gnathopods 1 and 2 both small .... Birubiinae, Key I

Key A (Harpiniinae)

1. Eyes present 2

—— Eyes absent 6

2. Antenna 2 strongly ensiform .... (and female *Cocoharpinia*) *Heterophoxus*

—— Antenna 2 not ensiform 3

3. Article 4 of pereopod 6 thick, dactyl of maxilliped very long, apical nail obsolescent .... *Basuto*

—— Article 4 of pereopod 6 thin, dactyl of maxilliped short, stubby, apical nail highly elongate 4

4. Mandibular molar triturative, propodus of gnathopods rectangular .... *Coxophoxus*

—— Mandibular molar simple, spinose, propodus of gnathopods ovate 5

5. Female uropod 2 lacking ramal spines, outer ramus of uropod 1 short .... *Torridoharpinia*

—— Female uropod 2 with ramal spines, outer ramus of uropod 1 as long as inner .... (and male *Cocoharpinia*) *Proharpinia*

6. Flagellum of male antenna 2 short as in female, male antenna 1 brushy 7

—— Flagellum of male antenna 2 highly elongate and proliferate, male antenna 1 not brushy 8

4. Mandibular molar semitriturative, of form B (Fig.107C) .... Leongathinae, Key D

—— Mandibular molar not semitriturative 5

5. Article 2 of antenna 1 especially shortened 6

—— Article 2 of antenna 1 elongate 8

6. Mandibular molar triturative, of form A (Fig.107B) ....
.... Pontharpiniinae, Key E and Joubinellinae, Key H

—— Mandibular molar not triturative 7

7. Mandibular molar of special form E (Fig.107A) bearing 3 or fewer spines · usually with common base, article 2 of pereopod 5 not tapering distally, telson lacking supernumerary dorsal spination .... Brolginae, Key F

—— Mandibular molar of form D (Fig.107G) bearing articulate spines not all organised into common base, usually 4 or more widely spread spines, article 2 pereopod 5 tapering distally, telson usually bearing supernumerary dorsal spination .... Parharpiniinae, Key G

8. Gnathopods 1 or 2 or both enlarged .... Joubinellinae, Key H

—— Gnathopods 1 and 2 both small .... Birubiinae, Key I

Key A (Harpiniinae)

1. Eyes present 2

—— Eyes absent 6

2. Antenna 2 strongly ensiform .... (and female *Cocoharpinia*) *Heterophoxus*

—— Antenna 2 not ensiform 3

3. Article 4 of pereopod 6 thick, dactyl of maxilliped very long, apical nail obsolescent .... *Basuto*

—— Article 4 of pereopod 6 thin, dactyl of maxilliped short, stubby, apical nail highly elongate 4

4. Mandibular molar triturative, propodus of gnathopods rectangular .... *Coxophoxus*

—— Mandibular molar simple, spinose, propodus of gnathopods ovate 5

5. Female uropod 2 lacking ramal spines, outer ramus of uropod 1 short .... *Torridoharpinia*

—— Female uropod 2 with ramal spines, outer ramus of uropod 1 as long as inner .... (and male *Cocoharpinia*) *Proharpinia*

6. Flagellum of male antenna 2 short as in female, male antenna 1 brushy 7

—— Flagellum of male antenna 2 highly elongate and proliferate, male antenna 1 not brushy 8

7. Male brushes of first antennae on article 1 and base of flagellum, of second antennae on article 3, article 5 lacking calceoli .... *Harpinia*

—— Male brushes of first antennae on article 3, not on base of flagellum or antenna 2, article 5 of antenna 2 with calceoli .... *Feriharpinia*

8. No rami on uropods 1-2 continuously spinose to apex, article 2 on outer ramus of uropod 3 elongate, antenna 2 scarcely or not ensiform .... *Harpiniopsis*

—— Some rami of uropods 1-2 with dorsal spines continuous to apex, article 2 on outer ramus of uropod 3 short, antenna 2 usually ensiform 9

9. Pereopod 6 powerful, thick .... *Palabriaphoxus*

—— Pereopod 6 weak, slender .... *Pseudharpinia*

Key B (Phoxocephalinae)

1. Article 3 of palp on maxilliped immensely produced (Fig. 111H) 2

—— Article 3 of palp on maxilliped unproduced or scarcely so 3

2. Mandibular molar triturative (Fig.107B) .... *Leptophoxoides*

—— Mandibular molar not triturative .... *Leptophoxus*

3. Mandibular molar triturative (Fig.107B) 4

—— Mandibular molar not triturative, bearing spines, or molar absent 9

4. Carpus of gnathopod 1 short and cryptic (Fig.110F) .... *Cephalophoxus*

—— Carpus of gnathopod 1 long and free (Fig.110H) 5

5. Neither pair of gnathopods enlarged 6

—— At least gnathopod 2 enlarged (Fig.110H) 7

6. Rostrum obsolescent (Fig.108E) article 6 of pereopod 7 puffy and poorly armed .... *Synphoxus*

—— Rostrum well developed, article 6 of pereopod 7 slender and well armed .... *Phoxocephalus*

7. Article 2 on outer ramus of uropod 3 short (Fig.111J) .... *Jerildaria*

—— Article 2 on outer ramus of uropod 3 elongate (Fig.111A) 8

8. Propodus of gnathopod 2 much larger than propodus of gnathopod 1 .... *Cephalophoxoides*

—— Propodus of gnathopods 1-2 alike .... *Eusyrophoxus*

9. Rami of uropod 3 reduced, shorter than peduncle, outer ramus lacking article 2 .... *Japara*

—— Rami of uropod 3 ordinary 10

10. Flagellum of female antenna 2 reduced to 1 article, rostrum obsolete, article 2 of antenna 1 slightly elongate and produced apically, maxilliped with basal spouts (Fig. 111I), uropods 1-2 with dorsal setae, inner ramus of uropod 2 reduced .... *Kondoleus*

—— Flagellum of female antenna 2 multiarticulate, rostrum present, article 2 of antenna 1 short (except *Mesophoxus*), unproduced, maxilliped lacking basal spouts, uropods 1-2 with normal rami and lacking dorsal setae except in *Hopiphoxus* 11

11. Gnathopods chelate equally and strongly (Fig.110J) 12

—— Gnathopods subchelate, occasionally gnathopod 1 weakly parachelate 13

12. Carpus of gnathopod 2 highly elongate, dactyls of pereopods 3-4 vestigial (Fig.108H) .... *Uldanamia*

—— Carpus of gnathopod 2 not elongate, dactyls of pereopods 3-4 fully developed .... *Limnoporeia*

13. Article 2 on outer ramus of uropod 3 vestigial .... (and possibly *Mesophoxus*) *Metaphoxoides*

—— Article 2 on outer ramus of uropod 3 well developed 14

14. Epimeron 3 grossly serrate, propodus of gnathopod 2 thin, sinuous, palm extremely oblique or transverse .... *Rikkarus*

—— Epimeron 3 of rounded classification, propodus of gnathopod 2 expanded, palm weakly to moderately oblique 15

15. Rami of uropods 1-2 dorsally setose near apices (Fig.107H) .... *Hopiphoxus*

—— Rami of uropods 1-2 neither setose nor bearing dorsal armaments near apices 16

16. Article 5 of gnathopod 1 elongate 17

—— Article 5 of gnathopods short 19

17. Telson ordinary 18

—— Telson with supernumerary lateral or dorsal spines (Fig. 109M), (carpus of gnathopod 2 elongate) .... *Parajoubinella*

18. Carpus of gnathopod 2 short, cryptic, palms of gnathopods 1-2 oblique .... *Diogodias*

—— Carpus of gnathopod 2 elongate, free, palms of gnathopods 1-2 transverse .... *Ringaringa*

19. Dactyls of pereopods 3-4 stunted .... *Vasco*

—— Dactyls of pereopods 3-4 elongate 20

20. Carpus of gnathopod 1 short and cryptic, palms of gnathopods oblique .... *Metaphoxus*

—— Carpus of gnathopod 1 free, palms of gnathopods transverse to chelate .... *Parametaphoxus*

Key C (Tipimeginae)

1. Uropods 1-2 with elongate setae on peduncles and rami, epimeron 3 with large posteroventral tooth .... *Waitangi*

—— Uropods 1-2 lacking elongate setae, epimeron 3 lacking large posteroventral tooth 2

2. Telson with lateral spines, urosome with lateral spines, inner ramus of uropod 1 with only 1 row of marginal spines .... *Trichophoxus*

—— Telson lacking lateral spines, urosome lacking lateral spines, inner ramus of uropod 1 with 2 rows of marginal spines 3

3. Epistome with large anterior tooth, pereopod 7 with gill, epimeron 3 with grossly developed facial row of spines .... *Booranus*

—— Epistome lacking anterior tooth, pereopod 7 lacking gill, epimeron 3 lacking facial spine row .... *Tipimegus*

Key D (Leongathinae)

1. Monotypic .... *Leongathus*

Key E (Pontharpiniinae)

1. Monotypic .... *Urophoxus* (= *Pontharpinia*)

Key F (Brolginae)

1. Article 2 of peduncle on antenna 1 elongate, mandible with 4 or more spines on molar (not fully typical of brolgins) .... *Cunmurra*

—— Article 2 of peduncle on antenna 1 shortened, mandible with 3 or fewer spines on molar 2

2. Apex of outer ramus on uropod 3 with 2-3 setae 3

—— Apex of outer ramus on uropod 3 with one seta 11

3. Rami of uropods 1-2 continuously spinose to apex .... *Mandibulophoxus*

—— Rami of uropods 1-2 not continuously spinose to apex 4

4. Uropod 1 lacking special apicomedial spine on peduncle 5

—— Uropod 1 bearing special apicomedial spine on peduncle (Fig.110G) 8

5. Molar with even spines, epimeron 3 poorly setose 6

—— Molar with 1 enlarged spine distinct from others, epimeron 3 with 3+ large setae 7

6. Article 4 of antenna 2 with 2+ strong spine rows, inner plate of maxilla 1 with 4 setae, epimeron 3 with 1+ long setae .... (*Foxiphalus*) and *Eobrolgus*

—— Article 4 of antenna 2 with 1 strong spine row, inner plate of maxilla 1 with 2 setae, epimeron 3 without long setae .... *Paraphoxus*

7. Gnathopod 2 enlarged .... *Fuegiphoxus*

—— Gnathopod 2 not enlarged .... *Eyakia*, *Mesophoxus*

8. Gnathopods identical to each other, propodus thin (Fig. 110I) .... *Kuritus*

—— Gnathopods diverse, propodus weakly to broadly expanded 9

9. Apical setae on outer ramus of uropod 3 longer than article 2, article 5 of gnathopod 2 cryptic .... *Wildus*, *Waipirophoxus*

—— Apical setae on outer ramus of uropod 3 shorter than article 2, article 5 of gnathopod 2 not cryptic 10

10. Molar with 4+ spines (non-brolgin), article 4 of antenna 2 with more than 2 rows of spines, telson with supernumerary lateral spines .... *Parharpinia*, *Phoxorgia*

—— Molar with 3 or fewer spines, article 4 of antenna 2 with 1 row of spines, telson lacking supernumerary spines .... *Elpeddo*

11. Most posterior spines on article 6 of pereopods 3-4 thin, gnathopods stout .... *Brolgus*

—— All but 1 posterior spine on article 6 of pereopods 3-4 thick and short, gnathopods thin .... *Ganba*

Key G (Parharpiniinae)

1. Displaced spine on peduncle of uropod 1 lateral .... *Protophoxus*

—— Displaced spine on peduncle of uropod 1 medial 2

—— Displaced spine on uropod 1 absent .... *Eobrolgus*

2. Ventral setae on article 2 of antenna 1 shifted apically (Fig.109A), epimera 1-2 poorly setose posteriorly, article 2 of pereopod 7 without ventral setae, telson lacking true dorsal spines .... *Phoxorgia*

—— Ventral setae on article 2 of antenna 1 in middle, epimera 1-2 well setose posteriorly, article 2 of pereopod 7 setose ventrally, telson with truly dorsal spines .... *Parharpinia*

Key H (Joubinellinae)

1. Gnathopods of highly eusirid, pelagic, and predatorial form (Fig.110E), gnathopod 1 usually much larger than gnathopod 2 but occasionally of equal size, antenna 2 extremely thin, lacking well-organised clusters of facial spines, flagellum in female reduced to 2-3 articles, mandibular molar strongly triturative .... *Joubinella*

—— Gnathopods weakly eusirid, of nonpelagic and nonpredatorial form, gnathopod 2 usually much larger than gnathopod 1 but occasionally of equal size, antenna 2 stout to medium in thickness, bearing well-organised clusters of facial spines, flagellum in female exceeding 6 articles, mandibular molar not or weakly triturative 2

2. Uropod 1 with 2 dorsal spines on peduncle half as large as rami .... *Synphoxus*

—— No spines on uropod 1 enlarged 3

3. Epimeron 3 reduced to fully rounded classification, lacking all but 2 fully developed setae (Fig.108A), [head normal, uropod 2 freely articulate, uropods 1-2 lacking accessory apical nails, no epimera with facial brushes of setae above lateral ridges, spines on uropod 2 normal, ventral setae on article 2 of antenna 1 set in middle] .... *Cunmurra*

—— Epimeron 3 with 5 or more fully developed setae 4

4. Article 4 of antenna 2 bearing only 2 rows of facial and apical spines, head with rostrum obsolete but broadly truncate from lateral view, inner ramus of uropod 2 freely articulate, ventral setae on article 2 of antenna 1 set proximally .... *Yammacoona*

—— Article 4 of antenna 2 bearing 3 or more rows of facial and apical spines, head with very short rostrum but anterior margin from lateral view sinuous, inner ramus of uropod 2 partially to fully fused to peduncle, ventral setae on article 2 of antenna 1 set distally 5

5. Spines on uropod 2 conical, of normal dimensions, sharp, epimera 1-2 lacking large vertically set setal brushes .... *Matong*

—— Spines on uropod 2 of rounded, jewel-like form, blunt, epimera 1-2 bearing large vertically aligned setal brushes .... *Kotla*

Key I (Birubiinae)

1. Gnathopod 2 significantly larger than gnathopod 1 .... *Cunmurra*

—— Gnathopods 1-2 subequal in size 2

2. Uropods 1-2 lacking accessory (besides normal apical nail) apical nails on inner rami 3

—— 1 or both uropods 1-2 bearing accessory apical nails on inner rami 11

3. Dactyl of pereopod 5 vestigial .... *Yan*

—— Dactyl of pereopod 5 fully formed 4

4. Article 2 of pereopod 5 tapering distally (Fig.111B) 5

—— Article 2 of pereopod 5 not tapering distally 7

5. Rami of uropod 3 minute, not longer than peduncle (Fig. 111L), telson without lateral spines .... *Mesophoxus*

—— Rami of uropod 3 ordinary, telson with lateral spines 6

6. Displaced spine on peduncle of uropod 1 medial .... *Parharpinia*

—— Displaced spine on peduncle of uropod 1 lateral .... *Protophoxus*

7. Epimeron 2 with well-developed posterior setation 8

—— Epimeron 2 with only posterior setules 9

8. Rostrum constricted (Fig.108E) .... *Foxiphalus, Eobrolgus*

—— Rostrum ordinary (Fig.108F) .... *Grandifoxus*

9. Antenna 2 ensiform (Fig.109E) .... *Rhepoxynius*

—— Antenna 2 not ensiform (Fig.109G) 10

10. Article 4 of female antenna 2 with well-developed dorsal setation, urosomite 3 with dorsal hook .... *Tickalerus*

—— Article 4 of female antenna 2 not setose, urosomite 3 lacking dorsal hook .... *Birubius*

11. Peduncle of uropod 1 with displaced apicomedial spine (Fig.110G) 12

—— Peduncle of uropod 1 lacking displaced apicomedial spine 13

12. Fully apical nails on rami of uropods 1-2 present (Fig.110G), rostrum ordinary .... *Phoxorgia*

—— Fully apical nails on rami of uropods 1-2 absent, subapicals present, rostrum reduced .... *Metharpinia*

13. Urosomite 3 ordinary .... *Birubius*

—— Urosomite 3 with dorsal hook 14

14. Uropod 3 ordinary .... *Microphoxus*

—— Uropod 3 short, rami not longer than peduncle 15

15. Coxa 4 perfectly rectangular, ventral setae on article 2 of antenna 1 situated proximally .... *Kulgaphoxus*

—— Coxa 4 not rectangular, ventral setae on article 2 of antenna 1 situated in middle or farther out .... *Tickalerus*

Basuto Barnard & Drummond

Basuto Barnard & Drummond, 1978: 530.

Type species. *Pontharpinia stimpsoni* Stebbing, 1908b, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae widely spread but confined apically. Article 1 of antenna 2 not ensiform, article 3 with many facial setae, facial spines on article 4 in 2 rows set apicad, all spines thin, article 5 very short. Right mandibular incisor with 3 teeth, [right lacinia mobilis unknown]; molar not triturative, with 4+ splayed spines; palpar hump huge, apex of palp article 3 oblique. Inner plate of maxilla 1 with 3 setae, palp 2-articulate. Maxillipeds outer plate small, apex of palp not protuberant, dactyl elongate, apical nail scarcely distinct.

Gnathopods dissimilar, gnathopod 2 strongly enlarged, article 5 of gnathopod 1 of ordinary length, of gnathopod 2 cryptic, palms oblique, propodus of gnathopod 1 ordinary, ovatorectangular, of gnathopod 2 broadened, neither heavily setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicolaterally, some rami of uropods 1-2 continuously spinose to apex, with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 reduced. Uropod 3 ordinary, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. Like *Mandibulophoxus* but article 2 of pereopod 5 narrow, article 3 of antenna 2 multisetose facially, uropod 2 small, gnathopod 2 more strongly enlarged.

Species. *Basuto latipes* (Griffiths, 1976b) [746]; *B. stimpsoni* (Stebbing, 1908b) (= *B. intermedia* Schellenberg, 1925a) (J.L. Barnard, 1957) (Griffiths, 1974a,b) (Ledoyer, 1986) [435].

Habitat and distribution. Marine, Senegal to Natal and Madagascar, 0-300 m, 2 species.

Birubius Barnard & Drummond

Figs 107G, 108D, 109N

Birubius Barnard & Drummond, 1976: 543.–Barnard & Drummond, 1978: 191.

Type species. *Birubius panamunus* Barnard & Drummond, 1976, original designation.

Diagnosis. Rostrum variable. Eyes present. Article 2 of antenna 1 elongate to medium, ventral setae widely spread. Article 1 of antenna 2 not or scarcely ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3-4 teeth, right lacinia mobilis bifid or simple, often flabellate or absent, molar not triturative, with 4+ splayed spines; palpar hump small to medium, apex of palp article 3 oblique. Inner plate of maxilla 1 with 3-4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, article 5 of gnathopods 1-2 of ordinary length, or elongate, without eusirid attachment and not cryptic, palms oblique, propodus ordinary to thin, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without facial brushes or long posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 occasionally continuously spinose to apex (thus with minute subapical spines or nails), inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. This is the basic member of the Birubiinae to which all other group members are compared in appropriate places. Therefore see *Cunmurra*, *Eobrolgus*, *Foxiphalus*, *Grandiphoxus*, *Kulgaphoxus*, *Metharpinia*, *Mesophoxus*, *Microphoxus*, *Parharpinia*, *Phoxorgia*, *Protophoxus*, *Rhepoxynius*, *Tickalerus* and *Yan*.

Species. *Birubius apari* Barnard & Drummond, 1978 [780]; *B. babaneekus* Barnard & Drummond, 1978 [782]; *B. batei* (Haswell, 1879a) (Barnard & Drummond, 1978) [780]; *B. booleus* Barnard & Drummond, 1978 [782]; *B. cartoo* Barnard & Drummond, 1978 [782]; *B. chintoo* Barnard & Drummond, 1978 [785N]; *B. eake* Barnard & Drummond, 1978 [794]; *B. eleebanus* Barnard & Drummond, 1978 [781]; *B. gallangus* Barnard & Drummond, 1978 [785N]; *B. gambodeni* Barnard & Drummond, 1978 [780]; *B. gelarus* Barnard & Drummond, 1978 [782]; *B. jirrandus* Barnard & Drummond, 1978 [780]; *B. kabbulinus* Barnard & Drummond, 1978 [785N]; *B. kareus* Barnard & Drummond, 1978 [782]; *B. karobrani* Barnard & Drummond, 1978 [782]; *B. kinkus* Barnard & Drummond, 1978 [782]; *B. kokorus* Barnard & Drummond, 1978 [784]; *B. kyeemus* Barnard & Drummond, 1978 [781]; *B. lorus* Barnard & Drummond, 1978 [781E]; *B. lowannus* Barnard & Drummond, 1978 [782]; *B. maamus* Barnard

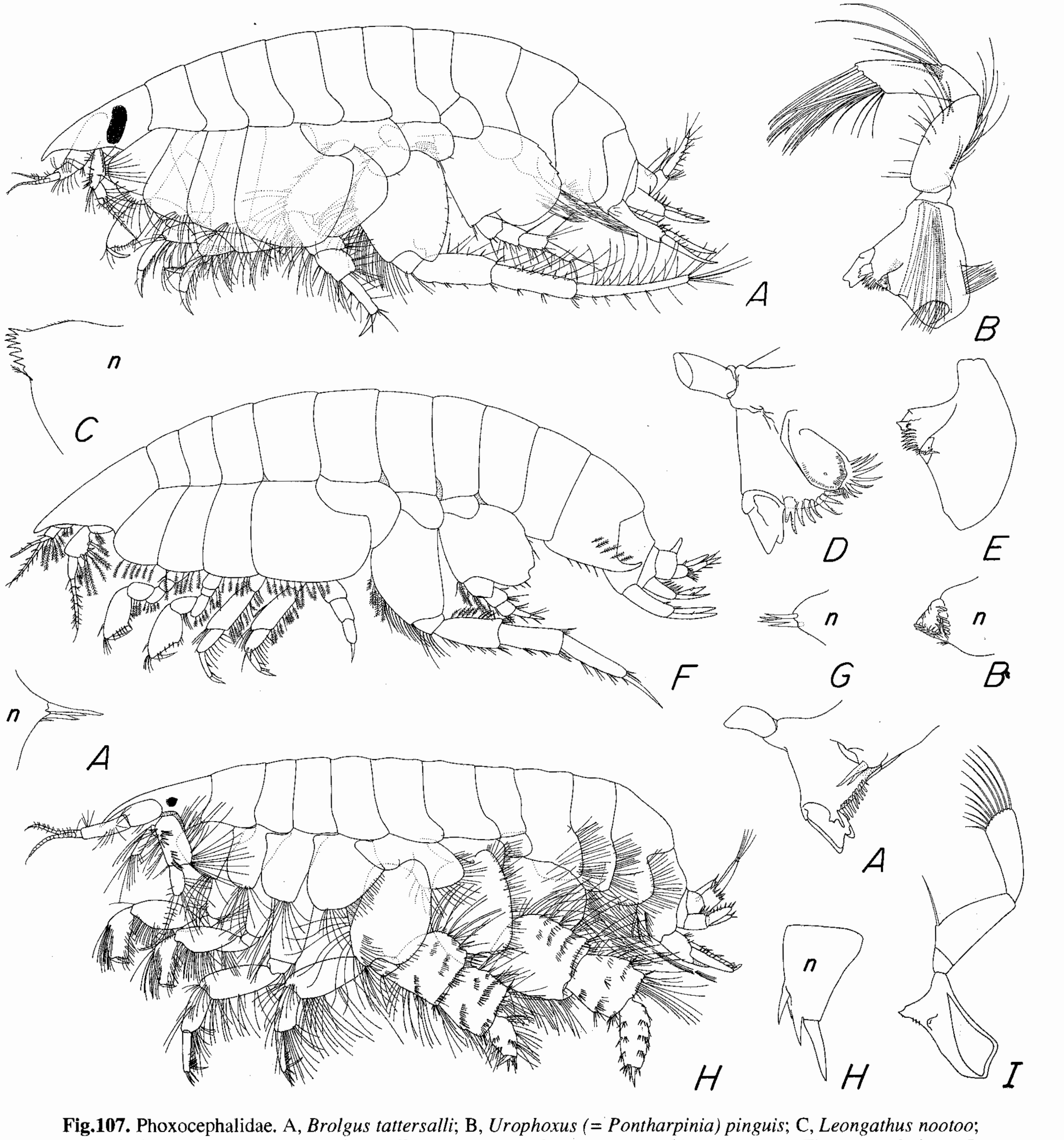


Fig.107. Phoxocephalidae. A, *Brolgus tattersalli*; B, *Urophoxus (= Pontharpinia) pinguis*; C, *Leongathus nootoo*; D, *Kotla batturi*; E, *Yammacoona kunarella*; F, *Harpinia plumosa*; G, *Birubius* species; H, *Tipimegus thalerus*; I, *Leptophoxus falcatus*.

& Drummond, 1978 [782]; *B. maldus* Barnard & Drummond, 1978 [782]; *B. mayamayi* Barnard & Drummond, 1978 [784]; *B. muldarpus* Barnard & Drummond, 1978 [781]; *B. munggai* Barnard & Drummond, 1978 [782]; *B. myallus* Barnard & Drummond, 1978 [782]; *B. nammuldus* Barnard & Drummond, 1978 [788N]; *B. narus* Barnard & Drummond, 1978 [781]; *B. panamunus* Barnard & Drummond, 1976 [784]; *B. quearus* Barnard & Drummond, 1978 [782]; *B. rostratus* (Dana, 1853) (Pirlot, 1932b) (= *B. barnardi* Pirlot, 1932b) [640]; *B. taldeus* Barnard & Drummond, 1978 [782]; *B. thalmus* Barnard & Drummond, 1978 [782]; *B. ularitus* Barnard & Drummond, 1978 [782]; *B. wirakus* Barnard & Drummond, 1978 [784]; *B. wulgaru* Barnard & Drummond, 1978 [782]; *B. yandus* Barnard & Drummond, 1978 [782]; *B. yorlunus* Barnard & Drummond, 1978 [784]; species, Pirlot, 1932b, fig.15 [646]; species, (= *B. villosa* identification of Schellenberg, 1926a, and K.H. Barnard, 1940) [743]; *incertae sedis* = *B. rostratus* identifications of Stebbing, 1910a, 1914b [various].

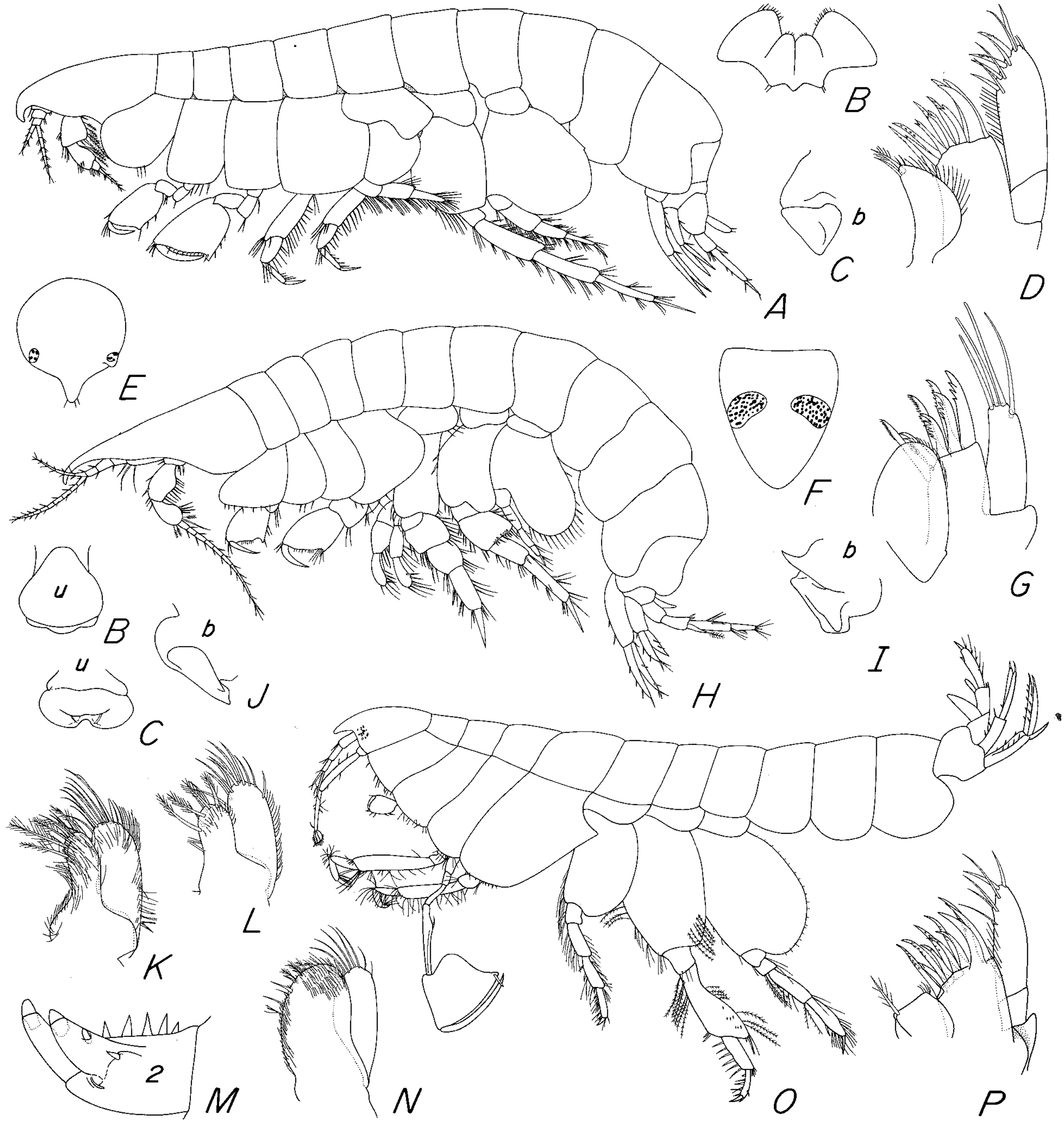


Fig.108. Phoxocephalidae. A, *Leptophoxus falcatus*; B, *Phoxocephalus holbolli*; C, *Tipimegus kalkro*; D, *Birubius mayamayi*; E, *Microphoxus minimus*; F, *Paraphoxus oculatus*; G, *Cephalophoxoides kukathus*; H, *Mandibulophoxus uncirostratus*; I, *Booranus weemus*; J, *Cunmurra itickerus*; K, *Leongathus nootoo*; L, *Brolgus millinus*; M, *Matong matong*; N, *Cephalophoxoides bassi*; O, *Joubinella traditor*; P, *Brolgus tattersalli*.

Habitat and distribution. Marine, Australia and Indonesia, sublittoral, 38 species.

Booranus Barnard & Drummond

Fig.108I

Booranus Barnard & Drummond, 1978: 71.

Type species. *Booranus weemus* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum constricted. Eyes present. Article 2 of antenna 1 of medium length, ventral setae widely spread. Article 1 of antenna 2 weakly ensiform, article 3 with numerous setae, facial spines on article 4 in 2+ rows, all spines thick, article 5 very short. *Epistome massively produced.* Right mandibular incisor with 4 teeth; right lacinia mobilis bifid; molar elongate, conical, then subtruncate, bearing 3-4 large special spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4-5 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not protuberant, dactyl elongate, apical nail absent.

Gnathopods ordinary, small, similar, article 5 of gnathopods 1-2 elongate, without eusirid attachment, palms transverse to chelate, propodus heavily setose anteriorly, trichophoxin in shape. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 miniaturised, article 3 enlarged, dactyl ordinary. *Coxal gill 7 present.*

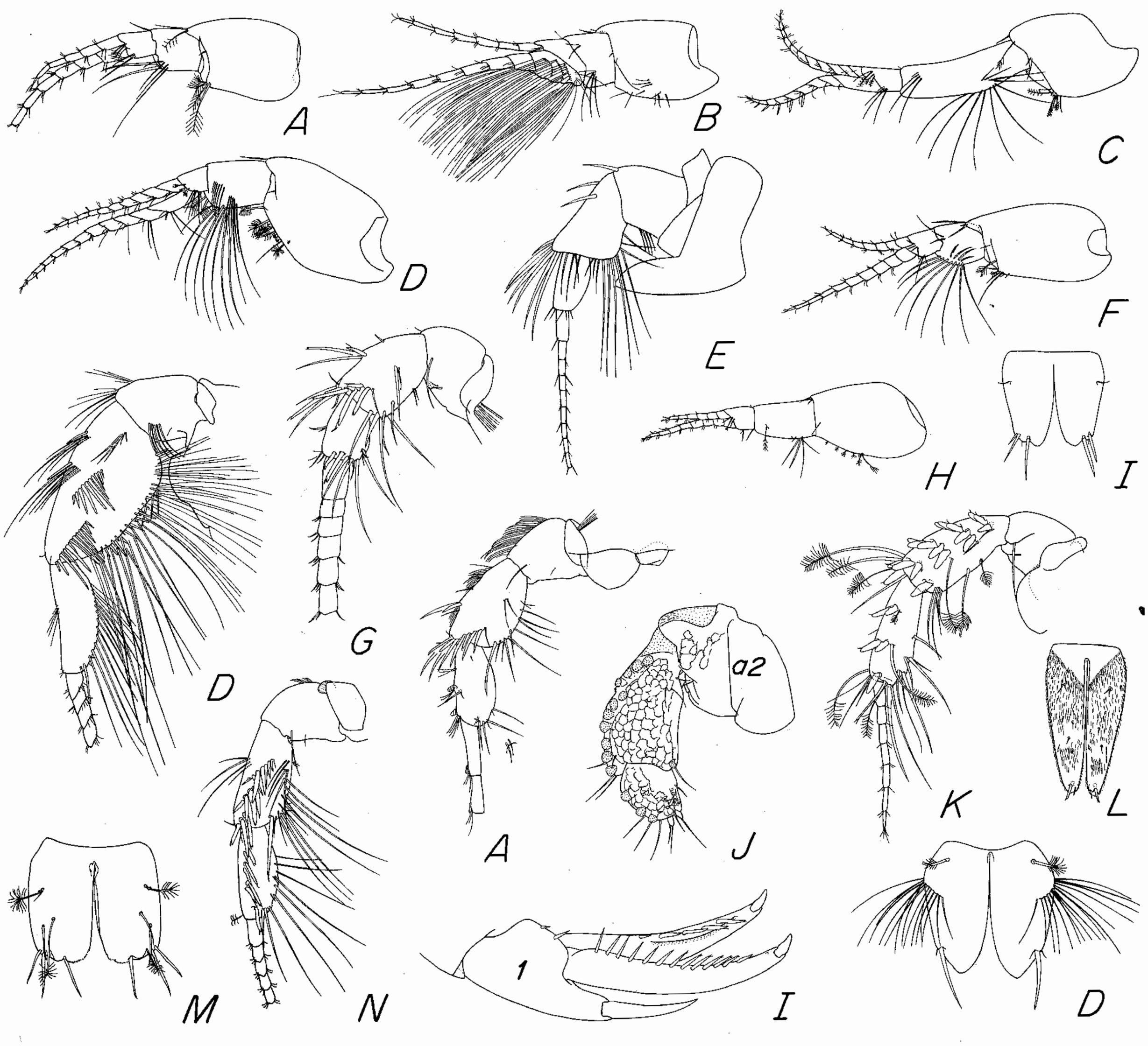


Fig.109. Phoxocephalidae. A, *Brolgus millinus*; B, *Elpeddo kaikai*; C, *Tipimegus thalerus*; D, *Urophoxus (= Pontharpinia) pinguis*; E, *Heterophoxus oculatus*; F, *Brolgus tattersalli*; G, *Wildus thambaroo*; H, *Leongathus nootoo*; I, *Tipimegus kangulun*; J, *Kondoleus tekin*; K, *Kotla batturi*; L, *Metaphoxus yaranellus*; M, *Parharpinia villosa*; N, *Birubius panamunus*.

Epimera 1-2 with long posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 with inter-ramal spike, without major displaced spine, some rami of uropods 1-2 continuously spinose to apex, with subapical spines or nails, inner ramus of uropod 1 with 2 rows of marginal spines. Inner ramus of uropod 2 especially shortened. Uropod 3 ordinary, bearing article 2 on outer ramus, with 3 long apical setae. Telson ordinary.

Relationship. Note two phrases in italics, characters of special note added to this diagnosis alone. These two characters, the massive epistome and the presence of coxal gills 7 distinguish this genus from *Tipimegus*. Otherwise, in the Phoxocephalidae these two characters are not used and are omitted from other diagnoses.

Species. ?*Booranus spinibasus* Cooper, 1974 [774]; *B. tikeri* Barnard & Drummond, 1978 [782]; *B. wangoorus* Barnard & Drummond, 1978 [780]; *B. weemus* Barnard & Drummond, 1978 [782].

Habitat and distribution. Marine, southern Australia, ?New Zealand, sublittoral, 4 species.

Brolgus Barnard & Drummond

Figs 107A, 108L,P, 109A,F, 110F, 111E,J

Brolgus Barnard & Drummond, 1978: 96.

Type species. *Paraphoxus tattersalli* J.L. Barnard, 1958, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae either widely spread or almost confined apically. Article 1 of antenna 2 not ensiform, article 3 with 1-2 facial setules, facial spines on article 4 in 2+ rows, some spines thick and some spines thin, article 5 very short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, molar not triturative, with 3 basally fused spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 0-2 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 moderately to strongly enlarged, article 5 of gnathopod 1 of ordinary length, of gnathopod 2 very short, cryptic, palms oblique, propodus of gnathopod 1 ordinary, thin, ovatorectangular, elongate, of gnathopod 2 broadened, both poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 1 apical seta. Telson ordinary.

Relationship. The basic brolgin, characterised by presence of only 3 or fewer spines on the mandibular molar. Therefore see Key F and especially *Cunmurra*, *Elpeddo*, *Ganba*, *Kuritus*, *Paraphoxus*, *Waipirophoxus* and *Wildus*.

Species. *Brolgus koongarrus* Barnard & Drummond, 1978 [785]; *B. mahmak* Barnard & Drummond, 1978 [782]; *B. millinus* Barnard & Drummond, 1978 [784]; *B. tattersalli* (J.L. Barnard, 1958) (Barnard & Drummond, 1978) [780]; *B. tavelus* Barnard & Drummond, 1978 [785].

Habitat and distribution. Marine, southern Australia, sublittoral, 5 species.

Cephalophoxoides Gurjanova

Fig.108G,N

Cephalophoxoides Gurjanova, 1977: 81.

Type species. *Phoxocephalus bassi* Stebbing, 1888, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 short. Right mandibular incisor with 2-3 teeth, right lacinia mobilis bifid, flabellate, molar triturative; palpar hump small to medium, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 strongly enlarged, article 5 of gnathopod 1 of ordinary length, free, with weak eusirid attachment, of gnathopod 2 similar but cryptic, palms oblique or transverse to chelate, propodus of gnathopod 1 ordinary to thin, rectangular, often elongate, of gnathopod 2 broadened, both poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, but often tapering distally, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long brushes or posterior setae, epimeron 3 ordinary or of 'rounded-glabrous' classification bearing 0-8 long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without interramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary to long, with or without supernumerary lateral or dorsal setae.

Relationship. Like *Phoxocephalus* but gnathopods diverse, gnathopod 2 enlarged. The eyes of *Phoxocephalus* are reduced or abnormal.

See *Eusyrophoxus*.

Species. *Cephalophoxoides bassi* (Stebbing, 1888) (Barnard & Drummond, 1978) [784]; *C. burleus* (Barnard & Drummond, 1978) [781]; *C. homilis* (J.L. Barnard, 1960a) [370]; *C. keppeli* (Barnard & Drummond, 1978) [773N]; *C. kergueleni* (Stebbing, 1888) (J.L Barnard, 1964b, 1967) (Bellan-Santini & Ledoyer, 1974) [851 to 370B]; *C. kukathus* (Barnard & Drummond, 1978) [780]; *C. rupullus* (Barnard & Drummond, 1978) [781]; *C. tunggeus* (Barnard & Drummond, 1978) [782B].

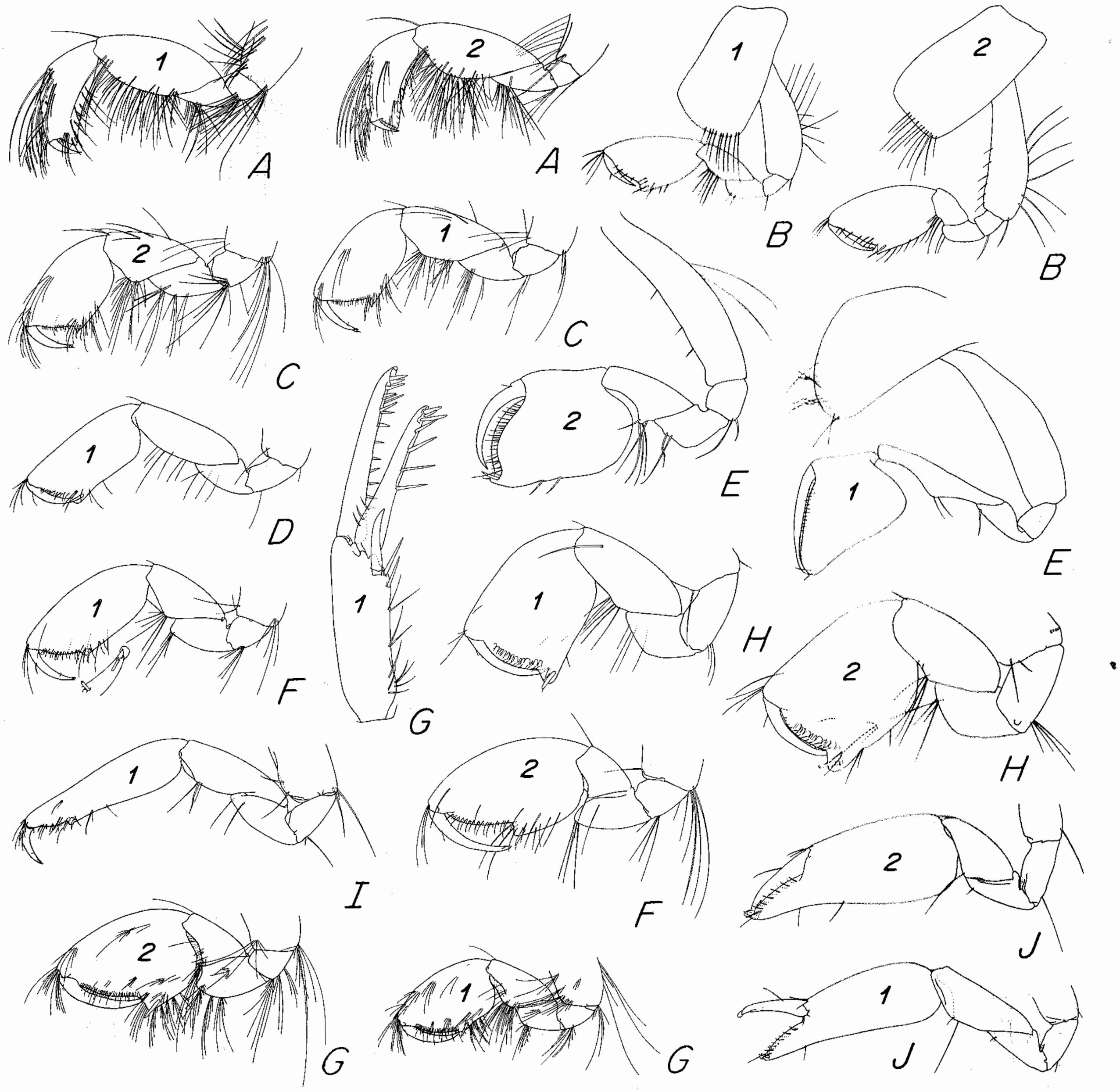


Fig.110. Phoxocephalidae. A, *Tipimegus thalerus*; B, *Phoxocephalus holbolli*; C, *Parharpinia villosa*; D, *Cunmurra itickerus*; E, *Joubinella strelkovi*; F, *Brolgus tattersalli*; G, *Urophoxus (= Pontharpinia) pinguis*; H, *Matong matong*; I, *Ganba pellati*; J, *Limnoporeia maranowe*.

Habitat and distribution. Marine, southern Australia; Kerguelen; to California, 0-2398 m, 8 species.

Cephalophoxus Gurjanova

Cephalophoxus Gurjanova, 1977: 81.

Type species. *Phoxocephalus regium* K.H. Barnard, 1930, original designation.

Diagnosis. Rostrum weakly constricted. Eyes present. Article 2 of antenna 1 short, ventral setae almost confined apically. Article 1 of antenna 2 weakly ensiform, article 3 with [? 2 facial setules], facial spines on article 4 in 1 row plus special apical spine(s), spines thick, article 5 short. Right mandibular incisor with [? 3 4 teeth, right lacinia mobilis bifid, simple, flabellate, absent] molar triturative, palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds with inner plates partly fused, poorly armed, apex of palp article 3 not protuberant, dactyl elongate, apical nail not

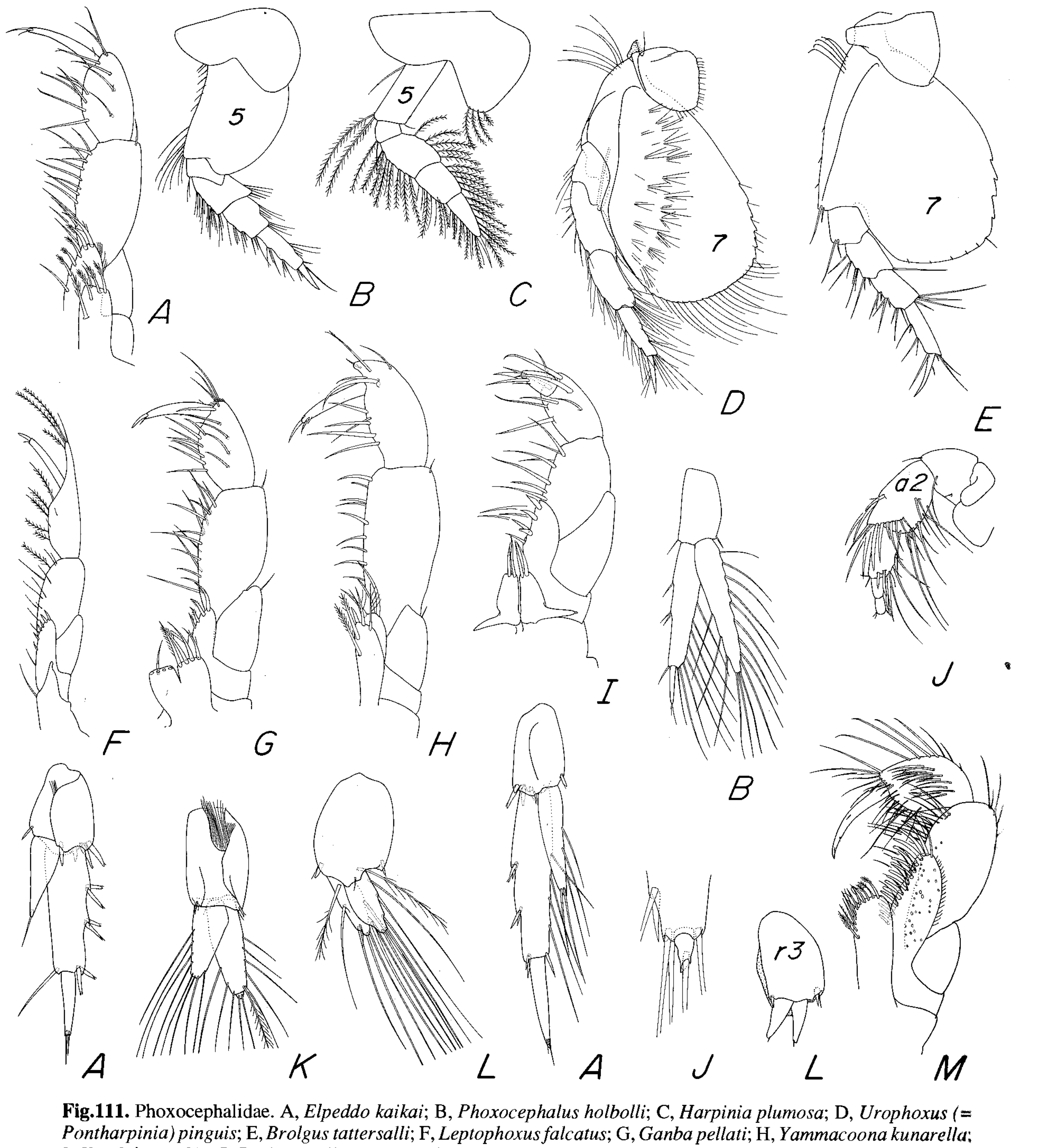


Fig.111. Phoxocephalidae. A, *Elpeddo kaikai*; B, *Phoxocephalus holbolli*; C, *Harpinia plumosa*; D, *Urophoxus (= Pontharpinia) pinguis*; E, *Brolgus tattersalli*; F, *Leptophoxus falcatus*; G, *Ganba pellati*; H, *Yammacoona kunarella*; I, *Kondoleus tekin*; J, *Brolgus millinus*; K, *Kotla batturi*; L, *Japara papporus*; M, *Tipimegus thalerus*.

distinct.

Gnathopods enlarged, similar, but gnathopod 2 even more enlarged, article 5 of gnathopods 1-2 very short, with eusirid attachment, cryptic, palms oblique, propodus of gnathopods 1-2 elongate, slightly broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, weakly tapering distally, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Only epimeron 2 with anterofacial setal brush; epimeron 3 of ordinary classification, with 3-5 weak posterior and 0-1 ventral setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary, with supernumerary lateral spine on each side.

Remarks. The only good drawing of mandible, by Hurley (1954a), is not certainly the right (though it looks to be) and therefore the queries in the description are not answered.

Relationship. Differing from *Phoxocephalus* in the cryptic carpus of both pairs of gnathopods; from *Cephalophoxoides* and *Parametaphoxus* by the cryptic carpus of gnathopod 1 (in the other two genera only gnathopod 2 has a cryptic carpus).

Species. *Cephalophoxus regium* (K.H. Barnard, 1930) (Hurley, 1954a), (Gurjanova, 1977) [775].

Habitat and distribution. Marine, New Zealand and Snares Islands, neritic to 91 m, 1 species.

Cocoharpinia Karaman

Cocoharpinia Karaman, 1980c: 154.

Type species. *Cocoharpinia iliffei* Karaman, 1980c, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically, article 3 in male densely brushy, not so in female. Article 1 of antenna 2 scarcely ensiform, article 3 with 2 facial setules, facial spine-setae on article 4 in 1 apical row, all spines thin, article 5 ordinary. Mouthparts in male reduced. Right mandibular incisor in female with [?3] teeth, right lacinia mobilis [?bifid], molar conical, not triturative, with 2 spines; palpar hump moderate, apex of palp article 3 oblique. Inner plate of maxilla 1 with 2 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not protuberant, dactyl stubby; apical nail elongate.

Gnathopods ordinary, small, weakly dissimilar, gnathopod 2 moderately enlarged, article 5 of gnathopods 1-2 very short, free on gnathopod 1, cryptic on gnathopod 2, palms oblique, propodus thin to moderate, ovatorectangular, elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 enlarged, dactyl ordinary.

Epimera 1-2 without brushes of setae, epimeron 3 of ordinary classification, lacking setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without interramal spike, with major displaced spine apicolaterally, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, rami longer than peduncle, bearing long article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. Male and female antenna 2 and pereopod 7 are so distinctive the 2 sexes may not be in the same genus.

Female not distinct from *Heterophoxus* but male lacking well-developed ensiform process on antenna 2 and therefore close to theoretical male of *Proharpinia*. Male characterised by dense aesthetascs on article 3 of antenna 1.

Species. *Cocoharpinia iliffei* Karaman, 1980c [367Z].

Habitat and distribution. Marine, Bermuda, sea cave, 1 species.

Coxophoxus J.L. Barnard

Coxophoxus J.L. Barnard, 1966a: 84.–Barnard & Drummond, 1978: 530.–Gurjanova, 1977: 68.

Type species. *Coxophoxus hidalgo* J.L. Barnard, 1966a, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically. [?Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules], facial spines on article 4 in 1 main row, spines thin, article 5 short. Right mandibular incisor with [?3 4 teeth, right lacinia mobilis unknown] molar triturative, large to medium; palpar hump small, apex of palp article 3 truncate. Inner plate of maxilla 1 naked, palp 1-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods weakly dissimilar, large, gnathopod 1 weakly enlarged, 2 more so, article 5 of gnathopods 1-

2 elongate, with eusirid attachment, palms oblique to transverse, propodus broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with few posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines, *inner ramus of both pairs of uropods with setae (instead of spines, = unusual)*. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 2-3 apical setae. Telson ordinary.

Relationship. The only harpiniin with triturative molar; therefore, the only triturative genus with thin article 2 of pereopod 5. Externally distinct from *Heterophoxus* in the nonensiform antenna 2, from *Basuto* in the thin article 4 of pereopod 4. Gnathopods like those of *Joubinella* but article 2 of pereopod 5 thin in *Coxophoxus* and broad in *Joubinella*.

Species. *Coxophoxus coxalis* (K.H. Barnard, 1932) (Gurjanova, 1977) [833]; *C. hidalgo* J.L. Barnard, 1966a [310B].

Habitat and distribution. Marine, South Georgia and southern California, 0-1675 m, 2 species.

Cunmurra Barnard & Drummond

Figs 108J, 110D

Cunmurra Barnard & Drummond, 1978: 92.

Type species. *Cunmurra itickerus* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 elongate, ventral setae situated in midmargin. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, molar not triturative, with 4+ splayed spines; palpar hump medium, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods slightly dissimilar, gnathopod 2 weakly enlarged, article 5 of gnathopod 1 elongate, of gnathopod 2 shorter, palms oblique, propodus of gnathopod 1 thin, rectangular, elongate, of gnathopod 2 broadened, both poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad to medium; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without interramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. This is a transitional genus between the brolgin group and the birubiin group. Unlike brolgins it has more than 3 spines on the molar but unlike the birubiin group it retains the weakly enlarged gnathopod 2. Epimeron 3, with its 3 or fewer long setae, is of the 'rounded' and/or 'glabrous' condition typical of most brolgins. The carpus of gnathopod 2 is not fully shortened as in apomorphic brolgins. Maxilla 1 has the full setal complement of birubiins, the normal antenna 2 and stout distal articles of pereopods 5-6.

Species. *Cunmurra itickerus* Barnard & Drummond, 1978 [785].

Habitat and distribution. Marine, South Australia, sublittoral, 1 species.

Diogodias Barnard & Drummond

Diogodias Barnard & Drummond, 1978: 467.

Type species. *Metaphoxus longicarpus* Ledoyer, 1973a, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. [?Right mandibular incisor with 3 teeth, right lacinia mobilis flabellate], molar absent; palpar hump medium, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipedal inner plates partly fused, apex of palp article 3 not protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 moderately to strongly enlarged, article 5 of gnathopod 1 elongate, of gnathopod 2 cryptic, palms oblique, propodus of gnathopods 1-2 slightly elongate or broadened, respectively, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long posterior setae, epimeron 3 of rounded-glabrous classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without interramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 0-2 apical setae. Telson ordinary to elongate.

Relationship. Like *Metaphoxus* and *Vasco* but carpus of gnathopod 1 elongate.

See *Parajoubinella* and *Ringaringa*.

Removal. See *Ringaringa*.

Species. *Diogodias longicarpus* (Ledoyer, 1973a, 1986) [698]; *D. platyrostris* (Ledoyer, 1973a, 1986) [698].

Habitat and distribution. Marine, Madagascar, 2-20 m, 2 species.

Elpeddo Barnard & Drummond

Figs 109B, 111A

Elpeddo Barnard & Drummond, 1978; 118.

Type species. *Elpeddo kaikai* Barnard & Drummond, 1978, original designation.

Diagnosis Rostrum unconstricted. Eyes absent. Article 2 of antenna 1 short, ventral setae confined apically. *Male antenna 1, primary flagellum with callynophore.* Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 row, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 3 basally fused spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 3 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, but gnathopod 2 weakly enlarged, article 5 of gnathopods 1-2 of ordinary length, free, without eusirid attachment, palms oblique, propodus ordinary, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, but weakly tapering distally, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long posterior setae, epimeron 3 of rounded-glabrous classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 2 short apical setae. Telson ordinary.

Relationship. Like *Brolgus* and *Ganba* but article 2 on outer ramus of uropod 3 with 2 apical setae. Differing from *Kuritus* in the ordinary (thus short) article 5 of gnathopod 2. Closest to *Wildus* but differing in the fully split (ordinary) inner plates of the maxilliped, shortness of setae on article 2 of outer ramus on uropod 3, and the odd lysianassid antenna 1 of the male.

Differing from its more primitive relative, *Fuegiphoxus*, in the loss of 2 setae on the inner plate of maxilla 1, loss of main spine on the inner plates of the maxillipeds, but with the development of displaced spine on uropod 1, neotenic elongate form of article 2 on outer ramus of uropod 3 and the presence of giant calceoli on article 5 of male antenna 2.

Species. *Elpeddo kaikai* Barnard & Drummond, 1978 [781].

Habitat and distribution. Marine, New South Wales, sublittoral, 1 species.

Eobrolgus J.L. Barnard

Eobrolgus J.L. Barnard, 1979b: 376.–Barnard & Barnard, 1982a: 34.

Type species. *Paraphoxus spinosus* Holmes, 1905, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short to medium, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid or simple, thin, molar not triturative, with 4+ splayed spines, pillow-shaped, palpar hump medium, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail obsolescent to absent.

Gnathopods ordinary, small, similar, article 5 of gnathopod 1 of ordinary length, of 2 very short, cryptic, palms oblique, propodus of gnathopods 1-2 ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal armament, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad and narrow respectively; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 1 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. Closely similar to *Paraphoxus* but bearing more than 3 spines on mandibular molar, 2 or more strong rows of thick facial spines on article 4 of antenna 2, the presence of more than 2 setae on the inner plate of maxilla 1 and the presence of one or more long setae on epimeron 3.

Like *Foxiphalus* but setae on article 2 of antenna 1 extending apically at least in female.

Species. *Eobrolgus chumashi* Barnard & Barnard, 1981, 1982a [370]; ?*E. pontarpioides* (Gurjanova, 1953) [286]; *E. spinosus* (Holmes, 1905) (Barnard & Barnard, 1981, 1982a) [364 + 379T].

Habitat and distribution. Marine, North Pacific and north-western Atlantic, cool water, 2-519 m, 3 species.

Eusyrophoxus Gurjanova

Eusyrophoxus Gurjanova, 1977: 77.

Type species. *Phoxocephalus tenuipes* Stephensen, 1925, original designation.

Diagnosis. Rostrum unconstricted. Eyes absent. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 weakly ensiform, article 3 with [?2 facial setules], facial spines on article 4 in [?1, 2 + rows, ?all ?some spines thick ?some spines thin], article 5 short. Right mandibular incisor with [?3 4 teeth, right lacinia mobilis ?bifid, ?simple, ?flabellate, ?absent, molar ?triturative, with ?3 4+ basally fused ?splayed spines; palpar hump ?small, apex of palp article 3 ?oblique, ?truncate. Inner plate of maxilla 1 with ?0,1,2,3,4,5,6,7 setae, palp ?1-articulate. Maxillipeds ?ordinary, apex of palp article 3 ?not strongly protuberant, dactyl ?elongate, apical nail ?distinct].

Gnathopods medium to large, similar, article 5 of gnathopods 1-2 of ordinary length, free, and cryptic respectively, with eusirid attachment, palms transverse, propodus broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thin or no armaments. Article 2 of pereopod 5 of broad form, but tapering distally, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 [?without long facial brushes or posterior setae], epimeron 3 bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with [?no apical setae]. Telson ordinary.

Relationship. Differing from the following genera with triturative mandibular molar as follows: from *Phoxocephalus* in the eusirid gnathopods one member of which has cryptic carpus; from *Cephalophoxoides* by the almost even sizes of the gnathopodal propodus; from *Cephalophoxus* by the noncryptic carpus of gnathopod 1; and from *Parajoubinella* in the cryptic carpus of gnathopod 2 and the normal head.

Species. *Eusyrophoxus tenuipes* Stephensen, 1925 [209B + 211B].

Habitat and distribution. Marine, north-western Arctic Atlantic, 600-1505 m, 1 species.

Eyakia J.L. Barnard

Eyakia J.L. Barnard, 1979b: 375.

Type species. *Parharpinia calcarata* Gurjanova, 1938b, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 of medium length, ventral setae widely spread. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows plus special apical spines, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar not triturative, pillow shaped, with 3-4+ splayed spines, one of those very large; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 moderately to strongly enlarged, article 5 of gnathopod 1 of ordinary length, but short on gnathopod 2, without eusirid attachment, palms oblique, propodus of gnathopods 1-2 ordinary or ovatorectangular, and weakly elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form but tapering distally, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 1 or more long setae. Urosomite 3 without dorsal hook.

Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Variables. Coxae 1-2 with posteroventral tooth (like *Grandifoxus*).

Relationship. Characterised by the enlarged spine on the mandibular molars which distinguishes it especially from *Cunmurra* and *Paraphoxus*; also differing from *Paraphoxus* in the strongly setose epimeron 3 and fully developed 4 setae on the inner plate of maxilla 1. From *Parharpinia* and *Protophoxus* in the lack of a displaced spine on uropod 1 and the enlarged spine on the mandibular molar.

See *Mesophoxus*.

Species. *Eyakia calcarata* (Gurjanova, 1938b, 1951) (J.L. Barnard,1960a) [230 + 540 + B]; *E. ochotica* (Gurjanova, 1953) [284]; *E. robusta* (Holmes, 1908) (J.L. Barnard, 1960a) [379 + B]; *E. subuncigera* (Kudrjaschov, 1965c) [279]; *E. uncigera* (Gurjanova, 1938b, 1951) [389].

Habitat and distribution. Marine, cold North Pacific, 4-689 m, 5 species.

Feriharpinia Barnard & Karaman

Feriharpinia Barnard & Karaman, 1982: 183.

Type species. *Harpinia ferentaria* Gurjanova, 1977, original designation.

Diagnosis. Rostrum unconstricted. Eyes absent. Article 2 of antenna 1 short, ventral setae widely spread. Article 1 of antenna 2 [?ensiform], article 3 with 3 facial setules, facial spines on article 4 in [?1 row, ?all spines thin], article 5 ordinary. Right mandibular incisor with [?3 teeth, right lacinia mobilis ?bifid, molar not triturative, with ?3+ basally fused splayed spines; ?special spines; palpar hump ?small] apex of palp article 3 oblique. Inner plate of maxilla 1 with 1 seta, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail [?distinct].

Gnathopods ordinary, small [?dissimilar, gnathopod 2 ?weakly enlarged], article 5 of gnathopods 1-2 very short, free, palms oblique, propodus ordinary, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 [?without posteroproximal setae, article 6 with thin armaments]. Article 2 of pereopod 5 of [?narrow form], articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 slightly enlarged, dactyl ordinary.

Epimera 1-2 [?without long facial brushes or posterior setae], epimeron 3 of ordinary classification, bearing 4 or more long setae. Urosomite 3 [?without dorsal hook]. Peduncle of uropod 1 [?without inter-ramal spike, ?without major displaced spine, rami of uropods 1-2 ?not continuously spinose to apex, inner ramus of uropod 1 with ?1 row of marginal spines]. Inner ramus of uropod 2 [?ordinary]. Uropod 3 [?ordinary, one of rami ?longer than peduncle, bearing ?article 2 on outer ramus, with ?2 apical setae]. Telson ordinary, but slightly elongate. See 'Relationship' for male armaments.

Relationship. Like *Harpinia* but male armaments distinctive: instead of brushes being present or absent on article 1 of antenna 1 and present on article 1 of flagellum of antenna 1 and on articles 3-4 of antenna 2, and instead of article 1 of primary flagellum on antenna 1 being enlarged and dominant, the male of *Feriharpinia* has a brush of aesthetascs on article 3 of the peduncle of antenna 1. Article 1 of the primary flagellum is not grossly enlarged, and article 5 of antenna 2 has a row of large dorsal calceoli, not found in *Harpinia*.

Species. *Feriharpinia ferentaria* Gurjanova, 1977 [279].

Habitat and distribution. Marine, Okhotsk Sea, west Kamchatka, 196-230 m, 1 species.

Foxiphalus J.L. Barnard

Foxiphalus J.L. Barnard, 1979b: 372.–Barnard & Barnard, 1982a: 4 (key).

Type species. *Pontharpinia obtusidens* Alderman, 1936, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 elongate, ventral setae narrowly to widely spread. Article 1 of antenna 2 ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid or simple, thin; molar not triturative, with 4+ splayed spines; palpar hump medium, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, article 5 of ordinary length to elongate, free, palms oblique, propodus ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes but with posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially, or not, rami of uropods 1-2 not conspicuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami not longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson with supernumerary lateral or dorsal spines (in adults or open sea forms).

Relationship. Differing from *Birubius* in the presence of posterior setae on epimeron 2 and the loss of the strong dactylar nail on the maxilliped. Differing from *Rhepoxynius* in the unconstricted rostrum; from *Grandifoxus* in the unconstricted rostrum and 2 or fewer setules on article 3 of antenna 2.

See *Eobrolgus* and *Paraphoxus*.

Species. See J.L. & C.M. Barnard, 1982a; *F. aleuti* J.L. & C.M. Barnard, 1982a [270]; *F. apache* J.L. & C.M. Barnard, 1982a [370]; *F. cognatus* (J.L. Barnard, 1960a) [370]; *F. golfensis* J.L. & C.M. Barnard, 1982a [540]; *F. major* (J.L. Barnard, 1960) (J.L. & C.M. Barnard, 1982a) [379]; *F. obtusidens* (Alderman, 1936) (J.L. & C.M. Barnard, 1982a) [369]; *F. secasius* J.L. & C.M. Barnard, 1982a [541]; *F. similis* (J.L. Barnard, 1960) (J.L. & C.M. Barnard, 1982a) [379]; *F. xiximeus* J.L. & C.M. Barnard, 1982a [373].

Habitat and distribution. Marine, north-eastern Pacific Ocean, Aleutians to Central America, 0-324 m, 9 species.

Fuegiphoxus Barnard & Barnard

Fuegiphoxus J.L. & C.M. Barnard, 1980b: 849.

Type species. *Parharpinia fuegiensis* Schellenberg, 1931, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae moderately spread. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 or 2+ rows, some spines thick, some spines thin, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, subflabellate, molar not triturative, with 3 basally fused spines, one of those elongate; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods small, dissimilar, gnathopod 2 weakly enlarged, article 5 of gnathopod 1 of ordinary length, free, of gnathopod 2 short and cryptic, palms oblique, propodus of gnathopods ovatorectangular, elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin or thick armaments. Article 2 of pereopod 5 of broad narrow form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. Differing from *Paraphoxus* in the positive but weak division of spine rows on the face of article 4 on antenna 2, the proximal position of the dorsal notch on the same article; elongation of the third spine on the molar; presence of 4 (versus 2) setae on the inner plate of maxilla 1, incompleteness of cryptic condition on carpus of gnathopod 2, presence of ventral setae on epimeron 3 and immersion of apical nails on rami of uropods 1-2.

Differing from *Eyakia* in the short thick article 2 of antenna 1, distinctly enlarged gnathopod 2, untapered article 2 of pereopod 5, and poorly setose epimeron 3.

See *Elpeddo*.

Species. *Fuegiphoxus abjectus* J.L. Barnard & C.M. Barnard, 1980b [864]; *F. fuegiensis* (Schellenberg, 1931) (Stephensen, 1949) (J.L. Barnard, 1960a) (Barnard & Drummond, 1978) [867 +430 + B]; *F. inutilus* J.L. Barnard & C.M. Barnard, 1980b [833]; *F. ?uncinata* (Chevreux, 1912d) [872].

Habitat and distribution. Marine, cold South America and Antarctica, 0-250 m, 4 species.

Ganba Barnard & Drummond

Figs 110I, 111G

Ganba Barnard & Drummond, 1978: 124.

Type species. *Ganba pellati* Barnard & Drummond 1978, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae sparse and confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 or debatably 2 rows, all spines thick, article 5 short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, molar not triturative, with 3 basally fused spines; palpar hump small, apex of palp article 3 truncate. Inner plate of maxilla 1 with 2 setae, palp 2-articulate. Maxillipeds: inner plates partly fused, apex of palp not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 moderately enlarged, article 5 of gnathopod 1 of ordinary length, of gnathopod 2 very short, without eusirid attachment, cryptic, palms oblique, propodus of gnathopods 1-2 thin, ovatorectangular, elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long posterior setae, epimeron 3 of rounded-glabrous classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 without rows of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 small, rami scarcely longer than peduncle, outer ramus bearing article 2, with 1 apical seta. Telson ordinary.

Relationship. Like *Kuritus* and *Wildus* but outer ramus of uropod 3 with only 1 apical seta.

Differing from *Brolgus* in the partially fused inner plates of the maxillipeds, thin gnathopod 2 and dominance of spines in place of setae on article 6 of pereopods 3-4.

Species. *Ganba pellati* Barnard & Drummond, 1978 [794].

Habitat and distribution. Marine, southern Australia, sublittoral, 1 species.

Grandifoxus J.L. Barnard

Grandifoxus J.L. Barnard, 1979b: 374.–Coyle, 1982: 432 (key).

Type species. *Phoxus grandis* Stimpson, 1856b, original designation.

Diagnosis. Rostrum constricted. Eyes present. Article 2 of antenna 1 of medium length, ventral setae narrowly or widely spread. Article 1 of antenna 2 ensiform, or not, article 3 with several facial setules or setae, facial spines on article 4 in 2+ rows, spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid or simple, thin or flabellate, molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4, setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail scarcely distinct or absent.

Gnathopods ordinary, small, similar, article 5 free, elongate, palms almost transverse, propodus heavily setose anteriorly, almost trichophoxin in shape. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes but with posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially or not, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson with supernumerary lateral or dorsal spines or setae.

Special character. Coxae 1-3 with teeth or humps ventrally in adults.

Relationship. Like *Metharpinia* but subapical supernumerary nails on dactyls of uropods 1-2 absent, facial armaments on article 3 of antenna 2 more than 2.

Differing from *Foxiphalus* in the superornamented article 3 of antenna 2 and the constricted rostrum. From *Rhepoxynius* in the second antennal character plus, in most adults, the humped coxae and extra telsonic armament.

Species. See Coyle (1982); *G. acanthinus* Coyle, 1982 [230]; *G. aciculatus* Coyle, 1982 [230]; *G. grandis* (Stimpson, 1856b) (= *G. milleri* Thorsteinson, 1941) (J.L. Barnard, 1960a, 1980b) [270]; *G. lindbergi* (Gurjanova, 1953) [230]; *G. longirostris* (Gurjanova, 1938b, 1951) (?= *G. lindbergi* Gurjanova, 1953) (J.L. Barnard, 1980b) [230]; *G. nasuta* (Gurjanova, 1936d) (Coyle, 1982) [290+]; *G. robustus* (Gurjanova, 1938b, 1951) [391]; *G. vulpinus* Coyle, 1982 [230]; *G. westi* (Gurjanova, 1980a) [286]; other unnamed species [230].

Habitat and distribution. Marine, Japan Sea to Monterey Bay, California, including Alaska, 0-?75 m, 9 species.

Harpinia Boeck

Figs 107F, 111C

Harpinia Boeck, 1876: 218.–Sars, 1895: 150.–Stebbing, 1906: 140.–J.L. Barnard, 1960a: 344.–Barnard & Drummond, 1978: 535.

Type species. *Phoxus plumosus* Krøyer, 1842, original designation.

Diagnosis. Rostrum unconstricted. Eyes absent. Article 2 of antenna 1 short, ventral setae confined apically; article 1 of male peduncle brushy, or not (*H. crenulata*), male primary flagellum with callynophore or not (*H. crenulata*). Article 1 of antenna 2 strongly ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 row, spines thin, article 5 very short; male articles 3-4 brushy, male flagellum as short as in female. Right mandibular incisor with 4 teeth, right lacinia mobilis bifid; molar not triturative, with 3+ basally fused or splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 2 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate or not, apical nail distinct.

Gnathopods small, slightly dissimilar, gnathopod 2 weakly enlarged, article 5 of gnathopods 1-2 very short, free, but tending to be cryptic on gnathopod 2, with weak eusirid attachment, palms oblique, propodus ordinary, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 enlarged, dactyl ordinary.

Epimera 1-2 without long posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 1-2 apical setae. Telson ordinary, or rarely with supernumerary lateral or dorsal armaments.

Sexual dimorphism. Mouthparts degenerate in some terminal males.

Variables. Specific taxonomy based on teeth of pereopod 7 article 2, tooth of epimeron 3, tooth of head.

Relationship. Like *Harpiniopsis* and *Pseudharpinia* but article 1 of primary flagellum on male elongate and brushy; flagellum of male antenna 2 short as in female. See *Feriharpinia.*

Species. See J.L. Barnard (1960a); Chevreux and Fage (1925); Gurjanova (1951); Karaman (1973a); Lincoln (1979a); Sars (1895); Watling (1981, key); *H. abyssi* Sars, 1879, 1885, 1886, 1895 (= *H. carinata* Sars, 1879) [250AB]; *H. antennaria* Meinert, 1893 (= *H. neglecta* Sars, 1895) [216 + B]; *H. bidentata* Stephensen, 1925a [211B]; *H. cabotensis* Shoemaker, 1930a [260]; *H. clivicola* Watling, 1981 [307B]; *H. crenulata* Boeck, 1871b (= *H. nana* Bonnier, 1896) (Sars, 1895) [354 + B]; *H. crenuloides* Stephensen, 1925a [200B]; *H. curtipes* Stephensen, 1925a (?Ledoyer, 1986) [224A + ?618B]; *H. dellavallei* Chevreux, 1911d [339 + BA]; *H. laevis* Sars, 1895 (Karaman, 1980c) [240B]; *H. latipes* Norman, 1900c see (*Pseudharpinia*) (Chevreux, 1927) [350B]; *H. mucronata* Sars, 1879, 1885, 1886, 1895 [220B]; *H. pectinata* Sars, 1895 (= *H. mediterranea* Karaman, 1973a) (Watling, 1981) [352 + 220 + B]; *H. plumosa* (Krøyer, 1842) (= *H. fusiformis* Stimpson, 1853) [216 + B]; *H. propinqua* Sars, 1895 (Bousfield, 1973) [250 + B]; *H. serrata* Sars, 1879, 1885, 1886, 1895 [250 + B]; *H. truncata* Sars, 1895 (Watling, 1981) [354 + BA].

Habitat and distribution. Marine, cool water North Atlantic and Arctic, Mediterranean, 6-3521 m, 17 species.

Harpiniopsis Stephensen

Harpiniopsis Stephensen, 1925a: 171.–J.L. Barnard, 1960a: 325.

Type species. *Harpiniopsis similis* Stephensen, 1925a, monotypy.

Diagnosis. Rostrum unconstricted, head often with antennal tooth. Eyes absent. Article 2 of antenna 1 short, ventral setae weakly ventral or almost confined apically. Article 1 of antenna 2 not or weakly, ensiform, article 3 with several facial setules, facial spines on article 4 in 1 main row, spines thin, article 5 ordinary to short. Right mandibular incisor with 3-4 teeth, right lacinia mobilis bifid or simple, flabellate or thin, molar not triturative, with 2+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 2 setae, palp 2-articulate. Maxillipedal inner plates poorly armed, thick, apex of palp article 3 not strongly protuberant, dactyl stubby, apical nail distinct, elongate.

Gnathopods ordinary, small, similar, or gnathopod 2 weakly enlarged, article 5 of gnathopods 1-2 very short, free to cryptic, palms oblique, propodus ordinary to thin, ovatorectangular to elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary (often with spike teeth), article 3 enlarged, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 variable, of ordinary or rounded classification, bearing 3 or more or 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 0-2 apical setae. Telson ordinary or with supernumerary lateral or dorsal setae.

Variables. Epistome often produced; article 2 of pereopod 7 often with spike teeth; outer ramus of uropod 1 occasionally shortened; apical setae on outer ramus of uropod 2 often vestigial.

Relationship. More ancestral than *Harpinia*; male antennae of normal phoxocephalid character, with elongate flagellum on antenna 2, no special brushes on antenna 1 besides normal basomedial brush on article 1; antenna 2 poorly ensiform. Like *Heterophoxus* but eyes absent.

See *Pseudharpinia*.

Species. See J.L. Barnard (1960a, 1966a,b, 1967a, 1971b); Gurjanova (1951); *H. amundseni* (Gurjanova, 1946) (Just, 1970) [220 + AB]; *H. australis* (J.L. Barnard, 1961b) [718B]; *H. bandelei* Ledoyer, 1986 [618B]; *H. capensis* J.L. Barnard, 1962d (Ledoyer, 1986) [702A + ?724A]; *H. emeryi* J.L. Barnard, 1960a [310AB]; *H. epistomata* J.L. Barnard, 1960a [310B]; *H. fulgens* J.L. Barnard, 1960a [310B]; *H. galera* J.L. Barnard, 1960a [310B]; *H. gurjanovae* (Bulycheva, 1936b) [280 + 287]; *H. kobjakovae* (Bulycheva, 1936b) [280]; *H. miharaensis* (Nagata, 1960, 1965a) [395]; *H. moiseevi* (Gurjanova, 1953) [286]; *H. nadania* J.L. Barnard, 1961b [715B]; *H. naiadis* J.L. Barnard, 1960a [310AB]; *H. orientalis* (Bulycheva, 1936b) [391]; *H. pacifica* (Bulycheva, 1936b) [391A]; *H. percellaris* J.L. Barnard, 1971b [310AB]; *H. petulans* J.L. Barnard, 1966a [310B]; *H. profundis* J.L. Barnard, 1960a [310B]; *H. pseudonadania* Ledoyer, 1986 [618B]; *H. salebrosa* (Gurjanova, 1936d) [290]; *H. schurini* (Bulycheva, 1936b) [280 + B]; *H. similis* Stephensen, 1925a, 1940b [220 + B]; *H. spaercki* (Dahl, 1959) (Kamenskaya, 1981a) [602A + 601A]; *H. tarasovi* (Bulycheva, 1936b) [391]; *H. triplex* J.L. Barnard, 1971b [310A]; *H. wandichia* (J.L. Barnard, 1962d) [801tA]; species D, J.L. Barnard, 1960a [546].

Habitat and distribution. Marine, cosmopolitan in cold water except North Atlantic shallows (replaced by *Harpinia*), 2-6580 (confirmed) m, 27 species.

Heterophoxus Shoemaker

Fig.109E

Heterophoxus Shoemaker, 1925: 22.–J.L. Barnard, 1960a: 318.–Barnard & Drummond, 1978: 532.

Type species. *Heterophoxus pennatus* Shoemaker, 1925 (= *Harpinia oculata* Holmes, 1908), monotypy.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae widely spread, but almost confined apically. Article 1 of antenna 2 strongly ensiform, article 3 with many facial setules, facial spines on article 4 in 1 main row, spines thin, article 5 very short. Right mandibular incisor with 4+ teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 3 basally fused spines; palpar hump medium, apex of palp article 3 oblique. Inner plate of maxilla 1 with 2 setae, palp 2-articulate. Maxillipedal inner plates partly fused, poorly armed, apex of palp article 3 not strongly protuberant, dactyl not elongate, but apical nail distinct.

Gnathopods small, similar, article 5 of gnathopods 1-2 very short, without eusirid attachment, almost cryptic, palms oblique, propodus of gnathopods 1-2 quatorectangular, elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 of ordinary size, article 3 enlarged, dactyl ordinary.

Epimera 1-2 without long midfacial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without displaced spine, rami of uropods 1-2 continuously spinose to apex, or not, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary or with supernumerary lateral spines.

Relationship. Probably close to the ancestral harpiniin: with eyes, ensiform antenna 2, and continuously spinose rami of uropods 1-2 (in some taxa). Without antennal brushes of male *Harpinia* and *Feriharpinia*. *Coxophoxus* has a triturative molar. *Pseudharpinia* and *Palabriophoxus* lack eyes; so does *Harpiniopsis* which retains a moderate ensiform process. See *Proharpinia*, *Torridoharpinia* and *Basuto*, all lacking ensiform process (see Karaman, 1980c: 152).

Species. *Heterophoxus cephalodens* Griffiths, 1975 [743]; *H. oculatus* (Holmes, 1908) (= *H. affinis* Holmes, 1908) (= *H. pennatus* Shoemaker, 1925) (= *H. nitellus* J.L. Barnard, 1960a) [490 + B]; *H. ophthalmicus* (Schellenberg, 1925a) [445]; *H. opus* Griffiths, 1975 [743]; *H. trichosus* K.H. Barnard, 1932 [870]; *H. videns* K.H. Barnard, 1930 [880].

Habitat and distribution. Marine, Antarctica, Africa, Pan-America, 2-1941 m, 6 species.

Hopiphoxus Barnard & Drummond

Hopiphoxus Barnard & Drummond, 1978: 469.

Type species. *Metaphoxus simillimus* J.L. Barnard, 1967a, original designation.

Diagnosis Rostrum unconstricted. Eyes absent. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 row, spines thin, article 5 ordinary. Right mandibular incisor with [?3] teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 2 basally fused spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds with small plates poorly armed, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods large, similar, gnathopod 2 strongly enlarged, article 5 of gnathopods 1-2 very short, cryptic, palms oblique, propodus broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, some rami of uropods 1-2 continuously setose to apex, inner ramus of uropod 1 with 1 row of marginal setae. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing long article 2 on outer ramus, with 2 weak apical setae. Telson elongate.

Additional character. Uropods 1-2 with setae on rami.

Relationship. Generally distinguished from genera around *Metaphoxus* in the setose rami of uropods 1-2 but differing from the very apomorphic *Kondoleus* in the ordinary antennae and urosome and unfused inner ramus of uropod 2.

Species. *Hopiphoxus simillimus* (J.L. Barnard, 1967a) [309A].

Habitat and distribution. Marine, Baja California, Cedros Trench, 2706 m, 1 species.

Japara Barnard & Drummond

Fig.111L

Japara Barnard & Drummond, 1978: 474.

Type species. *Japara papporus* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted but obsolescent. Eyes present. Article 2 of antenna 1 of medium length, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 row, spine(s) thick, article 5 very short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 4+ basally fused spines, one enlarged, elongate; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds with inner plates partly fused, inner and outer poorly armed, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods large, dissimilar, gnathopod 2 moderately enlarged, article 5 of gnathopod 1 of ordinary length, with eusirid attachment, of gnathopod 2 short and cryptic, palm of gnathopod 1 transverse to chelate, of gnathopods 2 oblique, propodus ovatorectangular, respectively elongate, and broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow respectively; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 without marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 minute, rami much shorter than peduncle, lacking article 2 on outer ramus. Telson ordinary, but normally lateral setule pairs now distal.

Relationship. Differing from *Metaphoxus*, *Parametaphoxus*, *Metaphoxoides*, *Cephalophoxus* and *Mesophoxus* in the short uropod 3 with short rami; from *Metaphoxus* and *Cephalophoxus* in the chelate gnathopod 1; from the latter in the more elongate carpus of gnathopod 1; from *Mesophoxus* (with short uropod 3) in the enlarged gnathopods, weak rostrum, short article 2 of antenna 1, poor facial armament on article 4 of antenna 2; from both *Mesophoxus* and *Paramesophoxus* in the short palp of maxilla 1; from *Paramesophoxus* also in the large gnathopods with cryptic carpus and weak armament of antenna 2.

Species. *Japara papporus* Barnard & Drummond, 1978 [784].

Habitat and distribution. Marine, south-eastern Australia, 10-43 m, 1 species.

Jerildaria Barnard & Drummond

Jerildaria Barnard & Drummond, 1978: 442.

Type species. *Jerildaria joubiphoxus* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 of medium length, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar triturative, palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds with small plates poorly armed, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, enlarged, article 5 of gnathopod 1 free, elongate, with eusirid attachment, of gnathopod 2 medium and subcryptic, palms transverse, to chelate, propodus broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes, but with sparse posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of mmmuropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 0-1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing short article 2 on outer ramus, with 2 apical setae. Telson elongate.

Relationship. Differing from *Phoxocephalus*, *Cephalophoxus* and *Cephalophoxoides* in the enlarged gnathopods with elongate eusirid article 5 on gnathopod 1. Differing also from *Phoxocephalus* and *Cephalophoxoides* in the shortened article 2 on the outer ramus of uropod 3. Differing from *Parajoubinella* in the subcryptic carpus of gnathopod 2.

Like *Eusyrophoxus* but article 2 on outer ramus of uropod 3 short, article 2 on antenna 1 longer, and armaments on article 4 of antenna 2 well developed.

Species. *Jerildaria joubiphoxus* Barnard & Drummond, 1978 [781].

Habitat and distribution. Marine, New South Wales, 43 m, 1 species.

Joubinella Chevreux

Figs 108O, 110E

Joubinella Chevreux, 1908a: 8.–Barnard & Drummond, 1978: 153.

Type species. *Joubinella ciliata* Chevreux, 1908a, monotypy.

Diagnosis. Divisible into 2 genera. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 elongate to medium in length, ventral setae absent or confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 variable, in 1, 2+ rows, or absent, article 5 ordinary to very thin. Right mandibular incisor with [?3 ?4 teeth, right lacinia mobilis ?bifid, ?simple, ?flabellate, ?absent], molar triturative; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, moderately to strongly enlarged, article 5 of gnathopod 1 free, elongate, with eusirid attachment, on gnathopod 2 similar or cryptic, palms transverse to chelate, propodus of gnathopods 1-2 broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form, but tapering distally, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 with or without inter-ramal spike, without major displaced spine, rami of uropods 1-2 continuously spinose to apex or not, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 0-2 apical setae. Telson ordinary.

Relationship. The only joubinellin with triturative molar; gnathopods extremely predatorial; facial spines on antenna 2 poorly organised; flagellum of female antenna 2 severely reduced.

Species. *Joubinella bychovskii* Gurjanova, 1952b [286]; *J. ciliata* Chevreux, 1908a [358B]; *J. indentata* Ledoyer, 1986 [618B]; *J. strelkovi* Gurjanova, 1952b [290B]; *J. traditor* Pirlot, 1932b (J.L. Barnard, 1961b) [600B]; *J. tzvetkova* Kudrjaschov, 1965c [282].

Habitat and distribution. Marine, world pelagic, 20-1340 m, 5 species.

Kondoleus Barnard & Drummond

Figs 109J, 111I

Kondoleus Barnard & Drummond, 1978: 480.

Type species. *Kondoleus tekin* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted, obsolescent. Eyes present. Article 2 of antenna 1 of medium length, forming sleeve around base of article 3, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, spheroid, article 5 very short. Right mandibular incisor with 4+ teeth, right lacinia mobilis flabellate, molar not triturative, with 3 basally fused elongate spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds inner plates small, with basal spouts, armament sparse, apex of palp article 3 not strongly protuberant, dactyl not elongate, stubby apical nail distinct.

Gnathopods large, dissimilar, gnathopod 2 moderately enlarged, article 5 of gnathopod 1 free, elongate, with eusirid attachment, of gnathopod 2 short and cryptic, palms chelate, propodus of gnathopods 1-2 respectively trapezoidal and ovatorectangular, of gnathopod 2 broadened, both poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, but some with setae, inner ramus of uropod 1 with 1 row of marginal seta(e). Inner ramus of uropod 2 fused to peduncle. Uropod 3 minute, one of rami scarcely longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson elongate.

Special characters. Spines on antenna 2 spheroid; flagella of antenna 1 and in female of antenna 2 weak to vestigial; maxillipeds with basal spouts; articles 4-5 of pereopods 5-6 rhomboid; some rami of uropods 1-2 with long setae; urosomites 1-2 fused, engorged, glandular.

Relationship. Differing from *Metaphoxus*, *Joubinella*, *Hopiphoxus*, and their relatives in the stubby article 4 of the maxillipedal palp, and the presence of salivary spouts at the bases of the inner plates on the maxillipeds. The genus is rather easily distinguished on the weak rostrum and spheroid armament of antenna 2. It has setose uropods 1-2 reminiscent of *Hopiphoxus*.

Species. *Kondoleus tekin* Barnard & Drummond, 1978 [782].

Habitat and distribution. Marine, Victoria, 8-18 m, 1 species.

Kotla Barnard & Drummond

Figs 107D, 109K, 111K

Kotla Barnard & Drummond, 1978: 161.

Type species. *Kotla batturi* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum obsolescent. Eyes present. Article 2 of antenna 1 elongate, ventral setae almost confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 3+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, slender; molar not triturative, with 7+ basally fused spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods similar, weakly enlarged, article 5 of gnathopods 1-2 free, elongate, without eusirid attachment, palms transverse, propodus broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad to medium, pereopod 7 ordinary, article 3 not enlarged, dactyl ordinary.

Epimera 1-2 with long facial brushes but no posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 fused to peduncle. Uropod 3 minute, rami not longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Additional characters. Coxae short; spination on peduncle of uropod 1 very widely spread.

Relationship. Differing from *Matong* in the fully fused inner ramus of uropod 2, the large vertical brushes of setae on epimera 1-2, the short coxae and the widely spread dorsolateral spination on the peduncle or uropod 1.

Species. *Kotla batturi* Barnard & Drummond, 1978 [782].

Habitat and distribution. Marine, Victoria, 18 m, 1 species.

Kulgaphoxus Barnard & Drummond

Kulgaphoxus Barnard & Drummond, 1978: 402.

Type species. *Kulgaphoxus borralus* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted, obsolescent. Eyes present. Article 2 of antenna 1 elongate, ventral setae narrowly spread,almost confined proximally. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, gnathopod 2 weakly enlarged, article 5 of gnathopods 1-2 free, elongate, without eusirid attachment, palms oblique, propodus of gnathopods 1-2 thin, rectangular, elongate, poorly setose anteriorly, but almost trichophoxin in shape. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary or vestigial.

Epimera 1-2 with long facial brushes of setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 with dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 shortened. Uropod 3 short, rami not longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary to elongate.

Special characters. Article 4 of antenna 2 with only 1 set of dorsal setae; coxa 4 perfectly rectangular (versus *Tickalerus*).

Relationship. Differing from *Birubius* in the shortened rami of uropod 3 and in the enlarged dorsal hook of urosomite 3. From *Tickalerus*, *Kulgaphoxus* differs in the proximal placement of setae on article 2 of antenna 1, the presence of only 1 set of dorsal setae on article 4 of antenna 2, the presence of accessory nails on the inner rami of uropods 1-2 and the perfectly rectangular coxa 4.

Species. *Kulgaphoxus borralus* Barnard & Drummond, 1978 [782]; *K. cadgeeus* Barnard & Drummond, 1978 [782].

Habitat and distribution. Marine, Victoria, 1-15 m, 2 species.

Kuritus Barnard & Drummond

Kuritus Barnard & Drummond, 1978: 129.

Type species. *Kuritus nacoomus* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 weakly in 2 rows, some spines thick, some spines thin, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, thin, molar not triturative, with 3 basally fused spines; palpar hump small, apex of palp article 3 scarcely oblique. Inner plate of maxilla 1 with 2 setae, palp 2-articulate. Maxillipeds plates small, poorly armed, apex of palp article 3 not protuberant, dactyl elongate, apical nail distinct.

Gnathopods small, similar, article 5 of ordinary length, free, palms oblique, propodus thin, rectangular, elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary. Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 long apical setae. Telson elongate.

Relationship. Differing from *Brolgus* and *Ganba* in bearing 2 apical setae on the outer ramus of uropod 3; from *Wildus* and *Brolgus* in the thin gnathopods identical to each other and with free carpi.

See *Paraphoxus*.

Species. *Kuritus nacoomus* Barnard & Drummond, 1978 [789].

Habitat and distribution. Marine, western Australia, Barrow Island, neritic, 1 species.

Leongathus Barnard & Drummond

Figs 107C, 108K, 109H

Leongathus Barnard & Drummond, 1978: 146.

Type species. *Leongathus nootoo* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted. Eyes weak or absent. Article 2 of antenna 1 of medium length, ventral setae confined proximally. Article 1 of antenna 2 weakly ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 main row, spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, thin, molar partly triturative, with 7+ large teeth, palpar hump medium apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail not distinct.

Gnathopods dissimilar, gnathopod 2 strongly enlarged, article 5 of gnathopod 1 of ordinary length, free, of gnathopod 2 short, cryptic, palms oblique, propodus of gnathopods 1-2 respectively thin and broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with mostly thin armaments. Article 2 of pereopod 5 of broad form, but tapering distally, articles 4-5 of pereopods 5-6 narrow;

pereopod 7 ordinary, article 3 ordinary, dactyl ordinary. Epimera 1-2 with facial and posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook.

Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. The only phoxocephalid with such an unusual molar; distinct from *Pontharpinia* in the nonsetose telson, poorly setose article 3 of antenna 2, poorly setose dactyl of pereopod 7, nonbundled setae of pereopod 7 and elongation of peduncular spines on uropod 2. From *Matong*, *Kotla* and *Yammacoona* differing in the cryptic article 5 of gnathopod 2, tapering article 2 of pereopod 5, normal coxae 1-3, and the presence of facial setae on article 2 of pereopod 7. Differing from *Mandibulophoxus* and *Basuto* in the elongate article 2 of antenna 1 with proximally situated ventral setae, and the lack of continuous armaments on the rami of uropods 1-2.

Species. *Leongathus nootoo* Barnard & Drummond, 1978 [781].

Habitat and distribution. Marine, New South Wales, 150 m, 1 species.

Leptophoxoides J.L. Barnard

Leptophoxoides J.L. Barnard, 1962d: 51.–Barnard & Drummond, 1978: 447.

Type species. *Leptophoxoides molaris* J.L. Barnard, 1962d, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with [?2] facial setules, facial spines on article 4 in 1 main row, all spines thin, article 5 short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, thin, molar triturative; palpar hump small, apex of palp article 3 truncate. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds with small plates, poorly armed, apex of palp article 3 strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 strongly enlarged, article 5 of gnathopods 1-2 very short, cryptic, palms oblique, propodus of gnathopods 1-2 ordinary and broadened, respectively, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl [unknown].

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, lacking long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 1 apical seta. Telson elongate.

Relationship. Like *Leptophoxus* but molar triturative.

Species. *Leptophoxoides molaris* J.L. Barnard, 1962d [702A].

Habitat and distribution. Marine, Cape Basin, South Africa, 4961 m, 1 species.

Leptophoxus Sars

Figs 107I, 108A, 111F

Leptophoxus Sars, 1895: 146.–Barnard & Drummond, 1978: 447.

Type species. *Phoxus falcatus* Sars, 1883, monotypy.

Diagnosis. Rostrum unconstricted but downcurved apically. Eyes absent. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 ragged row, all spines thin, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, thin, molar not triturative, with 3 basally fused spines; palpar hump small, apex of palp article 3 truncate. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxilliped plates feeble, apex of palp article 3 strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 strongly enlarged, article 5 of gnathopods 1-2 very short, with eusirid attachment, cryptic, palms oblique, propodus of gnathopod 1 ordinary, ovatorectangular, elongate, of gnathopod 2 broadened, both poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, pyriform, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 with dorsal hump. Peduncle of uropod 1 without inter-ramal spike, with no major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing elongate article 2 on outer ramus, with 2 apical setae. Telson ordinary but elongate.

Relationship. Like *Leptophoxoides* but mandibular molar not triturative. These are the phoxocephalins with strongly protuberant article 3 of the maxillipedal palp.

Species. *Leptophoxus falcatus* (Sars, 1883, 1895) (J.L. Barnard, 1960a) [250]; *L. f. icelus* J.L. Barnard, 1960a [310].

Habitat and distribution. Marine Arctic North Atlantic, North Pacific, 56-2258 m, 1 species.

Limnoporeia Fearn-Wannan

Fig.109J

Limnoporeia Fearn-Wannan, 1968a: 37.–Barnard & Drummond, 1978: 487.

Type species. *Limnoporeia kingi* Fearn-Wannan, 1968a, monotypy.

Diagnosis. Rostrum variable, unconstricted, but often elongate and with apicoventral tooth. Eyes present. Article 2 of antenna 1 elongate, or of medium length (type), ventral setae almost confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, some spines thick, some spines often thin, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis flabellate, molar not triturative, conical, with 3 or fewer basally fused spines; palpar hump small to medium, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds with small poorly armed plates, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods medium, dissimilar, gnathopod 2 moderately to strongly enlarged, article 5 of gnathopod 1 of ordinary length to elongate, free, of gnathopod 2 short, cryptic, palms chelate, propodus of gnathopods 1-2 thin, elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 with 0-1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson elongate.

Variables. Article 2 of antenna 1 elongate (*L. woorake*); dactyls of pereopods 3-4 occasionally vestigial; propodus of gnathopods broad and poorly chelate (*L. woorake*).

Relationship. Differing from *Metaphoxus* and *Parametaphoxus* in the much stronger chelation of both pairs of gnathopods.

See *Uldanamia* and *Parajoubinella.*

Species. *Limnoporeia kalduke* Barnard & Drummond, 1978 [782]; *L. kingi* Fearn-Wannan, 1968a [784E]; *L. maranowe* Barnard & Drummond, 1978 [782]; *L. ungamale* Barnard & Drummond, 1978 [782]; *L. wakkine* Barnard & Drummond, 1978 [784]; *L. woorake* Barnard & Drummond, 1978 [782]; *L. yarrague* Barnard & Drummond, 1978 [784].

Habitat and distribution. Marine, Victoria and New South Wales, 0-35 m, also inland salt lakes, 7 species.

Mandibulophoxus J.L. Barnard

Fig.108H

Mandibulophoxus J.L. Barnard, 1957: 432.–Barnard & Drummond, 1978: 90.

Type species. *Mandibulophoxus gilesi* J.L. Barnard, 1957a, original designation.

Diagnosis. Rostrum unconstricted. Eyes absent. Article 2 of antenna 1 short, ventral setae almost confined apically. Article 1 of antenna 2 not ensiform, article 3 with [?2] facial setules, facial spines on article 4 in 1 row, all spines thin, article 5 ordinary. Right mandibular incisor with 2 weak teeth, right lacinia mobilis flabellate, molar not triturative, with 3 spines; palpar hump huge, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 weakly to moderately enlarged, article 5 of gnathopod 1 elongate, without eusirid attachment, of gnathopod 2 short, almost cryptic, palms oblique, propodus of gnathopods 1-2 subrectangular, of gnathopod 2 slightly broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, but tapering proximally, articles 4-5 of pereopods 5-6 broad to medium; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicolaterally, rami of uropods 1-2 continuously spinose to apex, with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 3 apical setae. Telson ordinary.

Relationship. Differing from *Urophoxus* (= *Pontharpinia*) in the nontriturative mandibular molar, the absence of a setal brush on the telson, the reduction to 2 or fewer of facial setae on article 3 of antenna 2 and the apical placement of facial spines on article 4 of antenna 2.

The only so-called brolgin with heavily armed rami of uropods 1-2.

See *Basuto*.

Species. *Mandibulophoxus gilesi* J.L. Barnard, 1957a (Gray & McCain, 1969) [379]; *M. uncirostratus* (Giles, 1890) (J.L. Barnard, 1957a) (Gray & McCain, 1969) [664].

Habitat and distribution. Marine tropical Indo-Pacific and north-eastern Pacific Ocean, sublittoral, 2 species.

Matong Barnard & Drummond

Figs 108M, 110H

Matong Barnard & Drummond, 1978: 154.

Type species. *Matong matong* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 elongate, ventral setae almost confined apically. Article 1 of antenna 2 scarcely ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, slender, molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 3-4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods similar, weakly enlarged, article 5 free, elongate, without eusirid attachment, palms transverse, propodus broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad to medium; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes but with weak posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 almost fused to peduncle. Uropod 3 ordinary to minute in female, rami not longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. Differing from *Birubius* in the enlarged gnathopods, shortened rami of uropod 3 and loss of mobility on the inner ramus of uropod 2.

See *Kotla*.

Species. *Matong matong* Barnard & Drummond, 1978 [784].

Habitat and distribution. Marine, Victoria and New South Wales, 8-19 m, 1 species.

Mesophoxus Gurjanova

Mesophoxus Gurjanova, 1977: 77.

Type species. *Mesophoxus laperusi* Gurjanova, 1977, original designation.

Diagnosis. Rostrum unconstricted. Eyes tiny. Article 2 of antenna 1 elongate, ventral setae widely spread or ventral. Article 1 of antenna 2 [?not ensiform, article 3 with ?2 facial setules], facial spines on article 4 in 1 row, all spines thick, article5 ordinary. Right mandibular incisor with [?3 4 teeth, right lacinia mobilis ?bifid, ?simple, ?flabellate, ?absent], molar not triturative, with 3 splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with [?0,1,2,3,4,5,6,7 setae], palp 1-articulate [*probably erroneous*]. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail [?distinct].

Gnathopods ordinary, small (but only gnathopod 2 illustrated), article 5 of gnathopods 1-2 short, free, without eusirid attachment, palms oblique, propodus of gnathopods 1-2 ordinary, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form but tapering distally, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 [?without long facial brushes or ?posterior setae, epimeron 3 of ?ordinary classification or ?bearing 3 or more, fewer long setae. ?Urosomite 3 without dorsal hook.] Peduncle of uropod 1 [?without inter-ramal spike, with ?major displaced spine apicolaterally medially, rami of uropods 1-2 ?not continuously spinose to apex, ?without subapical spines or nails, inner ramus of uropod 1 with ?1 2 rows of marginal spines. Inner ramus of uropod 2 ?ordinary ?fused to peduncle]. Uropod 3 minute, rami not longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary, without supernumerary lateral or dorsal spines.

Relationship. Though poorly described there are many elements of the type species showing relationship with *Eyakia*; if the two are synonymous, one assumes *Mesophoxus* would take priority (pending ICZN ruling on date of publication). Coordinate characters are tapering article 2 of pereopod 5, and extra spines on article 4 of antenna 2. Possible generic characters of *Mesophoxus* include the shorter than normal rami of uropod 3, anterior setation of gnathopodal carpus and many more undescribed possibilities.

Differing from *Birubius* in the taper on article 2 of pereopod 5.

Species. *Mesophoxus laperusi* Gurjanova, 1977 [284].

Habitat and distribution. Marine, Okhotsk Sea between Hokkaido and Sakhalin, 200 m, 1 species.

Metaphoxoides Ledoyer

Metaphoxoides Ledoyer, 1967b: 29.–Barnard & Drummond, 1978: 466.

Type species. *Metaphoxus picardi* Ledoyer, 1967b, monotypy.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short to medium (type) in length, ventral setae almost confined apically. Article 1 of antenna 2 [?not ensiform, article 3 with ?2 facial setules], facial spines on article 4 in 2+ rows, spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis flabellate, molar not triturative, [?without spines]; palpar hump large, apex of palp article 3 rounded. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipedal plates poorly armed, apex of palp article 3 not strongly protuberant, dactyl stubby to elongate, apical nail distinct.

Gnathopods large, dissimilar, gnathopod 2 moderately enlarged, article 5 of gnathopod 1 free, elongate, on gnathopod 2 short, cryptic, palms transverse to oblique respectively, propodus broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad to narrow respectively; pereopod 7 ordinary, article 3 and dactyl ordinary.

Epimera 1-2 [?without long facial brushes or posterior setae], epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 [?without dorsal hook]. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 without marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, rami longer than peduncle, bearing vestigial article 2 on outer ramus, with 2 apical setae. Telson slightly elongate.

Additional character. Absent or vestigial article 2 on outer ramus of uropod 3.

Relationship. Distinguished by the reduced or absent article 2 on the outer ramus of uropod 3, with other characters normal.

Otherwise like *Metaphoxus* and *Parametaphoxus*.

Species. *Metaphoxoides angustimanus* Ledoyer, 1979a, 1986 [698]; *M. picardi* Ledoyer, 1970, 1986 [698]; ?*M. zavorus* Barnard & Drummond, 1978 [743].

Habitat and distribution. Marine, Madagascar and southern Africa, 0-112 m, 2 and 1 doubtful species.

Metaphoxus Bonnier

Fig.109L

Metaphoxus Bonnier, 1896: 630.–Stebbing, 1906: 138.–J.L. Barnard, 1960a: 303.–Barnard & Drummond, 1978: 448.

Type species. *Metaphoxus typicus* Bonnier, 1896 (= *Phoxocephalus pectinatus* Walker, 1896b, = *Phoxus simplex* Bate, 1857d), monotypy.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thin, article 5 short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 1 conical fused spine; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipedal plates small, poorly armed, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods large, similar, but gnathopod 2 weakly to strongly enlarged, article 5 of gnathopods 1-2 very short, cryptic, palms oblique, propodus of gnathopods 1-2 ovatorectangular, elongate or broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook.

Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 medium to vestigial apical setae. Telson ordinary but elongate.

Relationship. Differing from *Cephalophoxus* in the weaker molar; from *Phoxocephalus*, *Cephalophoxoides* in the nontriturative molar; from *Parametaphoxus* in the cryptic carpus of gnathopod 1.

See *Rikkarus*.

Removals. *Metaphoxus fultoni* Scott, 1890, to *Parametaphoxus*; *M. littoralis* Cooper & Fincham, 1974 to *Ringaringa*.

Species. *Metaphoxus frequens* J.L. Barnard, 1960a [379]; *M. mintus* Barnard & Drummond, 1978 [781]; *M. simplex* (Bate, 1857d) (= *M. kroyeri* Bate, 1857d, homonym) (= *M. pectinatus* Walker, 1896b) (= *M. typicus* Bonnier, 1896) (Chevreux & Fage, 1925) (Karaman, 1973a) [330]; *M. tuckatuck* Barnard & Drummond, 1978 [782]; *M. yaranellus* Barnard & Drummond, 1978 [785].

Habitat and distribution. Marine, north-eastern Atlantic, 0-80 m, north-eastern Pacific, 13-458 m, south, south-eastern Australia, 0-48 m; 5 species.

Metharpinia Schellenberg

Metharpinia Schellenberg, 1931: 65.–J.L. Barnard 1980a: 115.

Type species. *Metharpinia longirostris* Schellenberg, 1931, selected by Barnard & Drummond, 1978.

Diagnosis. Rostrum constricted. Eyes present. Article 2 of antenna 1 elongate or of medium length, ventral setae proximally placed. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, thin; molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, article 5 of gnathopods 1-2 of ordinary length to elongate, free, without eusirid attachment, palms oblique, propodus ordinary, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 with long posterior setae, epimeron 3 of ordinary classification, bearing 4 or more long setae. Urosomite 3 without dorsal hook, or with weak hump. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially, one or more rami of uropods 1-2 continuously spinose to apex, with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson with supernumerary lateral or dorsal setae.

Relationship. Characterised by subapical spines or nails on one ramus of uropods 1-2, usually outer ramus of uropod 1 only. Head constricted. Differing from *Rhepoxynius* and *Foxiphalus* especially in the uropodal character mentioned. From *Birubius*, *Metharpinia* differs in the supernumerary telsonic setation and displaced spine of uropod 1; from *Parharpinia* and *Protophoxus* in the untapered article 2 of pereopod 5.

Differing from its ancestral relative, *Phoxorgia*, in the reduced rostrum and loss of apical nails on rami of uropods 1-2, only the subapical components remaining in *Metharpinia*.

See *Microphoxus*.

Species. *Metharpinia coronadoi* J.L. Barnard, 1980a [373]; *M. floridana* (Shoemaker, 1933c) (J.L. Barnard, 1960a, 1980a) [362]; *M. jonesi* (J.L. Barnard, 1963, 1980a) [373]; *M. longirostris* Schellenberg, 1931 (J.L. Barnard, 1960a, 1980a) [860]; *M. oripacifica* J.L. Barnard, 1980a [540].

Habitat and distribution. Marine, American seas, Magellan to California and South Carolina, 0-43 m, 5 species.

Microphoxus J.L. Barnard

Fig.109E

Microphoxus J.L. Barnard, 1960a: 291.–Barnard & Drummond, 1978: 415.–J.L. Barnard, 1980a: 105.

Type species. *Microphoxus minimus* J.L. Barnard, 1960a, original designation.

Diagnosis. Rostrum constricted to obsolescent. Eyes present. Article 2 of antenna 1 of medium length, ventral setae widely spread. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 or 2+ rows, spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, thin, molar not triturative, with 3+ basally fused spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 1 or 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods small, similar, article 5 elongate, palms almost transverse, propodus thin, ovatorectangular, heavily setose anteriorly, trichophoxin in shape. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 with dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, some rami of uropods 1-2 with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson with supernumerary lateral or dorsal setae.

Variables. *Microphoxus cornutus* with more than 1 row of facial spines on article 4 of antenna 2, more spines on molar (6), 4 setae on inner plate of maxilla 1, long posterior setae on epimera 1-2, displaced medial spine on peduncle of uropod 1.

Relationship. Like *Metharpinia* and *Birubius* but with strong and sharp dorsal hook on urosomite 3.

Species. *Microphoxus cornutus* (Schellenberg, 1931) (J.L. Barnard, 1960a, 1980a) [864]; *M. minimus* (J.L. Barnard, 1960a, 1980a) [539].

Habitat and distribution. Marine, Magellanic South America and Pacific Costa Rica, 1-15 m, 2 species.

Palabriaphoxus Gurjanova

Palabriaphoxus Gurjanova, 1977: 74.

Type species. *Harpinia palabris* J.L. Barnard, 1961b, original designation.

Diagnosis. Poorly described. Rostrum unconstricted. Eyes absent. Article 2 of antenna 1 elongate, ventral setae widely spread. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 row, all spines thin, article 4 short, article 5 ordinary. Right mandibular incisor with [?3 4 teeth, right lacinia mobilis bifid, simple, flabellate, absent], molar not triturative, with [?3 4 +?, basally fused? splayed spines]; palpar hump [?small, apex of palp article 3 ?oblique, ?truncate. Inner plate of maxilla 1 with ?0,1,2,3,4,5,6,7 setae, palp ?2-articulate. Maxillipeds ?ordinary, ?inner plates partly fused, ?setation, apex of palp? article 3 not strongly protuberant, dactyl ?not elongate, apical nail ?distinct].

Gnathopods ordinary, small, alike, article 5 on gnathopods 1-2 of ordinary length, free, without eusirid attachment, palms oblique, propodus ordinary, broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with few posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 6 powerful, article 2 with basoposterior cusp; pereopod 7 miniaturised, article 3 slightly enlarged, dactyl ordinary, article 2 grossly toothed.

Epimera 1-2 without long facial brushes, posterior setae sparse, epimeron 3 of ordinary classification. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicolaterally, some rami of uropods 1-2 continuously spinose to apex, with apical spines, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary, with supernumerary lateral setae.

Relationship. Differing from other harpiniins in the powerful pereopod 6 with articles 4-6 thickened; otherwise close to *Pseudharpinia.*

Species. *Palabriaphoxus palabria* (J.L. Barnard, 1961b) [715B].

Habitat and distribution. Marine, Tasman Sea, 610 m, 1 species.

Parajoubinella Gurjanova

Parajoubinella Gurjanova, 1977: 82.

Type species. *Parajoubinella concinna* Gurjanova, 1977, original designation.

Diagnosis. Rostrum unconstricted but complexly extended, geniculate apically. Eyes present. Article 2 of antenna 1 short, asetose. Article 1 of antenna 2 not ensiform, article 3 with [?2 facial setules], facial spines on article 4 in 2+ rows, [?all spines thick or ?some spines thin], article 5 ordinary. Right mandibular incisor [?absent], right lacinia mobilis [?absent], molar not triturative [new observation fide R.J. Lincoln]; palpar hump small; apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds ordinary, plates large, apex of palp article 3 not protuberant, dactyl elongate, apical nail distinct.

Gnathopods small, dissimilar, gnathopod 1 weakly to moderately elongate, article 5 of gnathopods 1-2 free, elongate only on gnathopod 1, with eusirid attachment, palms transverse to chelate, propodus of gnathopods 1-2 rectangular, slightly broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 [?without long facial brushes or posterior setae, epimeron 3 ?bearing 3 or more fewer long setae. Urosomite 3 ?without dorsal hook]. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, outer rami much longer than peduncle, bearing article 2, with 4 apical setae. Telson with supernumerary lateral spines.

Relationship. As represented in figures of Gurjanova, differing from *Phoxocephalus*, *Cephalophoxus*, and *Cephalophoxoides* in the elongate carpus of the gnathopods; from *Leptophoxus* in the unproduced palp article 3 on the maxillipeds; from *Uldanamia* in the small palpar hump of the mandible and presence of more than 2 setae on article 2 of the outer ramus on uropod 3, the untoothed epimeron 3, the well-developed dactyls of pereopods 3-4, but especially the poor development of gnathopodal chelae and thin inner plate of maxilla 1; from *Limnoporeia* in the elongate carpus of gnathopod 2 and the poor development of gnathopodal chelae; from *Diogodias* in the supernumerary telsonic spination and elongate carpus of gnathopod 2; and from all other genera in the odd rostrum.

See *Diogodias* and *Ringaringa*.

Species. *Parajoubinella concinna* Gurjanova, 1977 [775].

Habitat and distribution. Marine, New Zealand, shallow water, 1 species.

Paramesophoxus Gurjanova

Paramesophoxus Gurjanova, 1977: 76.

Type species. *Paramesophoxus racunae* Gurjanova, 1977, original designation.

Diagnosis. Poorly described. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae almost confined apically. Article 1 of antenna 2 not ensiform, article 3 with [?2 facial setules], facial spines on article 4 in 1 row, plus rudimentary row, most spines thick, some spines thin, article 5 short. Right mandibular incisor with 3 teeth, right lacinia mobilis flabellate, molar not triturative, with 3 basally fused spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 1 seta, palp 1-articulate. Maxillipeds [?ordinary, ?inner plates partly fused, ?setation, ?apex of palp article 3 not strongly protuberant], dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, [?dissimilar, gnathopod 2 weakly to moderately to strongly enlarged], article 5 of gnathopods 1-2 of ordinary length, free, without eusirid attachment, palms oblique, propodus of gnathopods 1-2 ordinary to elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 slightly enlarged, dactyl ordinary.

Epimera 1-2 [?without long facial brushes or posterior setae, ?epimeron 3 of ordinary classification, ?bearing 3 or fewer long setae. ?Urosomite 3 without dorsal hook]. Peduncle of uropod 1 [?without inter-ramal spike, ?with major displaced spine, ?rami of uropods 1-2 not continuously spinose to apex, ?without subapical spines or nails, inner ramus of uropod 1 with ?1 2 rows of marginal spines. Inner ramus of uropod 2 ?ordinary ?fused to peduncle. Uropod 3 ?ordinary ?minute, ?rami not longer than peduncle, bearing ?article 2 on outer ramus, with ?1 2 3 apical setae. Telson ?ordinary, ?with supernumerary lateral or dorsal spines].

Relationship. The type species of this genus is poorly described and we leave it open for future work but believe this genus differs from *Paraphoxus* only by the lack of the juncture line between articles 1 and 2 of the palp on maxilla 1. This is scarcely adequate to distinguish the genus.

Species. *Paramesophoxus racunae* Gurjanova, 1977 [391].

Habitat and distribution. Marine, northern Japan Sea, depth unknown, 1 species.

Parametaphoxus Gurjanova

Parametaphoxus Gurjanova, 1977: 81.

Type species. *Phoxocephalus fultoni* Scott, 1890, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 of medium length, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with [?2 facial setules], facial spines on article 4 in 1 row, all spines thin, article 5 ordinary. Right mandibular incisor with [?3 4 teeth, right lacinia mobilis ?bifid, ?simple, ?flabellate, ?absent,] molar not triturative, with 1 basally fused spine; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipedal plates small, poorly armed, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods enlarged, dissimilar, gnathopod 2 weakly larger than 1, article 5 of gnathopod 1 short, scarcely free, of gnathopod 2 very short and cryptic, palms transverse-chelate to oblique respectively, propodus of gnathopods 1-2 elongate, broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thin armaments.

Article 2 of pereopod 5 broad, pyriform, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 (or no) row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 0-2 apical setae (variable by sex, etc.) Telson elongate.

Additional characters. Aberrances: inner plate of maxilla 1 setose (*P. tulearensis*, see Ledoyer, 1967); article 6 of pereopods 3-4 with thick elements (*P. tulearensis*).

Relationship. Differing from *Metaphoxus* in the free carpus of gnathopod 1 and the transverse to chelate palms of the gnathopods; from *Phoxocephalus* in the well-developed gnathopods with cryptic carpus on gnathopod 2 and chelate propodus.

Species. *Parametaphoxus fultoni* (Scott, 1890) (= *P. chelatus* Della Valle, 1893) (Calman, 1896) (Chevreux & Fage, 1925) (J.L.Barnard, 1964e) (Karaman, 1973a) (Lincoln, 1979a) [352 + 370]; *P. tulearensis* (Barnard & Drummond, 1978) (= *P. fultoni* identification of Ledoyer, 1967, 1986) [698].

Habitat and distribution. Marine, eastern Atlantic, England to Adriatic, eastern Pacific, mid-California to Baja California, Madagascar, 0-170 m, 2 species.

Paraphoxus Sars

Fig.108F

Paraphoxus Sars, 1895: 148.–Barnard & Drummond, 1976: 524.–Barnard & Drummond, 1978: 144.

Type species. *Phoxus oculatus* Sars, 1879, monotypy.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae almost confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 row, plus rudimentary row, some spines thick, some spines thin, article 5 short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate; molar not triturative, with 3 basally fused spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 2 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, gnathopod 2 weakly enlarged, article 5 of gnathopod 1 of ordinary length, free, without eusirid attachment, of gnathopod 2 shorter and almost cryptic, palms oblique, propodus of gnathopods 1-2 ordinary, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary, without supernumerary lateral or dorsal spines.

Relationship. An ordinary brolgin, differing from *Kuritus*, *Elpeddo* and *Wildus* in the loss of displaced spine on the peduncle of uropod 1; from *Brolgus* and *Ganba* in the presence of 2 (versus 1) setae on article 2 of the outer ramus on uropod 3.

See *Eobrolgus* and *Eyakia*.

Species. See also list of species to be allocated to new genera at terminus of this family; *P. oculatus* (Sars, 1879) (= *P. maculatus* Chevreux, 1888b) (Sars, 1895) (Chevreux & Fage, 1925) (Karaman 1973a) [210 + AB]; *P. simplex* Gurjanova, 1938b, 1951 [391].

Habitat and distribution. Marine, North Atlantic and North Pacific Oceans, 27-2800 m, 2 species.

Parharpinia Stebbing

Figs 109M, 110C

Parharpinia Stebbing, 1899a: 207.–Barnard & Drummond, 1976: 531.–Barnard & Drummond, 1978: 175.

Type species. *Phoxus villosus* Haswell, 1879a, original designation.

Diagnosis. Rostrum variable. Eyes present. Article 2 of antenna 1 of medium length, ventral setae widely spread. Article 1 of antenna 2 scarcely ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1, or rarely 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, article 5 of gnathopods 1-2 of ordinary length, free, without eusirid attachment, palms oblique, propodus of gnathopods 1-2 ordinary, thinly ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, but tapering distally, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without facial brushes, but with posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially, rami of uropods 1-2 not continuously spinose to apex, without subapical spines, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2-4 apical setae. Telson with supernumerary lateral or dorsal spines or setae.

Special character. Article 2 of pereopod 7 setose ventrally.

Relationship. Differing from *Eobrolgus* in (1) the accessory telsonic armament; (2) posteriorly setose epimera 1-2; (3) wide spread of ventral setae on article 2 of antenna 1; and (4) the displaced spine of uropod 1. From *Birubius*, *Parharpinia* differs in items 1, 2 and 4 plus (5) tapering article 2 of pereopod 5; and (6) short article 2 of antenna 1.

Parharpinia is very close to *Foxiphalus* but differs in the poorly ensiform antenna 2 and tapering article 2 of pereopod 5.

See *Eyakia* and *Protophoxus*.

Removal. *Parharpinia fuegiensis* Schellenberg, 1931, to *Fueguiphoxus*.

Species. See also list of species of unknown generic assignment at terminus of this family; *P. villosa* (Haswell, 1879a) (Barnard & Drummond, 1978) [780]; *P. warte* Barnard & Drummond, 1978 [786].

Habitat and distribution. Marine, Australia from New South Wales to Great Australian Bight, 8-145 m, 2 species.

Phoxocephalus Stebbing

Figs 108B, 110B, 111B

Phoxus Krøyer, 1842: 150 [homonym, Coleoptera] (*Phoxus holbolli* Krøyer, 1842, selected by Boeck, 1876).
Spinifer Krøyer, 1842: 151 [homonym, Mollusca] (*Phoxus holbolli* Krøyer, 1842, here selected).
Phoxocephalus Stebbing, 1888: 810 [new name].–Gurjanova, 1977: 82.–Barnard & Drummond, 1978: 417.

Type species. *Phoxus holbolli* Krøyer, 1842, selected by Boeck, 1876.

Diagnosis. Rostrum unconstricted. Eyes vestigial or absent. Article 2 of antenna 1 short or of medium length, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2 rows, some spines thick, some spines thin, article 5 short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar triturative; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, article 5 of gnathopod 1 of ordinary length, of gnathopod 2 very short, first free, second almost cryptic, palms oblique, propodus of gnathopods 1-2 ordinary, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, but tapering distally, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary but elongate.

Relationship. Differing from the other triturative phoxocephalin genera such as *Cephalophoxus*, *Cephalophoxoides*, *Parajoubinella* and *Eusyrophoxus* in the very weak gnathopods with short free carpus (though carpus of gnathopod 2 tending to become cryptic).

See *Synphoxus*.

Removals. *Phoxocephalus bassi* Stebbing, 1888; *P. burleus* Barnard & Drummond, 1978; *P. homilis* J.L. Barnard, 1960a; *P. keppeli* Barnard & Drummond, 1978; *P. kergueleni* Stebbing, 1888; *P. kukathus* Barnard & Drummond, 1978; *P. rupullus* Barnard & Drummond, 1978; *P. tunggeus* Barnard & Drummond, 1978, all to *Cephalophoxoides; P. regium* K.H. Barnard, 1930, to *Cephalophoxus; P. coxalis* K.H. Barnard, 1932, to *Coxophoxus; P. tenuipes* Stephensen, 1923b, to *Eusyrophoxus; P. fultoni* Scott, 1890, to *Parametaphoxus*.

Species. See also list of species of unknown generic assignment at terminus of this family; *P. holbolli* (Krøyer, 1842) (= *P. kroyeri* Stimpson, 1853) (Sars, 1895) (J.L. Barnard, 1960a) [216 + B].

Habitat and distribution. Marine, cold North Atlantic and adjacent Arctic south to 40°, 0-190 m, 1 species.

Phoxorgia Barnard & Barnard

Phoxorgia J.L. & C.M. Barnard, 1980b: 867.

Type species. *Parharpinia sinuata* K.H. Barnard, 1932, original designation.

Diagnosis. Rostrum weakly constricted. Eyes present. Article 2 of antenna 1 short, ventral setae almost confined apically. Article 1 of antenna 2 not ensiform, article 3 with 3 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, subflabellate, molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, article 5 of ordinary length to elongate, free, palms transverse, propodus ovatorectangular, slightly broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, scarcely tapering distally, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 4 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially, some rami of uropods 1-2 with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary or with weakly supernumerary lateral or dorsal spines.

Relationship. Like *Parharpinia* but ventral setae on article 2 of antenna 1 shifted apically, posterior setation on epimera 1-2 poor, ventral setae on article 2 of pereopod 7 lacking and true dorsal spines on telson lacking.

Differing from *Birubius* in the displaced spine of uropod 1.

Very close to but differing from *Elpeddo* in the slightly tapering head, thick spines on inner plate of maxilliped, 2 (versus 1) rows of spines on article 4 of antenna 2, more than 3 spines on the molar, almost continuous spination on the rami of uropods 1-2, and the weakly developed lateral spines on the telson.

See *Metharpinia*.

Species. *Phoxorgia sinuata* (K.H. Barnard, 1932) (J.L. Barnard, 1960a) [867].

Habitat and distribution. Marine, South America from Valparaiso south-eastward to South Georgia, 4-159 m, 1 species.

Proharpinia Schellenberg

Proharpinia Schellenberg, 1931: 80.–J.L. Barnard, 1960a: 311.–Barnard & Drummond, 1978: 532.

Type species. *Proharpinia antipoda* Schellenberg, 1931, monotypy.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae almost confined apically (by fiat). Article 1 of antenna 2 not ensiform, article 3 with 4-5 facial setules, facial spines on article 4 in 1 main row, all spines thin, article 5 short. Right mandibular incisor with [?3 teeth, right lacinia mobilis ?bifid, ?weakly flabellate, ?molar not triturative, with ?3 splayed spines]; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl body not elongate, but apical nail distinct and elongate.

Gnathopods small, scarcely dissimilar, gnathopod 2 weakly to moderately enlarged, article 5 of gnathopods 1-2 very short, free on gnathopod 1, cryptic on gnathopod 2, palms oblique, propodus of gnathopods 1-2 ovatorectangular, elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, but article 3 enlarged, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 continuously spinose to apex, with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with vestigial or no apical setae. Telson ordinary.

Variable. *Proharpinia stephenseni*, the second species of the genus, is retained here only provisionally; it differs from the type in the presence of setae on the inner plate of the maxilliped and the absence of apical spination on the rami of uropods 1-2. However it matches the type in the telson, and loss of strong setation on article 2 of the outer ramus on uropod 3.

Relationship. Differing from *Heterophoxus* in the absence of an ensiform process on antenna 2; more ancestral than *Torridoharpinia* in the spination of uropods 1-2 and normal condition of outer ramus of uropod 1 (not shortened), and normal armament of telson but more apomorphic in loss of setae on inner plate of maxilla 1.

Removals. *Proharpinia hurleyi* J.L. Barnard, 1958, and *P. tropicana* J.L. Barnard, 1960a, to *Torridoharpinia*.

Species. See J.L. Barnard, 1960a; *P. antipoda* Schellenberg, 1931 [866]; *P. setifera* Ledoyer, 1986 [618B]; *P. stephenseni* Schellenberg, 1931 [866].

Habitat and distribution. Marine, Magellan area, Falkland Islands, and near Madagascar, 2-450 m, 3 species.

Protophoxus K.H. Barnard

Protophoxus K.H. Barnard, 1930: 335.–Barnard & Drummond, 1976: 532.–Barnard & Drummond, 1978: 189.

Type species. *Protophoxus australis* K.H. Barnard, 1930, monotypy.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae widely spread. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 main row, all spines thick, article 5 ordinary. Right mandibular incisor with 3 main teeth, right lacinia mobilis bifid, thin, molar not triturative, with 4+ splayed spines; palpar hump medium, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, article 5 of gnathopods 1-2 of ordinary length to weakly elongate, free, without eusirid attachment, palms oblique, propodus ordinary, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form but tapering distally, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 with facial brushes but no posterior setae, epimeron 3 of ordinary classification, bearing 4 or more long setae in facial row. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicolaterally, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson with supernumerary lateral or dorsal spines.

Additional character. Article 2 of pereopod 7 lacking ventral setae.

Relationship. Like *Parharpinia* but displaced spine of uropod 1 in lateral position, article 2 of pereopod 7 lacking ventral setosity, and epimera 1-2 lacking posterior setosity.

Species. *Protophoxus australis* K.H. Barnard, 1930 (Barnard & Drummond, 1978) (Ledoyer, 1984) [775 + 586].

Habitat and distribution. Marine, New Zealand, New Caledonia, neritic, intertidal to 37 m, 1 species.

Pseudharpinia Schellenberg

Pseudharpinia Schellenberg, 1931: 81.–J.L. Barnard, 1960a: 342.–Barnard & Drummond, 1978: 533.

Type species. *Pseudharpinia dentata* Schellenberg, 1931, monotypy.

Diagnosis. Rostrum unconstricted. Eyes absent. Article 2 of antenna 1 short, ventral setae widely spread. Article 1 of antenna 2 ensiform, article 3 with several facial setules, facial spines on article 4 in 1 or weakly 2 rows, spines mostly thin, article 5 very short. Right mandibular incisor with [?4 teeth, right lacinia mobilis ?bifid, flabellate], molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 2 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl stubby, apical nail distinct.

Gnathopods ordinary, small, similar, gnathopod 2 weakly enlarged, article 5 of gnathopods 1-2 short, free, palms oblique, propodus of gnathopods 1-2 thin, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with [?thin] armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 of ordinary size, article 3 enlarged, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, some rami of uropods 1-2 continuously spinose to apex, with subapical spines or nails, inner ramus of uropod 2 often with 2 rows of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary or with supernumerary lateral or dorsal spines.

Variables. Medial spination on peduncles of uropods 1-2 widely spread (*P. excavata*); antenna 2 poorly ensiform (*P. ayutlanta*, *P. cinca*); maxillipedal palp with elongate dactyl (*P. abyssalis*, *P. obtusifrons*).

Relationship. Differing from *Heterophoxus* in the loss of eyes; from *Harpiniopsis* in the one or more of the continuously spinose rami on uropods 1-2 and the more strongly ensiform antenna 2.

Removal. *Pseudharpinia latipes* Norman, 1900c, to *Harpinia*.

Species. See Bushueva (1982, key); *P. abyssalis* (Pirlot, 1932b) [640AB]; *P. a. productus* J.L. Barnard, 1964e [501A]; *P. ayutlanta* (J.L. Barnard, 1964a) [501B]; ?*P. birjulini* (Gurjanova, 1953) [286B]; *P. brevirostris* (Chevreux, 1920, 1927) (?Ledoyer, 1986) [330B + ?694A]; *P. calcariaria* Bushueva, 1982 [881BA]; *P. cariniceps* (K.H. Barnard, 1932) [875 + B]; *P. cinca* (J.L. Barnard, 1961a, 1962d) [735AB]; *P. dentata* Schellenberg, 1931 [864]; *P. excavata* (Chevreux, 1887c, 1900a) (= *P. sanpedroensis* J.L. Barnard, 1960a) (J.L. Barnard, 1967a) [423AB]; *P. latipes* (Norman, 1900c) (Chevreux, 1927) (see *Harpinia*) [350B]; *P. obtusifrons* (Stebbing, 1888) (Bellan-Santini & Ledoyer, 1974) [880]; *P. vallini* (Dahl, 1954) [804B].

Habitat and distribution. Marine, cosmopolitan cold water, mostly deep, 15-6328 m, 12 species.

Rhepoxynius J.L. Barnard

Rhepoxynius J.L. Barnard, 1979b: 371.–Barnard & Barnard, 1982c: 2 (key).

Type species. *Pontharpinia epistoma* Shoemaker, 1938a, original designation.

Diagnosis. Rostrum constricted. Eyes present. Article 2 of antenna 1 elongate to medium, ventral setae widely to narrowly spread. Article 1 of antenna 2 weakly ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid or simple, thin, molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct, often weak.

Gnathopods ordinary, small, similar, article 5 of gnathopods 1-2 of ordinary length to elongate, free, without eusirid attachment, palms oblique to transverse, propodus of gnathopods 1-2 ordinary to thin and elongate, poorly setose anteriorly, occasionally trichophoxin in shape. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad to medium; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially or not, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. Differing from *Birubius* in the ensiform antenna 2, from *Foxiphalus* in the constricted rostrum, and from *Grandifoxus* in the presence of only 2 facial setules on article 3 of antenna 2 and the absence of cusps on coxae 1-3.

Species. See J.L. Barnard (1963, 1964b,e 1966a,b, 1971b); J.L. & C.M. Barnard (1982c); *R. abronius* (J.L. Barnard, 1960a) [373 + B]; *R. bicuspidatus* (J.L. Barnard, 1960a) [379 + B]; *R. daboius* (J.L. Barnard, 1960a) [379 + B]; *R. epistomus* (Shoemaker, 1938) (J.L. Barnard, 1960a) [362]; *R. fatigans* (J.L. Barnard, 1960a) [373 + B]; *R. gemmatus* (J.L. Barnard, 1969b) [377]; *R. heterocuspidatus* (J.L. Barnard, 1960a) [370]; *R. homocuspidatus* J.L. & C.M. Barnard, 1982c [373]; *R. hudsoni* J.L. Barnard & C.M. Barnard, 1982c [361]; *R. lucubrans* (J.L. Barnard, 1960a) [370]; *R. menziesi* J.L. & C.M. Barnard, 1982c [373]; *R. stenodes* (J.L. Barnard, 1960a) [370 + B]; *R. tridentatus* (J.L. Barnard, 1954a, 1960a) [379]; *R. t. pallidus* J.L. Barnard, 1960a [269E]; *R. variatus* (J.L. Barnard, 1960a) [379]; *R. vigitegus* (J.L. Barnard, 1971b) [268]; species "C," "D," "L," J.L. & C.M. Barnard, 1982c [377, 373, 371].

Habitat and distribution. Marine, both coasts of North America, boreal and warm-temperate, 0-813 m, 15 species.

Rikkarus Barnard & Drummond

Rikkarus Barnard & Drummond, 1978: 470.

Type species. *Rikkarus lea* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 1 row, spines thin, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 1-9 splayed spines, one of these large, elongate; palpar hump medium to large, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipedal plates small, poorly armed, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods similar, moderately enlarged, article 5 very short, cryptic, palms oblique, propodus thin, ovatorectangular, elongate, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae but deeply serrate. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 without marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, rami longer than peduncle, bearing article 2 on outer ramus, with 2 small apical setae. Telson elongate.

Relationship. Like *Metaphoxus* but epimeron 3 grossly serrate.

Species. *Rikkarus lea* Barnard & Drummond, 1978 [781].

Habitat and distribution. Marine, New South Wales, 66 m, 1 species.

Ringaringa n.gen.

Type species. *Metaphoxus littoralis* Cooper & Fincham, 1974, here selected.

Etymology. From the type locality, Ringaringa Beach.

Diagnosis. Rostrum unconstricted, very long, with apical spike. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 moderately ensiform, article 3 with [?2] facial setules, facial spines on article 4 in 1 row, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis small but flabellate, molar simple, with 3 stout spines; palpar hump [?small], apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipedal inner plates not fused, apex of palp article 3 not protuberant, dactyl elongate, apical nail distinct.

Gnathopods similar, gnathopod 2 moderately to strongly enlarged, gnathopod 1 moderately enlarged, article 5 of gnathopods 1-2 elongate, not lobed, palms transverse, propodus of gnathopods 1-2 slightly elongate and broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long posterior setae, epimeron 3 of rounded-glabrous classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, bearing article 2 on outer ramus, with 4 apical setae. Telson elongate.

Relationship. Like *Diogodias* but carpus of gnathopod 2 elongate; like *Parajoubinella* but carpus of gnathopod 2 elongate and telson lacking supernumerary lateral spines.

Species. *Ringaringa littoralis* (Cooper & Fincham, 1974) [776].

Habitat and distribution. Marine, New Zealand, Stewart Island, intertidal sand, 1 species.

Synphoxus Gurjanova

Synphoxus Gurjanova, 1980a: 95.

Type species. *Synphoxus novaezelandicus* Gurjanova, 1980a, original designation.

Diagnosis. Poorly described. Rostrum obsolescent, head broad apically. Eyes present. Article 2 of antenna 1 short or of medium length (figures vary), sparse ventral setae widely spread. Article 1 of antenna 2 not ensiform, article 3 with [?2] facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 short. Right mandibular incisor with [?3 4] teeth, right lacinia mobilis [?bifid, simple, flabellate, absent], molar weakly triturative; palpar hump large, apex of palp article 3 [?oblique]. Inner plate of maxilla 1 with setae, outer with 4 spines, palp [?1-articulate]. Maxillipeds [?ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct].

Gnathopods small, similar, article 5 of gnathopods 1-2 free, elongate, without eusirid attachment, palms almost transverse, propodus rectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 of ordinary size, article 3 slightly enlarged, dactyl vestigial.

Epimera 1-2 [?without long facial brushes or posterior setae, epimeron 3 of ?rounded classification, bearing ?3 or fewer long setae]. Urosomite 3 [?without dorsal hook]. Peduncle of uropod 1 without inter-ramal spike, with major pair of spines apicomedially, rami of uropods 1-2 not continuously spinose to apex but with strong apical nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 small, one of rami scarcely longer than peduncle, bearing article 2 on outer ramus, without apical setae. Telson slightly elongate.

Special character. Article 6 of pereopod 7 puffy and poorly armed; some spines on uropod 1 giant.

Relationship. Differing from *Yammacoona* in the elongate article 2 on the outer ramus of uropod 3 and the free elongate carpus of gnathopod 2. Differing from phoxocephalins in the obsolete rostrum, large palpar hump of the mandible and puffy poorly armed article 6 of pereopod 7.

Species. *Synphoxus novaezealandicus* Gurjanova, 1980a [775].

Habitat and distribution. Marine, New Zealand, 0 m, 1 species.

Tickalerus Barnard & Drummond

Tickalerus Barnard & Drummond, 1978: 396.

Type species. *Tickalerus birubi* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum constricted. Eyes present. Article 2 of antenna 1 elongate, ventral setae narrowly spread. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, gnathopod 2 weakly enlarged, article 5 of gnathopods 1-2 of ordinary length, free, without eusirid attachment, palms oblique, propodus of gnathopods 1-2 ordinary, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 ordinary, article ordinary, dactyl ordinary.

Epimera 1-2 with many facial but no posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 with dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 small, rami scarcely longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Special character. Article 4 of female antenna 2 with 2 or more sets of well-developed dorsal setae.

Relationship. Like *Birubius* but with well-developed dorsal setation on article 4 of female antenna 2 (rudimentary in a few species of *Birubius*), with dorsal process on urosomite 3 and the short rami of uropod 3 (some species of *Birubius* with slightly shortened rami). See *Kulgaphoxus*.

Species. *Tickalerus birubi* Barnard & Drummond, 1978 [782].

Habitat and distribution. Marine, Victoria, 9-11 m, 1 species.

Tipimegus Barnard & Drummond

Figs 107H, 108C, 109C,I, 110A, 111M

[*Pontharpinia* Stebbing, 1897: 32, confounded genus, see *Urophoxus*].
Tipimegus Barnard & Drummond, 1978: 47.

Type species. *Tipimegus thalerus* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum constricted. Eyes present. Article 2 of antenna 1 elongate, ventral setae widely spread. Article 1 of antenna 2 weakly ensiform, article 3 with 3+ facial setules, facial spines on article 4 in 2+ rows, spines thick, article 5 very short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, weakly flabellate, molar not triturative, large, elongate, conical, then subtruncate, bearing 3-4 large special spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 3-5 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail not distinct.

Gnathopods small, similar, article 5 of gnathopods 1-2 free, elongate, palms transverse, propodus poorly setose anteriorly, trichophoxin in shape. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 miniaturised, article 3 enlarged, dactyl ordinary.

Epimera 1-2 with long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing many long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 with inter-ramal spike, without major displaced spine, rami of uropods 1-2 continuously spinose to apex, with subapical spines or nails, inner ramus of uropod 1 with 2 rows of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 3 apical setae. Telson ordinary.

Relationship. Differing from *Urophoxus* (= *Pontharpinia*) in the unusual mandibular molar, trichophoxin gnathopods, miniaturisation of pereopod 7, presence of inter-ramal spike on uropod 1, and many other characters (see Barnard & Drummond, 1978).

See *Booranus*, *Trichophoxus* and *Waitangi*.

Species. *Tipimegus dinjerrus* Barnard & Drummond, 1978 [781]; *T. kalkro* Barnard & Drummond, 1978 [782]; *T. kangulun* Barnard & Drummond, 1978 [784]; *T. stebbingi* (J.L. Barnard, 1958), obscure [781]; *T. thalerus* Barnard & Drummond, 1978 [784]; species 4N, 5N, Barnard & Drummond, 1978 [784].

Habitat and distribution. Marine, south-eastern Australia, 2-150 m, 4 valid and 3 dubious species.

Torridoharpinia Barnard & Karaman

Torridoharpinia Barnard & Karaman, 1982: 184.

Type species. *Proharpinia hurleyi* J.L. Barnard, 1958, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae ventrally spread or almost confined apically. Article 1 of antenna 2 not ensiform, article 3 with 4 facial setules, facial spines on article 4 in 1 main row, all spines thin, article 5 short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 2 splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 2-4 (type) setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods small, dissimilar, gnathopod 2 weakly to moderately enlarged, article 5 of gnathopods 1-2 short, free on gnathopod 1, cryptic on gnathopod 2, palms oblique, propodus ovatorectangular but broadened on gnathopod 2, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of narrow form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 enlarged, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 only in male with 2 rows of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 1 or 2 (type) apical setae. Telson ordinary, but one apical element stout (contrast *Proharpinia*).

Relationship. Differing from *Proharpinia* in the lack of ramal spines on female uropod 2, the shortened outer ramus of uropod 1, the presence of 1-2 long apical setae on article 2 of the outer ramus on uropod 3, the presence of a stout spine on each lobe of the telson and the presence of setae on the inner plate of maxilla 1. *Proharpinia* has only thin setae or setules on the telson.

Species. *Torridoharpinia hurleyi* J.L. Barnard, 1958, 1960a (= *T. stephenseni* of Hurley, 1957a, not Schellenberg, 1931) [849]; *T. tropicana* (J.L. Barnard, 1960a) [546].

Habitat and distribution. Marine, New Zealand, Auckland Islands, Campbell Island, Galapagos Islands, 0-46 m, 2 species.

Trichophoxus K.H. Barnard

Trichophoxus K.H. Barnard, 1930: 336.–Barnard & Drummond, 1976: 534.–Barnard & Drummond, 1978: 85.

Type species. *Trichophoxus capillatus* K.H. Barnard, 1930, monotypy.

Diagnosis. Rostrum constricted, small. Eyes present. Article 2 of antenna 1 elongate, ventral setae widely spread. Article 1 of antenna 2 weakly ensiform, article 3 with many facial setules, facial spines on article 4 in 2+ rows, plus special apical spines, spines thick, article 5 short. Right mandibular incisor with 4 teeth, right lacinia mobilis bifid, thin, molar not triturative, large, elongate, conical, then subtruncate, bearing 4 large special spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail not distinct.

Gnathopods small, similar, article 5 free, elongate, without eusirid attachment, palms transverse, propodus elongate, heavily setose anteriorly, trichophoxin in shape. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 miniaturised, article 3 enlarged, dactyl ordinary.

Epimera 1-3 with long facial brushes and posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 with inter-ramal spike, with major displaced spine apicolaterally, some rami of uropods 1-2 continuously spinose to apex, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2-3 apical setae. Telson with supernumerary lateral spines, setules shifted distad.

Relationship. Differing from *Tipimegus* in (1) lateral spination on telson; (2) presence of 4 (versus 3) setae on inner plate of maxilla 1; (3) presence of only 1 row of spines on inner ramus of uropod 1; (4) strong distad shift in dorsal setule pairs on telson and 11 other characters (see Barnard & Drummond, 1978).

Species. *Trichophoxus capillatus* K.H. Barnard, 1930

(Barnard & Drummond, 1976, 1978) [779]; ?*T. spinibasus* (Cooper, 1974) [774].

Habitat and distribution. Marine, New Zealand, 0-3 m, 2 species.

Uldanamia Barnard & Drummond

Uldanamia Barnard & Drummond, 1978: 522.

Type species. *Uldanamia pillare* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted, elongate, with large apicoventral process. Eyes present. Article 2 of antenna 1 short, ventral setae almost confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, some spines thick, some spines thin, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis flabellate, molar not triturative, with 3 basally fused spines; palpar hump large, apex of palp article 3 oblique. Inner plate of maxilla 1 without setae, palp 1-articulate. Maxillipedal plates small, poorly armed, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods similar, gnathopod 2 weakly enlarged, article 5 of gnathopods 1-2 free, elongate, palms chelate, propodus of gnathopods 1-2 thin, elongate, poorly setose anteriorly. Articles 4-5 of pereopods 3-4 immensely setose posteroproximally, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form but tapering distally, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl vestigial.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification but with 3 deep posterior notches, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, some rami of uropods 1-2 almost continuously spinose to apex, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson elongate, with supernumerary dorsal spines.

Relationship. Differing from *Limnoporeia* in the elongate and free carpus of gnathopod 2, the serrate epimeron 3, densely setose pereopods 3-4 and heavily spinose telson.

Species. *Uldanamia pillare* Barnard & Drummond, 1978 [782].

Habitat and distribution. Marine, Victoria, 8-15 m, 1 species.

Urophoxus Gurjanova (= *Pontharpinia* Stebbing)

Figs 107B, 109D, 110G, 111D

Pontharpinia Stebbing, 1897: 32 (*Urothoe pinguis* Haswell, 1879b, monotypy) [name unavailable by ICZN rule on confounded type species].–Barnard & Drummond, 1978: 40.
Urophoxus Gurjanova, 1977: 85.

Type species. *Urothoe pinguis* Haswell, 1879b, original designation.

Nomenclature. Although Barnard & Drummond (1976) tried to save *Pontharpinia* for *Urothoe pinguis* Haswell, they were too late in getting their plea to ICZN and Gurjanova, ignoring our quest, captured the nomenclature. Stebbing did not have Haswell's species in hand when he established *Pontharpinia.* He had a species later known as *Paraphoxus stebbingi* J.L. Barnard (1958) now transferred to *Tipimegus.*

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae widely spread. Article 1 of antenna 2 not ensiform, article 3 with 4+ facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis flabellate, molar triturative, palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 5+ setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 moderately enlarged, article 5 of gnathopod 1 of ordinary length, free, of gnathopod 2 short, with eusirid attachment, cryptic, palms oblique, propodus of gnathopods 1-2 ordinary, elongate, broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad, pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 with long facial brushes of setae, epimeron 3 of ordinary classification. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially, rami of uropods 1-2 continuously spinose to apex, with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, rami longer than peduncle, bearing article 2 on outer ramus, with 3 apical setae. Telson with supernumerary dorsolateral setal brush.

Relationship. The basic phoxocephalid. Distinguished by the setal brushes on the telson.

See *Mandibulophoxus* and *Tipimegus.*

Species. *Urophoxus pinguis* (Haswell, 1879b) (not Stebbing, 1897) (Barnard & Drummond, 1978) [784]

Habitat and distribution. Marine, New South Wales, Victoria, 2-40 m, 1 species.

Vasco Barnard & Drummond

Vasco Barnard & Drummond, 1978: 468.

Type species. *Metaphoxus brevidactylus* Ledoyer, 1973a, original designation.

Diagnosis. Rostrum unconstricted. Eyes weak. Article 2 of antenna 1 short; ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with [?2 facial setules], facial spines on article 4 in 2+ rows, spines thick, article 5 ordinary. Right mandibular incisor with 3 teeth, right lacinia mobilis simple, flabellate, molar not triturative, with [?no spines]; palpar hump medium, apex of palp article 3 rounded-truncate. Inner plate of maxilla 1 [?without setae], palp 1-articulate. Maxillipeds [?with small plates, poorly armed, apex of palp [?article 3 not strongly protuberant, dactyl ?elongate, apical nail ?distinct].

Gnathopods enlarged, weakly dissimilar, gnathopod 2 strongly enlarged, article 5 of gnathopods 1-2 very short, cryptic, palms oblique, propodus of gnathopods 1-2 elongate to broadened respectively, poorly setose anteriorly. Article 5 of pereopods 3-4 with scarcely any posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary; dactyl ordinary.

Epimera 1-2 [?without long facial brushes or posterior setae, epimeron 3 of ?rounded classification, bearing ?3 or fewer long setae]. Urosomite 3 [?without dorsal hook]. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, inner ramus of uropod 1 without marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 small apical setae. Telson elongate.

Additional character. Dactyls of pereopods 3-4 stunted.

Relationship. The stunted dactyls of pereopods 3-4 distinguish this genus from others in the *Metaphoxus* group. *Vasco* differs from *Metaphoxoides* in the longer carpus of gnathopod 1 and long article 2 on the outer ramus of uropod 3.

Species. *Vasco brevidactylus* (Ledoyer, 1973a, 1986) [694].

Habitat and distribution. Marine, Madagascar, 11-49 m, 1 species.

Waipirophoxus Gurjanova

Waipirophoxus Gurjanova, 1980b: 99.

Type species. *Paraphoxus waipiro* J.L. Barnard, 1972b, original designation.

Diagnosis. Like *Wildus* but inner rami of uropods 1-2 lacking marginal spines, lateral apex of peduncle on uropod 1 with 2 spines (versus 1).

Relationship. Probably not distinct from *Wildus* but several attributes remain undescribed.

Species. *Waipirophoxus waipiro* (J.L. Barnard, 1972b) [775].

Habitat and distribution. Marine, New Zealand, shallow water, 1 species.

Waitangi Fincham

Fig.69F

Waitangi Fincham, 1977: 286.–Barnard & Drummond, 1978: 86.

Type species. *Paraphoxus rakiura* Cooper & Fincham, 1974, original designation.

Diagnosis. Rostrum constricted, strong to obsolescent. Eyes present. Article 2 of antenna 1 elongate, ventral setae widely spread. Article 1 of antenna 2 weakly ensiform, article 3 with many facial setae, facial spines on article 4 in 2+ rows, spines thick, article 5 very short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, weakly flabellate, molar not triturative, large, elongate, conical, then subtruncate, bearing 3-4 large special spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 3 [type unknown] setae, palp 2-articulate. Maxillipeds ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail not distinct.

Gnathopods small, similar, article 5 free, elongate, without eusirid attachment, palms transverse to chelate, propodus thin, elongate, heavily setose anteriorly, trichophoxin in shape. Article 5 of pereopods 3-4 without posteroproximal setae, article 6 with thin armaments. Article 2 of pereopod 5 of broad form,articles 4-5 of pereopods 5-6 broad; pereopod 7 miniaturised, article 3 enlarged, dactyl ordinary.

Epimera 1-2 with long facial brushes and posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 with inter-ramal spike, without major displaced spine, rami of uropods 1-2 continuously setose and spinose to apex, with subapical spines or nails, inner ramus of uropod 1 with 2 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 3 apical setae. Telson with supernumerary lateral or dorsal spines.

Variables. *Waitangi brevirostris* with severely reduced rostrum, untoothed incisors, thicker armaments on article 6 of pereopods 3-4 than type species, and absence of setae on peduncles and rami of uropods 1-2, and thus probably not a member of *Waitangi.*

Relationship. Differing from *Trichophoxus* and *Tipimegus* in the presence of long setae on the peduncles and rami of uropods 1-2.

Species. ?*Waitangi brevirostris* Fincham, 1977 [779]; ?*W. chelatus* (Cooper, 1974) [774]; *W. rakiura* (Cooper & Fincham, 1974) [776].

Habitat and distribution. Marine, New Zealand, intertidal sand beaches, 2 valid and 1 probable species.

Wildus Barnard & Drummond

Fig.109G

Wildus Barnard & Drummond, 1978: 133.

Type species. *Wildus thamberoo* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum unconstricted. Eyes present. Article 2 of antenna 1 short, ventral setae confined apically. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, some spines thick, some spines thin, article 5 very short. Right mandibular incisor with 3 teeth, right lacinia mobilis bifid, thin, molar not triturative, with 3 basally fused spines; palpar hump medium, apex of palp article 3 truncate. Inner plate of maxilla 1 with 2 setae, palp 2-articulate. Maxillipedal inner plates partly fused, both pairs small, poorly armed, apex of palp article 3 not protuberant, dactyl elongate, apical nail distinct.

Gnathopods dissimilar, gnathopod 2 weakly enlarged, article 5 of gnathopod 1 of ordinary length, free, of gnathopod 2 short and cryptic, palms oblique, propodus of gnathopods 1-2 ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thin and thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 medium to narrow; pereopod 7 ordinary, article 3 ordinary, dactyl ordinary.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, with major displaced spine apicomedially, rami of uropods 1-2 not continuously spinose to apex, without subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 long apical setae. Telson ordinary to elongate.

Relationship. Differing from *Brolgus* and *Ganba* in bearing 2 apical setae on the outer ramus of uropod 3; from *Kuritus* in the stouter and more diverse gnathopods with cryptic article 5 on gnathopod 2.

See *Elpeddo*.

Removal. *Wildus fuegiensis* Schellenberg, 1931, to *Fuegiphoxus*.

Species. *Wildus mullokus* Barnard & Drummond, 1978 [784]; *W. parathambaroo* Myers, 1985c [576]; *W. thambaroo* Barnard & Drummond, 1978 [787]; ?*W. waipiro* (J.L. Barnard, 1972b) [775] (see *Waipirophoxus*).

Habitat and distribution. Marine, southern Australia and New Zealand, ?Magellan, 0-6 m, 3 valid and 1 dubious species.

Yammacoona Barnard & Drummond

Figs 107E, 111H

Yammacoona Barnard & Drummond, 1978: 166.

Type species. *Yammacoona kunarella* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum obsolescent. Eyes present. Article 2 of antenna 1 elongate, ventral setae confined proximally. Article 1 of antenna 2 scarcely ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, plus special apicoventral spines, spines thick, article 5 ordinary. Right mandibular incisor with 5+ teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 4+ basally fused spines; palpar hump large, apex of palp article 3 truncate. Inner plate of maxilla 1 with 4 setae, palp 2-articulate. Maxillipedal plates very small, poorly armed, apex of palp article 3 strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods weakly dissimilar, gnathopod 2 weakly enlarged, article 5 of gnathopod 1 of ordinary length, free, of gnathopod 2 short and cryptic, palms oblique, propodus of gnathopods 1-2 broadened, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal spines, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad; pereopod 7 ordinary, article 3 ordinary, dactyl vestigial.

Epimera 1-2 with long facial brushes but no posterior setae, epimeron 3 of ordinary classification, bearing 3 or more long setae. Urosomite 3 without dorsal hook.

Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 not continuously spinose to apex, but some with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2-3 apical setae. Telson ordinary.

Relationship. Differing from *Matong* and *Kotla* in shortened article 3 of antenna 1, proximal placement of ventral setae on article 2 of antenna 1, reduction in rows of facial spines on article 4 of antenna 2 with consolidation into a longer row, enlarged palpar hump on mandible, smaller plates of maxillipeds, and free inner ramus of uropod 2.

See *Synphoxus*.

Species. *Yammacoona kunarella* Barnard & Drummond, 1978 [782].

Habitat and distribution. Marine, Victoria, 12-17 m, 1 species.

Yan Barnard & Drummond

Yan Barnard & Drummond, 1978: 388.

Type species. *Yan tiendi* Barnard & Drummond, 1978, original designation.

Diagnosis. Rostrum constricted. Eyes present. Article 2 of antenna 1 short, elongate to medium in length, ventral setae narrowly spread. Article 1 of antenna 2 not ensiform, article 3 with 2 facial setules, facial spines on article 4 in 2+ rows, all spines thick, article 5 ordinary. Right mandibular incisor with 4+ teeth, right lacinia mobilis bifid, flabellate, molar not triturative, with 4+ splayed spines; palpar hump small, apex of palp article 3 oblique. Inner plate of maxilla 1 with 3 setae, palp 2-articulate. Maxillipedal plates small but setation ordinary, apex of palp article 3 not strongly protuberant, dactyl elongate, apical nail distinct.

Gnathopods ordinary, small, similar, gnathopod 2 scarcely enlarged, article 5 of gnathopods 1-2 of ordinary length to elongate, free, palms oblique, propodus of gnathopods 1-2 ordinary, often thin, ovatorectangular, poorly setose anteriorly. Article 5 of pereopods 3-4 with posteroproximal setae, article 6 with thick armaments. Article 2 of pereopod 5 of broad form, articles 4-5 of pereopods 5-6 broad to medium; pereopod 7 ordinary, article 3 ordinary, dactyl vestigial or absent.

Epimera 1-2 without long facial brushes or posterior setae, epimeron 3 of rounded classification, bearing 3 or fewer long setae. Urosomite 3 without dorsal hook. Peduncle of uropod 1 without inter-ramal spike, without major displaced spine, rami of uropods 1-2 continuously spinose to apex, with subapical spines or nails, inner ramus of uropod 1 with 1 row of marginal spines. Inner ramus of uropod 2 ordinary. Uropod 3 ordinary, one of rami longer than peduncle, bearing article 2 on outer ramus, with 2 apical setae. Telson ordinary.

Relationship. Like *Birubius* but dactyl of pereopod 7 vestigial or absent.

Species. *Yan errichus* Barnard & Drummond, 1978 [781]; *Y. tiendi* Barnard & Drummond, 1978 [787].

Habitat and distribution. Marine, southern Australia, intertidal, shallow water, 2 species.

Phoxocephalids of Unknown Generic Assignment

Pontharpinia centralis Schellenberg, 1938a [381]; *Phoxocephalus erythrophthalmus* (Catta, 1875) [348]; *Phoxocephalus geniculatus* (Stimpson, 1856) [395]; *Phoxocephalus obtusus* (Stimpson, 1856) [395]; *Paraphoxus pyripes* K.H. Barnard, 1930 (= *Pontharpinia maxima* Stephensen, 1947) [870]; *Parharpinia obliqua* K.H. Barnard, 1932 [833 + 871]; *Parharpinia rotundifrons* K.H. Barnard, 1932 [833]; *Pontharpinia barnardi* Pirlot, 1932 [633].

PHOXOCEPHALOPSIDAE Barnard & Clark, 1984a

Diagnosis. Haustorioid with rostrum of moderate size, broad; cheek weak. Antenna 1 of haustorius form, article 1 short, main setal row strong, article 2 as long as article 1, article 3 shorter, primary flagellum elongate, accessory flagellum short. Antenna 2 of haustorius form, article 4 expanded, with facial spines near base, article 5 shorter and narrower than article 4, these articles furnished with 1 or more longitudinal rows of facial armaments, ventral margin with long setae, and 2 other kinds but none glassy; flagellum longer than article 4 of peduncle. Epistome and upper lip distinct. Mandibles with stubby, sparsely but distinctly toothed incisors, laciniae mobiles diverse, rakers sparse and widely separate, molar of medium size, triturative, choppers weak; palp 3-articulate, article 3 not bevelled, with apical fan of setae, with urohaustoriid setal distribution, setae hooked but not awned. Lower lip with mandibular lobes moderately well developed. Maxilla 1 with 2-articulate palp, inner plate small and with 1 seta. Maxilla 2 ordinary, inner plate with oblique facial row of setae. Maxillipeds with unexpanded bases and no baler lobes, with normally enlarged plates, outer spinose; palp 4-articulate, article 2 expanded, article 4 clavate, multisetose.

Coxae 1-4 evenly integrated by stepped enlargement from coxa 1 onwards, coxa 4 dominant, coxa 1 medium and slightly tapering, coxa 3-4 not (type) or distinctly (other species) produced posteroventrally. Coxal gills 2-6; brood-plates slender. Gnathopods feeble, grossly alike in proportions, carpus elongate, but gnathopod 1 almost simple, gnathopod 2 minutely subchelate, article 3 short. Article 5 of pereopods 3-4 broad, slightly expanded, not deeply lobate, with thin posterior spines;

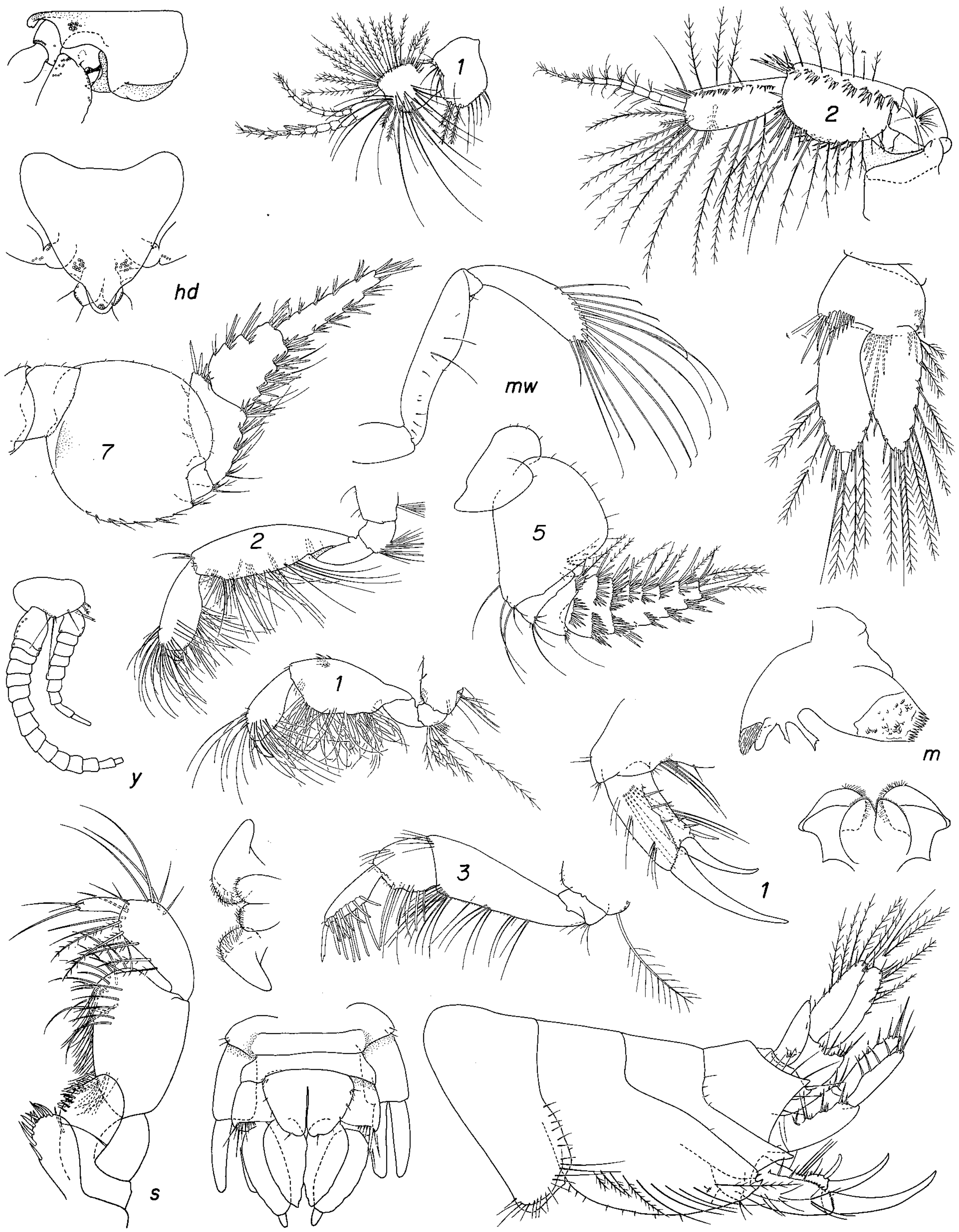


Fig.112. Phoxocephalopsidae. All *Phoxocephalopsis* species except (L) *Puelche orensanzi.*

dactyls of pereopods 3-7 well developed; pereopod 5 of haustorius form, articles 2, 4 and 5 expanded, articles 4-5 with extensive facial rows of spines; pereopods 6-7 alike, articles 5-6 weakly expanded; no pereopod with underslung articulation.

Pleopods like urohaustoriids but pleopod 3 inferior (not 2). Epimeron 1 fully developed and setose; epimeron 2 weakly dominant in setation and size. Urosomites ordinary. Rami of uropod 1 styliform, naked; of uropod 2 rod-like and spinose or with several setae; uropod 3 of ordinary haustorioid-phoxocephalid kind, neither ramus dominant, both leaflike, article 2 on outer ramus very small and poorly setose. Telson short, broad, deeply cleft. [Sexual dimorphism unknown.]

See key in Haustorioidea.

Relationship. Phoxocephalopsids lie in position ancestral both to Zobrachoidae-Urohaustoriidae and Haustoriidae, and at present appear to be the most primitive living haustorioids known. Despite this assertion the family has several apomorphic characters, such as the simple gnathopod 1 and dominant epimeron 2. One might consider *Zobracho* as more primitive because of its subchelate gnathopods; *Phoxocephalopsis*, in contrast to *Zobracho*, retains more or less plesiomorphic uropods 1-2 and first maxillary palp. Except for epimeron 2 and the poorly setose maxillae and weak raker system, it could form a plausible ancestor to the Haustoriidae, which have numerous modifications in mouthparts and pereopods. Phoxocephalopsids cannot be derived from any zobrachoid or urohaustoriid without evolutionary reversal to normalcy in uropods 1-2.

Phoxocephalopsids differ from urothoids in the antennae.

Key to Genera of Phoxocephalopsidae

1. Epimeron 2 dominant, epimera with posteroventral points, coxa 2 with more than half surface area of coxa 3, rakers present, incisors toothed .... *Phoxocephalopsis*

—— Epimeron 3 dominant, epimera untoothed, coxa 2 with less than one third surface area of coxa 3, rakers absent, incisors untoothed .... *Puelche*

Phoxocephalopsis Schellenberg

Fig.112

Phoxocephalopsis Schellenberg, 1931: 69.–Barnard & Clark, 1984: 86.

Haustoriella Barnard, 1931a: 426 (*Haustoriella psammophila*, K.H. Barnard, 1931a, monotypy).

Type species. *Phoxocephalopsis zimmeri* Schellenberg, 1931, monotypy.

Diagnosis. Incisors toothed; rakers present. Coxa 2 much larger than 1, only slightly smaller than 3, with more than half surface area of 3. Epimeron 2 dominant.

Variables. Dactyl of pereopod 5 naked (typical), spinose (species of Ruffo, 1956b); outer ramus of uropod 2 with apical spines (typical), lacking apical spines (*P. deceptionis*).

Species. *Phoxocephalopsis deceptionis* Stephensen, 1947a [872]; *P. gallardoi* Barnard & Clark, 1984 (= *P. zimmeri* identification of Barnard & Drummond, 1982c) [866]; *P. mehuiensis* Varela, 1983 [765]; *P. psammophila* (K.H. Barnard, 1931a, 1932) [833]; *P. zimmeri* Schellenberg, 1931 (not Barnard & Drummond, 1982c) (Barnard & Clark, 1984) [860]; species (= identification of *P. zimmeri* of Ruffo, 1956b) [751].

Habitat and distribution. Marine, South Brazil to Magellan and Falkland Islands, then to central Chile, 4-112 m, 5 species.

Puelche Barnard & Clark

Fig.112L

Puelche Barnard & Clark, 1982b: 262.

Type species. *Puelche orensanzi* Barnard & Clark, 1982, original designation.

Diagnosis. Incisors untoothed; rakers absent. Coxa 2 reduced, about one third surface area of coxa 3, scarcely larger than coxa 1. Epimeron 3 dominant.

Species. *Puelche orensanzi* Barnard & Clark, 1982b [862].

Habitat and distribution. Marine, Argentina, San Roman Beach, sandy, 1 species.

PHREATOGAMMARIDAE Bousfield, 1982

[see Barnard & Barnard (1983)]

PLATYISCHNOPIDAE Barnard & Drummond, 1979

Diagnosis. Rostrum strong, cylindrical, with subapical ventral retrorse process, cheek poorly developed. Antenna 1 of haustorius form or urothoe form (typical), flagella elongate. Antenna 2 of urothoe form, article 5 slightly to strongly shorter and slightly narrower than article 4, latter without major facial armament, ventral margin with 1 kind of armament, either setae or glassy spines, flagellum often greatly elongate in male and antenna 2 bearing calceoli. Prebuccal complex massive, upper lip dominant, epistome scarcely evident. Mandibles bearing short, broad, phoxocephalid-like incisors with 3 main teeth or stubby modifications thereof, 1 of these widely disjunct; laciniae mobiles present on both sides, alike or not, rakers moderately numerous and serrate, molar of medium size, not triturative, bearing spinules, lacking accessory chopper; palp 3-articulate, article 3 lacking outer setae, all spines concentrated on apical bevel. Lower lip with discrete inner lobes, mandibular extensions of outer lobes well developed. Maxilla 1 with 1-articulate palp, inner plate with fewer than 5 setae. Maxilla 2 ordinary or outer plate enlarged, inner plate with poorly developed oblique facial row of setae. Maxillipeds with unexpanded bases, poorly enlarged plates, outer spinose; palp 4-articulate, article 2 wide but not differentially expanded, article 4 unguiform, with or without nail. No baler lobes on any maxillae or maxillipeds.

Coxae variable but coxa 4 strongly dominant and posterodorsally excavate, thus with posteriorly directed lobe, coxa 3 rectangular, or ventrally narrow, coxae 1-2 of various dimensions. Coxal gills on segments 2-6, 3-7, or 2-7; brood plates slender. Gnathopods feeble or slightly enlarged, alike or not, carpus more or less elongate, propodus elongate or not, strongly or weakly chelate. Article 5 of pereopods 3-4 narrow, with sparse posterior spination; dactyls of pereopods 3-7 well developed or pereopod 5 weakly of haustorius form, articles 2, 4, occasionally 5, expanded, articles 4-5 with weakly developed facial spination; pereopods 6-7 more or less alike but pereopod 7 larger, article 2 usually of modified phoxocephalid form, article 4 of pereopods 6-7 expanded; no pereopod with underslung articulation.

Pleopod 2 not inferior. Peduncles of pleopods much longer than wide, coupling hooks of haustorius kind; inner rami as long as outer (or very nearly), bearing multiple clothespin spines with small inner barbs. Epimeron 1 well developed; epimeron 2 often dominant in size. Urosomites ordinary. Rami of uropods 1-2 styliform or rodlike, spinose; uropod 3 of phoxocephalid form but inner ramus very small to moderate in size, article 2 of outer ramus small to greatly elongate, apices of rami poorly setose. Telson variable, cleft to entire. Sexual dimorphism occurring on antenna 2 and uropod 3.

See key in Haustorioidea.

Model genus. *Tiburonella* is used as the basic genus of this family owing to the apomorphic conditions of *Platyischnopus.*

Phylogeny. We consider the generalised derivative sequence in this family to be: *Tiburonella*, *Eudevenopus*, *Tittakunara*, *Tomituka*, *Yurrokus*, and large gap to *Indischnopus*, *Platyischnopus*, with *Skaptopus* seemingly forming a branch near *Indischnopus* (similar coxae, rakers, pleonite 3) but retaining basic antenna 1.

Relationship. Platyischnopids have so many characters in common with the subfamily Phoxocephalinae (Phoxocephalidae) that one might derive them from an ancestor common to that group. The structure of the mandibular incisors and the pattern of spine distribution on the mandibular palp, plus the shape of coxa 4 suggest this affinity. Article 2 of pereopod 7 has faint similarity to that of phoxocephalids but the remainder of the appendage is much stouter and more elongate than in phoxocephalids. The unusual head is a distinguishing mark.

Platyischnopids also have many superficial similarities to several species of Synopiidae, especially to the genus *Pseudotiron* which has a similar head. Synopiids differ from platyischnopids in the more elongate articles on the peduncle of antenna 1, the magniramous uropod 3 lacking article 2 on the outer ramus, the unreduced inner ramus similar to the outer ramus, the well-setose inner plate of maxilla 1, the presence of facial setae on the inner plate of maxilla 2, the callynophore of the primary flagellum on antenna 1, the longer outer plate of the maxilliped and the non-chelate gnathopods.

See 'Condukiidae' for further comments.

Key to Genera of Platyischnopidae

1. Head lacking apical process between antennae .... *Skaptopus*

—— Head with apical rostral process between antennae 2

2. Article 2 of antenna 1 about 1.4 times as long as article 1, coxa 3 distally tapering .... *Platyischnopus*

—— Article 2 of antenna 1 not exceeding 1.1 times as long as article 1, coxa 3 distally broad 3

3. Pleonite 3 with dorsal teeth, mandibular rakers absent, setae on palp article 2 of mandible vestigial or absent .... *Indischnopus*

—— Pleonite 3 naked, mandibular rakers present, setae on palp article 2 of mandible present 4

4. Coxa 1 of ordinary length and rectangular 5

—— Coxa 1 short and shoe-shaped 6

5. Telson lacking lateral brush of setae, posterior lobe of coxa 4 tapering .... *Tiburonella*

—— Telson with lateral brush of setae, posterior lobe of coxa 4 not tapering .... *Eudevenopus*

6. Article 2 of pereopod 7 with soft notch, telson with dorsofacial spines .... *Tittakunara*

—— Article 2 of pereopod 7 with sharp cusp, telson lacking dorsofacial spines 7

7. Article 5 of gnathopods 1-2 longer than article 6, gnathopods chelate .... *Tomituka*

—— Article 5 of gnathopods 1-2 scarcely longer than 6, gnathopods poorly chelate .... *Yurrokus*

Eudevenopus Thomas & Barnard

Eudevenopus Thomas & Barnard, 1983b: 3.

Type species. *Platyischnopus metagracilis* J.L. Barnard, 1964b, original designation.

Diagnosis. Head bearing apical rostral process between antennae. Article 2 of antenna 1 not exceeding 1.1 times as long as article 1. Mandibular rakers present; setae on palp article 2 present. Coxa 1 of ordinary length and rectangular; coxa 3 distally broad; posterior lobe of coxa 4 not tapering. Article 5 of gnathopods 1-2 not longer than article 6, gnathopods strongly chelate. Article 5 of pereopod 7 with soft notch. Pleonite 3 dorsally naked. Telson with lateral brush of setae.

Variables. Dactyl of pereopod 7 long or short; inner ramus of uropod 2 strongly or scarcely shortened.

Relationship. Differing from *Tiburonella* in the lateral brushes of setae on the telson, presence of only 1 seta on inner plate of maxilla 1 and see Thomas & Barnard (1983b) for many minor points.

Species. *Eudevenopus gracilipes* (Schellenberg, 1931, 1935a) (Thomas & Barnard, 1983b) [765]; *E. honduranus* Thomas & Barnard, 1983b (?= *E. capuciatus* Oliveira, 1955c) [490]; *E. metagracilis* (J.L. Barnard, 1964b, 1969b) (Thomas & Barnard, 1983b) [369].

Habitat and distribution. Marine, Eastern Pacific from Baja California to middle Chile, Western Atlantic from South Carolina to southern Brazil, 1-73 m, 3 species.

Indischnopus Barnard & Drummond

Fig.113A

Indischnopus Barnard & Drummond, 1979: 33.

Type species. *Platyischnopus herdmani* Walker, 1904, original designation.

Diagnosis. Head bearing apical rostral process between antennae. Article 2 of antenna 1 about 1.4 times as long as article 1. Mandibular rakers absent; setae on palp article 2 or absent. Coxa 1 of ordinary length and shoe-shaped; coxa 3 distally broad; posterior lobe of coxa 4 tapering and sharp. Article 5 of gnathopods 1-2 much longer than article 6, gnathopods poorly chelate. Article 5 of pereopod 7 with sharp cusps. Pleonite 3 with dorsal teeth. Telson lacking lateral brush of setae.

Relationship. Like *Platyischnopus* in elongate articles 2-3 of antenna 1, lack of rakers, and lack of setae on article 2 of the mandibular palp, but differing in the larger and congested coxae 1-3, sharp point on coxa 4, dorsal teeth of pleonite 3 and deeper telsonic cleft.
See *Skaptopus*.

Species. *Indischnopus capensis* (K.H. Barnard, 1926) (Barnard & Drummond, 1979) [743]; *I. herdmani* (Walker, 1904) (Pillai, 1957) (Nayar, 1959) (Rabindranath, 1971d) (Barnard & Drummond, 1979) (Ledoyer, 1979a, 1986) [660].

Habitat and distribution. Marine, South Africa to southern India, ?10-?126 m, 2 species.

Platyischnopus Stebbing

Figs 113C,D, 114A,D

Platyischnopus Stebbing, 1888: 830.–Barnard & Drummond, 1979: 3.

Type species. *Platyischnopus mirabilis* Stebbing, 1888, monotypy.

Diagnosis. Head bearing apical rostral process between antennae. Article 2 of antenna 1 exceeding 1.4 times as long as article 1. Mandibular rakers absent; setae on palp article 2 absent. Coxae 1-3 very short, diverse; coxa 3 distally tapering; posterior lobe of coxa 4 not tapering. Article 5 of gnathopods 1-2 much longer than article 6, gnathopods chelate. Article 5 of

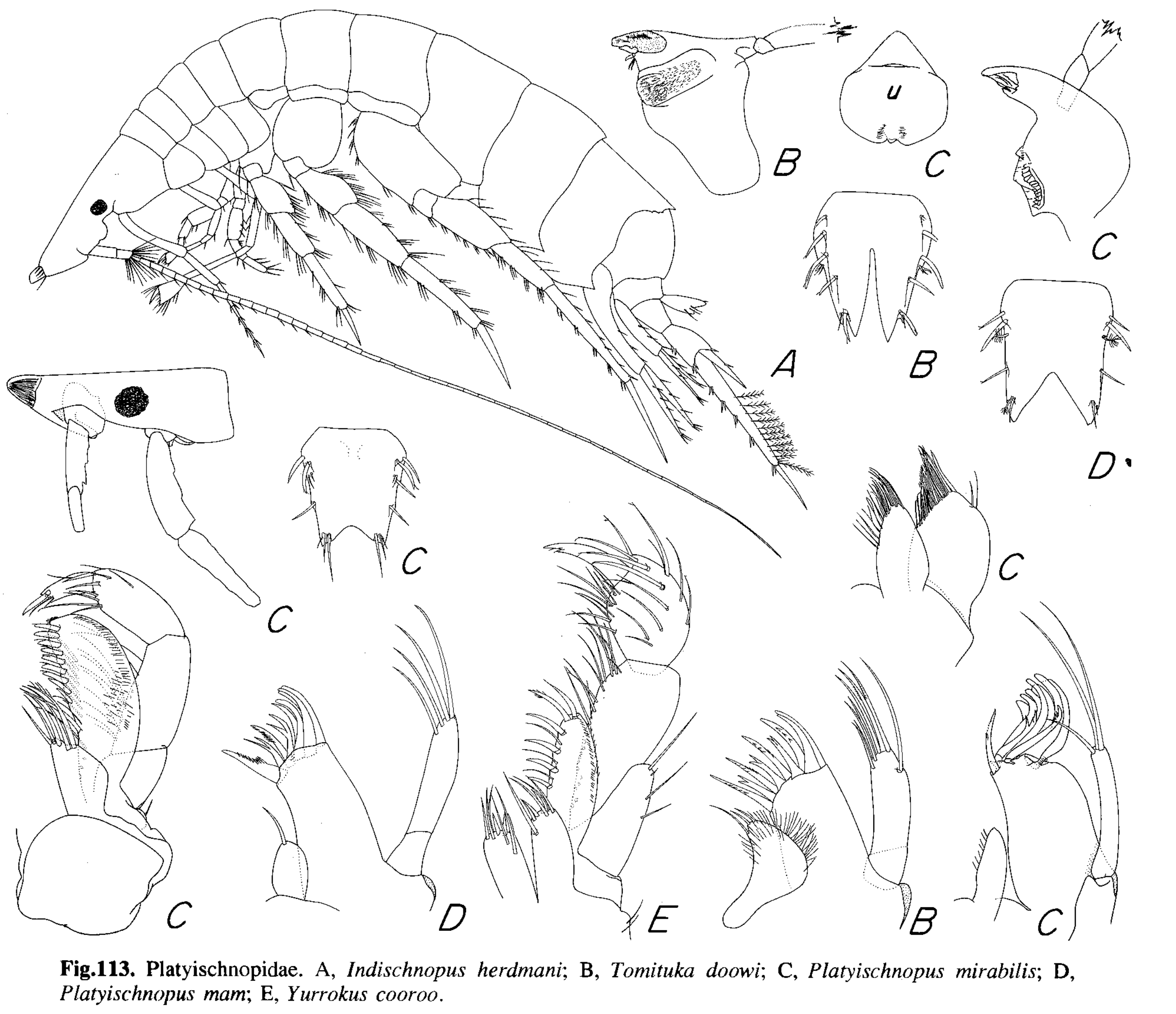


Fig.113. Platyischnopidae. A, *Indischnopus herdmani*; B, *Tomituka doowi*; C, *Platyischnopus mirabilis*; D, *Platyischnopus mam*; E, *Yurrokus cooroo*.

pereopod 7 with sharp cusp. Pleonite 3 dorsally naked. Telson lacking lateral brush of setae.

Additional characters. Teeth of incisor absent; spines of outer plate on maxilla 1 strongly curved or sinuous, often festooned; telson almost entire, lacking mid-dorsal spines.

Relationship. Differing from *Tiburonella*, *Eudevenopus*, *Tittakunara*, *Tomituka* and *Yurrokus* in the elongate articles 2-3 of antenna 1, lack of rakers, lack of setae on article 2 of mandibular palp and smallness of coxa 1-3 together.

See *Indischnopus*.

Removal. *Platyischnopus neozelanicus* Chilton, 1897, to *Otagia* in Condukiidae.

Species. *Platyischnopus mam* (Barnard & Drummond, 1979) (= *P. mirabilis* by Chilton, 1922b, not Stebbing, 1888) [781]; *P. mirabilis* Stebbing, 1888, 1906, 1910a (Barnard & Drummond, 1979) [784].

Habitat and distribution. Marine, south-eastern Australia, 4-40 m, 2 species.

Skaptopus Thomas & Barnard

Skaptopus Thomas & Barnard, 1983b: 26.

Type species. *Skaptopus brychius* Thomas & Barnard, 1983b, original designation.

Diagnosis. Head lacking apical rostral process between antennae. Article 2 of antenna 1 about not exceeding 1.1 times as long as article 1. Mandibular rakers absent; setae on palp article 2 vestigial or absent. Coxa 1 of ordinary length and rectangular; coxa 3 distally broad; posterior lobe of coxa 4 evenly rounded. Article 5 of gnathopods 1-2 scarcely longer than article 6, gnathopods poorly chelate. Article 5 of pereopod 7 with soft notch. Pleonite 3 with dorsal teeth. Telson lacking lateral brush of setae.

Sexual dimorphism. Article 3 of male antenna 1 with huge setal brush, article 4 of antenna 2 swollen.

Relationship. Differing from all other platyischnopids in the reduced rostral area lacking sensory pits. Combining basic antenna 1 with absence of rakers as in *Platyischnopus* and *Indischnopus* but with large congested coxae 1-3 and toothed epimeron 3 like *Indischnopus*.

Species. *Skaptopus brychius* Thomas & Barnard, 1983b [361].

Habitat and distribution. Marine, north-western Atlantic from Georges Bank to Virginia, 129-175 m.

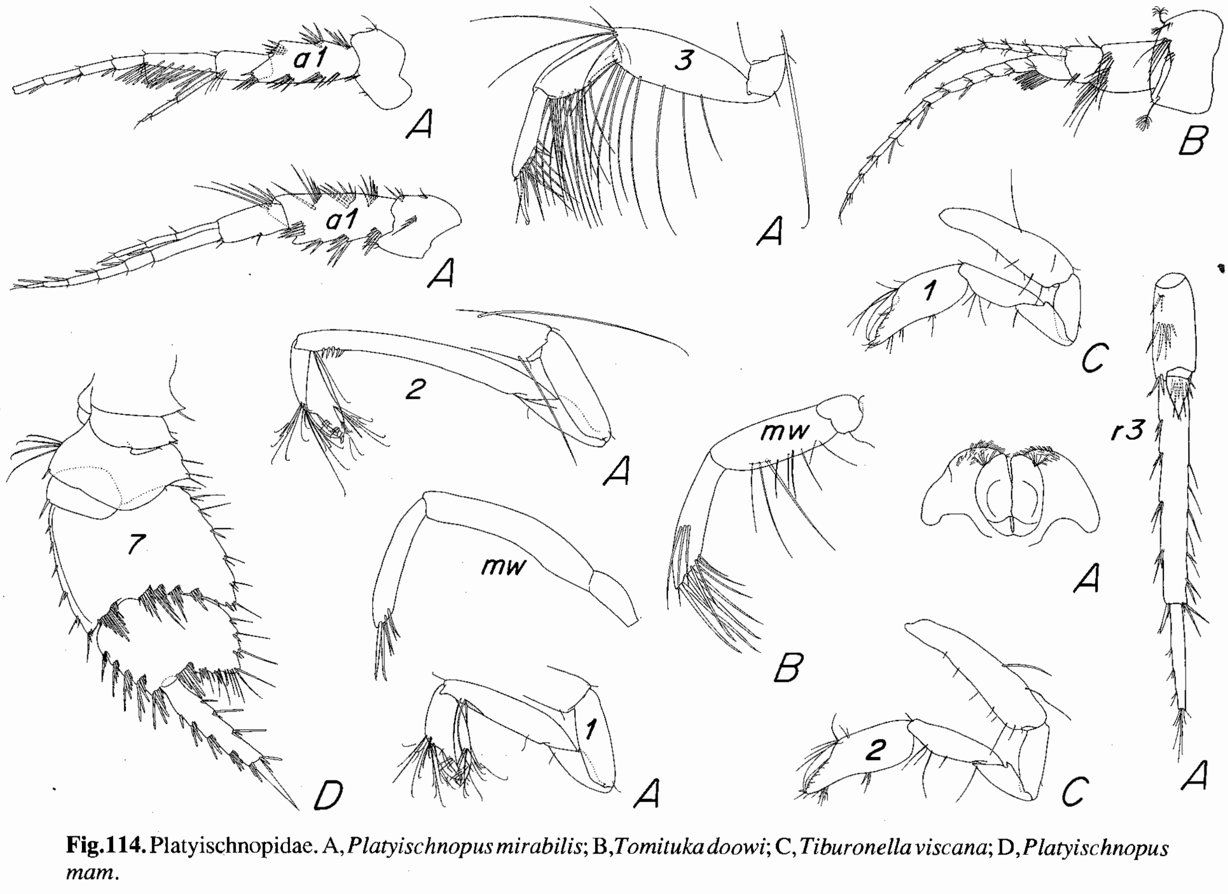


Fig.114. Platyischnopidae. A, *Platyischnopus mirabilis*; B, *Tomituka doowi*; C, *Tiburonella viscana*; D, *Platyischnopus mam*.

Tiburonella Thomas & Barnard

Fig.114C

Tiburonella Thomas & Barnard, 1983b: 20.

Type species. *Platyischnopus viscana* J.L. Barnard, 1964b, original designation.

Diagnosis. Head bearing apical rostral process between antennae. Article 2 of antenna 1 about 1.1 times as long as article 1. Mandibular rakers present; setae on palp article 2 present. Coxa 1 of ordinary length and rectangular; coxa 3 broad; posterior lobe of coxa 4 tapering. Article 5 of gnathopods 1-2 not longer than article 6, gnathopods strongly chelate. Article 5 of pereopod 7 with soft notch. Pleonite 3 dorsally naked. Telson lacking lateral brush of setae.

Relationship. Considered to be the basic or model platyischnopid because of the presence of head process, short articles 2-3 of peduncle on antenna 1, presence of rakers and setae on article 2 of mandibular palp, unreduced coxae, regular shape of article 2 on pereopod 7 with soft hump or notch, and smooth dorsum of pleonite 3.

Species. *Tiburonella viscana* (J.L. Barnard, 1964b) (Thomas & Barnard, 1983b) [490].

Habitat and distribution. Marine, eastern Pacific from southern California to Costa Rica; Western Atlantic at Belize; 3-27 m, 1 species.

Tittakunara Barnard & Drummond

Tittakunara Barnard & Drummond, 1979: 28.

Type species. *Tittakunara katoa* Barnard & Drummond, 1979, original designation.

Diagnosis. Head bearing apical rostral process between antennae. Article 2 of antenna 1 not exceeding 1.1 times as long as article 1. Mandibular rakers present; setae on palp article 2 present. Coxa 1 short and hemilunar; coxa 3 distally broad; posterior lobe of coxa 4 not tapering. Article 5 of gnathopods 1-2 longer than article 6, gnathopods poorly chelate. Article 5 of pereopod 7 with soft notch. Pleonite 3 dorsally naked. Telson lacking lateral brush of setae.

Relationship. Differing from *Tiburonella* and *Eudevenopus* in the small coxa 1 and elongate carpus of gnathopods. From *Tomituka* and *Yurrokus* in the soft notch (versus sharp point) on article 2 of pereopod 7.

Species. *Tittakunara katoa* Barnard & Drummond, 1979 [781].

Habitat and distribution. Marine, Australia, New South Wales, 0 m, 1 species.

Tomituka Barnard & Drummond

Figs 113B, 114B

Tomituka Barnard & Drummond, 1979: 16.

Type species. *Tomituka doowi* Barnard & Drummond, 1979, original designation.

Diagnosis. Head bearing apical rostral process between antennae. Article 2 of antenna 1 about 1.1 times as long as article 1. Mandibular rakers present; setae on palp article 2 present. Coxa 1 short, shoe-shaped; coxa 3 distally broad; posterior lobe of coxa 4 not tapering. Article 5 of gnathopods 1-2 much longer than article 6, gnathopods chelate. Article 5 of pereopod 7 with sharp cusp. Pleonite 3 dorsally naked. Telson lacking lateral brush of setae.

Relationship. Differing from *Tiburonella* and *Eudevenopus* in the shoe-shaped coxa 1, sharp point of article 2 on pereopod 7, and long carpus of gnathopods.

Species. *Tomituka doowi* Barnard & Drummond, 1979 [782].

Habitat and distribution. Marine, Australia, Victoria, 4-8 m, 1 species.

Yurrokus Barnard & Drummond

Fig.113E

Yurrokus Barnard & Drummond, 1979: 23.

Type species. *Yurrokus cooroo* Barnard & Drummond, 1979, original designation.

Diagnosis. Head bearing apical rostral process between antennae. Article 2 of antenna 1 not exceeding 1.1 times as long as article 1. Mandibular rakers present; setae on palp article 2 present. Coxa 1 short; shoe-shaped; coxa 2 shoe-shaped; coxa 3 distally broad; posterior lobe of coxa 4 not tapering. Article 5 of gnathopods 1-2 scarcely longer than article 6, gnathopods poorly chelate. Article 5 of pereopod 7 with sharp cusp. Pleonite 3 dorsally naked. Telson lacking lateral brush of setae.

Relationship. Differing from *Tiburonella* ar

Eudevenopus in the short coxa 1, shoe-shaped coxa 2, point on article 2 of pereopod 7, and lack of tooth on epimeron 3. From *Tomituka* in the thick propodus of gnathopod 1 and lack of tooth on epimeron 3.

Species. *Yurrokus cooroo* Barnard & Drummond, 1979 [782].

Habitat and distribution. Marine, Australia, Victoria, 4 m, 1 species.

PLEUSTIDAE Buchholz, 1874

Diagnosis. Accessory flagellum 1-articulate or absent. Lower lip of special form, inner lobes wide (fused or not), outer lobes especially tilted inward, mandibular lobes short, giving appearance in Figure 115A.

See Eusiridae and Iphimediidae.

Description. Body smooth or dorsally and/or laterally keeled. Rostrum small or huge. Mouthparts ordinary though article 3 of maxillipedal palp often produced and dactyl rarely reduced. Anterior coxae never as acuminate as in Iphimediidae. Gnathopods generally small to feeble. Pereopods of ordinary dimensions, occasionally dactyl toothed. Outer rami of uropods 1-2 usually shortened. Uropod 3 ordinary, outer ramus occasionally shortened slightly, peduncle rarely with ventral extension. Telson medium, entire or weakly cleft.

Relationship. Differing from Iphimediidae and Eusiridae in the special form of the lower lip. From Iphimediidae also in the poorly to non-acuminate anterior coxae.

Removals. *Parepimeriella* Schellenberg (1931) is removed to *Parepimeria* in the Iphimediidae (= Paramphithoidae) though Schellenberg (1931) described the lower lip as of pleustid form. However, the long, thin, simple and heavily setose gnathopods relate it to *Parepimeria* which for the moment fits Iphimediidae better than Pleustidae. *Neopleustes euacanthoides* Gurjanova, 1972, to *Parapleustes euacanthoides*; *Neopleustes rasmyslovi* Gurjanova, 1951, to *Arctopleustes*; *Parapleustes barnardi* Ledoyer, 1972c, to *Tepidopleustes*; *Parapleustes echinoicus* Tzvetkova, 1975b, to *Dactylopleustes*; *Parapleustes glabricauda* Dunbar, 1954, to *Arctopleustes*; *Parapleustes honomu* J.L. Barnard, 1970a, to *Tepidopleustes*; *Parapleustes nautilus* J.L. Barnard, 1969a, to *P. behningi*; *Parepimeriella* Schellenberg, 1931, to *Parepimeria*; *Pleustes medius* Goes, 1866, to *Pleustomesus*; *Pleustoides* Gurjanova, 1972, to *Pleusymtes*; *Stenopleustes gagarae* Gurjanova, 1972, to *Parapleustes*; *Sympleustes corniger* Shoemaker, 1952, to *Parapleustes*.

Key to Genera of Pleustidae

1. Molar very large, triturative, columnar 2

—— Molar feeble, nontriturative or poorly triturative, conical 8

2. Gnathopods 1-2 simple, (articles 5-6 bearing numerous long setae along posterior margin) .... (Iphimediidae) *Parepimeria*

—— Gnathopods 1-2 subchelate, articles 5-6 moderately to poorly setose (exception, *Mesopleustes*) 3

3. Article 2 of antenna 1 with long dorsal distal tooth (not ventral) .... *Pleustostenus*

—— Article 2 of antenna 1 without dorsodistal tooth, ventral tooth occasional 4

4. Rostrum reaching more than 60% along article 1 on peduncle of antenna 1 5

—— Rostrum reaching 40% or less along article 1 on peduncle of antenna 1 6

5. Coxa 1 not covered by coxa 2; coxa 4 strongly tapering distally .... *Mesopleustes*

—— Coxa 1 strongly covered by coxa 2; coxa 4 not tapering distally .... *Pleustomesus*

6. Article 3 of maxilliped palp strongly produced distally .... *Stenopleustes*

—— Article 3 of maxilliped palp not produced distally 7

7. Carpal lobes of gnathopods narrow, sharp or absent, accessory flagellum short or absent .... (= *Pleustoides*) *Pleusymtes*

—— Carpal lobes of gnathopods broadly truncate, accessory flagellum elongate .... *Cleonardopsis*

8. Peduncle of uropod 3 with large ventrodistal plate supporting rami .... *Austropleustes*

—— Peduncle of uropod 3 without large ventrodistal plate supporting rami 9

9. Rostrum exceeding apex of article 1 on peduncle of antenna 1 .... *Pleustes*

—— Rostrum reaching 50% or less along article 1 of peduncle on antenna 1 10

10. Gnathopods 1-2 of eusirid-shape .... *Pleusirus*

—— Gnathopods 1-2 not of eusirid-shape 11

11. Article 3 of maxilliped palp produced or article 4 absent 12

—— Article 3 of maxilliped palp not produced, article 4 well developed, nail-shaped 14

12. Posterior margin of epimeron 3 smooth, distoposterior corner tooth usually present; article 5 of gnathopods 1-2 shorter than article 6 13

—— Posterior margin of epimeron 3 bearing numerous serrations, distoposterior corner tooth poorly marked; article 5 of gnathopods 1-2 longer than article 6 .... *Tepidopleustes*

13. Gnathopods dissimilar to each other; gnathopod 1 slender, with article 5 longer than article 6, without lobe; gnathopod 2 large, article 5 shorter than article 6, without lobe .... *Arctopleustes*

—— Gnathopods 1-2 similar to each other in shape, both with article 5 shorter than article 6, bearing lobe .... *Neopleustes*

14. Dactyl of pereopods 3-7 slender, without teeth along inferior margin; distal margin of both lobes on maxilla 2 with setae .... *Parapleustes*

—— Dactyl of pereopods 3-7 stout, with teeth along inferior margin; distal margin of both lobes on maxilla 2 with spines .... *Dactylopleustes*

Arctopleustes Gurjanova

Arctopleustes Gurjanova, 1972: 135.

Type species. *Neopleustes rasmyslovi* Gurjanova, 1951, original designation.

Diagnosis. Body smooth. Rostrum short. Peduncular article 2 of antenna 1 much shorter than article 1. Accessory flagellum obsolescent. Labrum incised asymmetrically. Mandibular molar feeble, conical, non-triturative. Inner plates of labium coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 with distal tubercle, dactyl well developed. Coxae 1-4 ordinary. Gnathopods 1-2 moderately stout, slender, subchelate, simple, unequal, gnathopod 1 slender, article 5 slender, article 5 longer than article 6, lobe absent, propodus not expanded. Gnathopod 2 stout, article 5 much shorter than article 6, lobe large, propodus expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson entire.

Relationship. Like *Neopleustes* except for the unequal gnathopods.

Species. *Arctopleustes glabricauda* (Dunbar, 1954) (Karaman & Barnard, 1979) (Just, 1980) [220]; *A. rasmyslovi* (Gurjanova, 1951) (Gurjanova, 1972) [292].

Habitat and distribution. Marine, Ungava to Thule to Kara Sea, 65-124 m, 2 species.

Austropleustes K.H. Barnard

Fig.116G

Austropleustes K.H. Barnard, 1931a: 428.–K.H. Barnard, 1932: 168.–Gurjanova, 1972: 134.

Type species. *Austropleustes cuspidatus* K.H. Barnard, 1931a, original designation.

Diagnosis. Body keeled. Rostrum short. Peduncular article 2 of antenna 1 [?as long as ?much shorter than article 1]. Accessory flagellum [?obsolescent. composed of 1 long article]. Labrum incised [?asymmetrically]. Mandibular molar feeble, conical, non-triturative. Inner plates of labium absent. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 with distal tubercle, dactyl well developed. Coxae 1-4 ordinary. Gnathopods 1-2 slender, subchelate, equal, article 5 as long as article 6, lobes small or absent, propodus not expanded. Dactyls of pereopods 3-7 with 1 denticle. Epimera unornamented posteriorly. Rami of uropods 1-2 lanceolate, outer shortened, of uropod 3 lanceolate, outer shortened, peduncle of uropod 3 with long tooth. Telson entire or incised weakly.

Variables. *Austropleustes simplex* so distinctive as to suggest not in this genus, possibly not in this family: body untoothed, epimeron 3 weakly serrate, telson weakly cleft but uropod 3 bearing typical peduncular tooth, maxilliped with typical process on palp article 3.

Relationship. Characterised by the large peduncular tooth-plate on uropod 3.

Species. *Austropleustes cuspidatus* K.H. Barnard, 1931a, 1932 [871B]; ?*A. simplex* K.H. Barnard, 1932 [833B].

Habitat and distribution. Marine, South Georgia and South Shetlands, 230-342 m, 2 species.

Cleonardopsis K.H. Barnard

Cleonardopsis K.H. Barnard, 1916: 175.
Amathillopleustes Pirlot, 1934: 205 (*Amathillopleustes alticoxa* Pirlot, 1934, original designation).

Type species. *Cleonardopsis carinata* K.H. Barnard, 1916, monotypy.

Diagnosis. Body keeled. Rostrum moderately long. Peduncular article 2 of antenna 1 shorter than article 1. Accessory flagellum composed of 1 long article. Labrum scarcely incised. Mandibular molar medium, triturative. Inner plates of labium partly coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 without distal tubercle, dactyl well developed. Coxae 1-4 ordinary. Gnathopods 1-2 moderately stout, subchelate, equal, article 5 stout, slightly shorter than article 6, lobe broad and deep, propodus expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented posteriorly. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson incised one fourth.

Relationship. Close to the Iphimediidae except for the shape of coxae 1-4, the especially large coxa 4 with distoposterior lobe, and all coxae with subrounded distal margin.

Differing from *Pleusymtes* in the truncate carpal lobes of the gnathopods and the elongate accessory flagellum.

Species. *Cleonardopsis carinata* K.H. Barnard, 1916 (= *Amathillopleustes alticoxa* Pirlot, 1934) (Schellenberg, 1926c) (Stephensen, 1944c) (Griffiths, 1975) [420B].

Habitat and distribution. Marine, probably deep cosmopolitan, 564-1189 m, 1 species.

Dactylopleustes Karaman & Barnard

Dactylopleustes Karaman & Barnard, 1979: 112.

Type species. *Parapleustes echinoicus* Tzvetkova, 1975b, original designation.

Diagnosis. Body smooth. Rostrum short. Peduncular article 2 of antenna 1 much shorter than article 1. Accessory flagellum obsolescent. Labrum incised asymmetrically. Mandibular molar feeble. Inner plates of labium absent. Maxillae 1-2 ordinary, but outer plate of maxilla 2 with heavy spines. Plates of maxilliped short, palp 4-articulate, powerful, article 3 without distal tubercle, dactyl well developed. Coxae 1-4 ordinary. Gnathopods 1-2 very slender, subchelate, equal, article 5 as long as article 6, lobes absent, propodus not expanded. Dactyls of pereopods 3-7 strongly toothed on inferior margin. Epimera unornamented. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson entire.

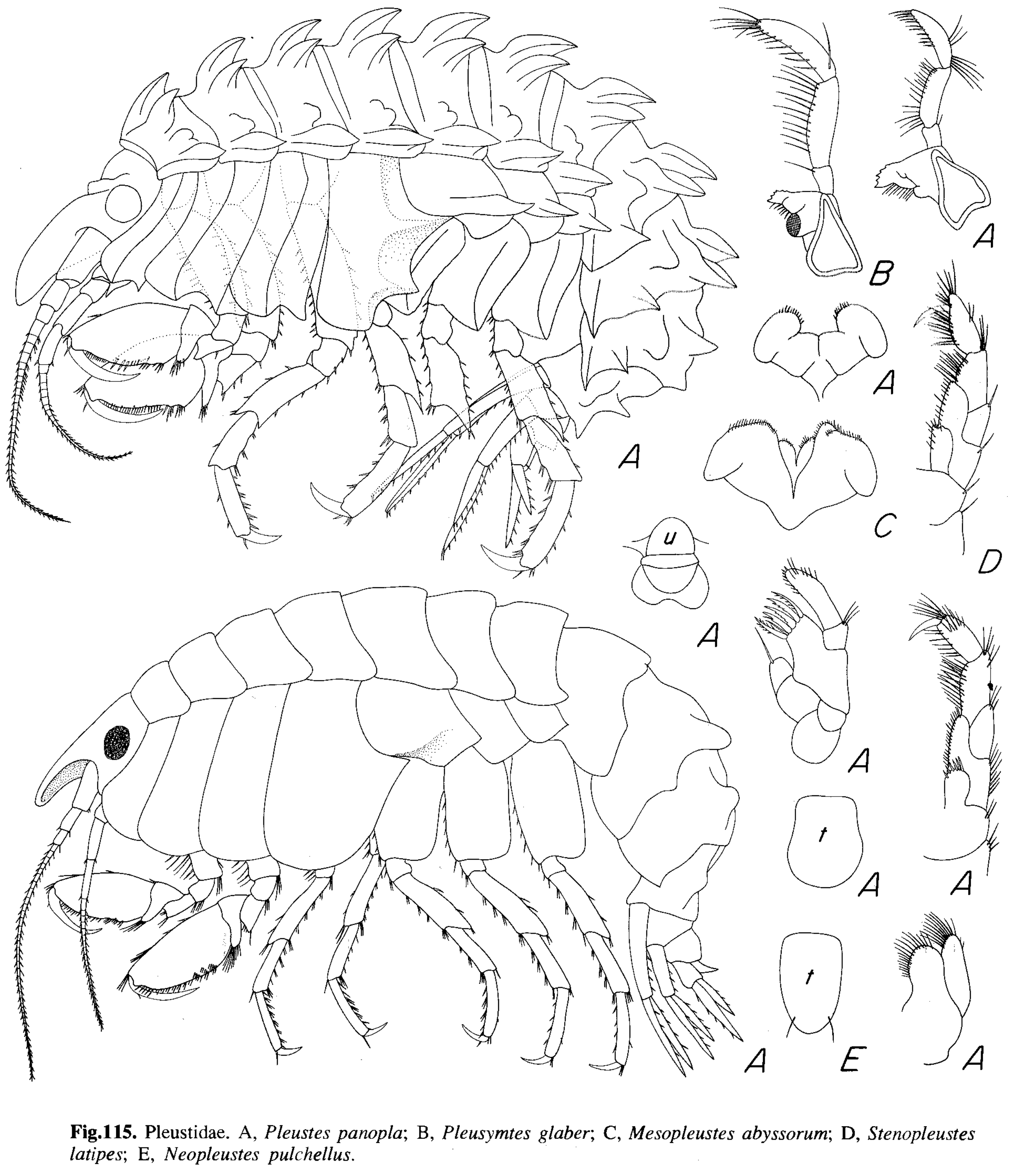


Fig.115. Pleustidae. A, *Pleustes panopla*; B, *Pleusymtes glaber*; C, *Mesopleustes abyssorum*; D, *Stenopleustes latipes*; E, *Neopleustes pulchellus*.

Relationship. Differing from *Parapleustes* in the toothed dactyls of the pereopods and stout armament on maxilla 2.

Species. *Dactylopleustes echinoicus* (Tzvetkova, 1975b) (Vader, 1978) [281I].

Habitat and distribution. Marine, Commander Islands, near Bering Strait, on *Strongylocentrotus polyacanthus*, littoral, 1 species.

Mesopleustes Stebbing

Figs 115C, 116E

Mesopleustes Stebbing, 1899a: 209.–Stebbing, 1906: 315.–Gurjanova, 1972: 133.

Type species. *Pleustes abyssorum* Stebbing, 1888, original designation.

Diagnosis. Also entered in Key to Iphimediidae. Body keeled. Rostrum long. Peduncular article 2 of antenna 1 almost as long as article 1. Accessory flagellum obsolescent. Labrum not incised. Mandibular molar large, triturative. Inner plates of labium obsolescent. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 without distal tubercle, dactyl well developed. Coxae 1-4 subacuminate distally, coxa 1 somewhat shortened, not covered by coxa 2. Gnathopods 1-2 moderately stout, subchelate, unequal, gnathopod 1 slender, article 5 stout, shorter

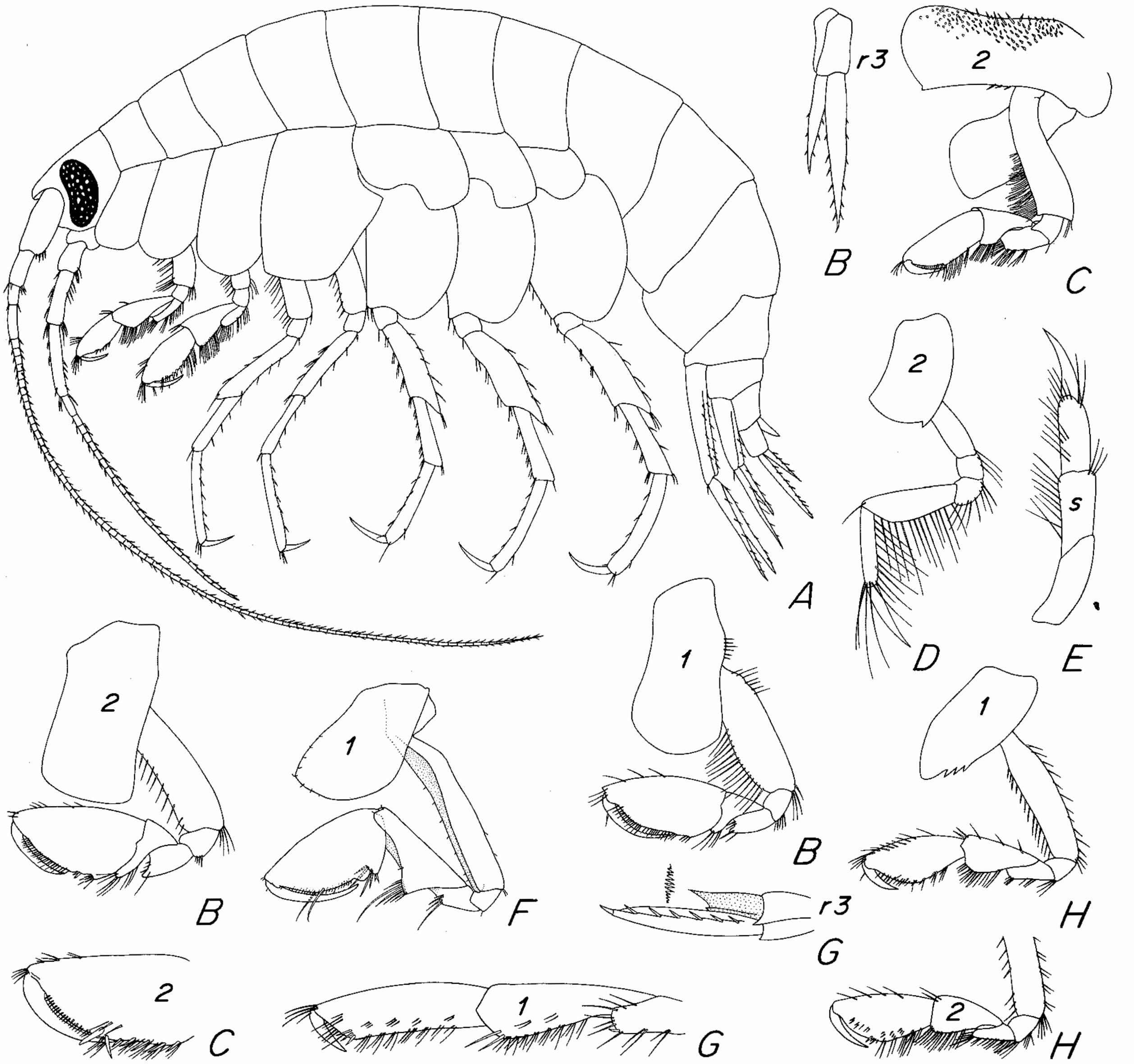


Fig.116. Pleustidae and Iphimediidae. A, *Stenopleustes malmgreni*; B, *Pleustes panopla*; C, *Pleustostenus displosus*; D, *Parepimeriella irregularis* (see also Fig.75H); E, *Mesopleustes abyssorum*; F, *Pleusirus secorrus*; G, *Austropleustes cuspidatus*; H, *Neopleustes pulchellus*.

than article 6, lobe short, broad, propodus weakly expanded. Gnathopod 2 stout, article 5 much shorter than article 6, lobe moderately large, propodus expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without tooth. Telson entire.

Relationship. See couplet 5 of key. The coxae are somewhat reminiscent of those in Iphimediidae but the placement of this genus in that key shows that it is rather foreign to that family.

Species. *Mesopleustes abyssorum* Stebbing, 1888 (Pirlot, 1936b) (Chevreux, 1927) (J.L. Barnard, 1964d, 1967a) [420BA + I].

Habitat and distribution. Marine, probably cosmopolitan deep, 694-3479 m, occasionally attached to palps of *Colossendeis colossa*, 1 species.

Neopleustes Stebbing

Figs 115E, 116H

Neopleustes Stebbing, 1906: 311.–Gurjanova, 1972: 133.

Type species. *Amphitoe pulchella* Krøyer, 1846a, original designation.

Diagnosis. Body smooth or keeled. Rostrum moderately long. Peduncular article 2 of antenna 1 shorter than article 1. Accessory flagellum obsolescent. Labrum incised asymmetrically. Mandibular molar feeble, conical, non-triturative. Inner plates of labium partly coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 with distal tubercle, dactyl well developed. Coxae 1-4 ordinary, or slightly acuminate distally, especially coxa 1. Gnathopods 1-2 slender, subchelate, equal, article 5 shorter than article 6, lobes weak or absent, propodus weakly expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without tooth. Telson entire.

Variables. Head with dorsal keel (*N. boecki*); with large anteroventral tooth (type), tooth weak (*N. boecki*); coxae 1-4 weakly acuminate (type), not (*N. boecki*, etc.).

Relationship. Differing from *Parapleustes* in the produced article 3 of the palp on the maxilliped.

Species. See Dunbar (1954); *N. boecki* (Hansen, 1888) (Sars, 1895) (Gorbunov, 1946) (Gurjanova, 1951) [220]; ?*N. carinatus* Margulis, 1963 [283]; *N. pulchellus* (Krøyer, 1846a) (Sars, 1895 as *Paramphithoe*) (= *N. euacantha* Sars, 1885, 1886), (*N. p. typicus* [Krøyer] identifications of Gurjanova, 1951; Bulycheva, 1957c; Margulis, 1963; Shoemaker, 1930a, 1955a) [200].

Habitat and distribution. Marine, Arctic south to Gulf of St. Lawrence, and Okhotsk Sea, 7-800 m, 3 species.

Parapleustes Buchholz

Parapleustes Buchholz, 1874: 337.–Stebbing, 1906: 320.–Sexton, 1909: 851.–Barnard & Given, 1960: 42.–J.L. Barnard, 1969c: 425.–Gurjanova, 1972: 13.–Lincoln, 1979a: 428.

Incisocalliope J.L. Barnard, 1959a: 22 (*Incisocalliope newportensis* J.L. Barnard, 1959a, original designation).

Type species. *Parapleustes gracilis* Buchholz, 1874, monotypy.

Diagnosis. Body smooth or keeled. Rostrum short. Peduncular article 2 of antenna 1 shorter than article 1. Accessory flagellum obsolescent. Labrum incised asymmetrically. Mandibular molar feeble, conical, nontriturative. Inner plates of labium partly coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 without distal tubercle, dactyl well developed. Coxae 2-4 ordinary, or coxae 1-3, acuminate distally, coxa 1 variable in size, rarely slightly covered by coxa 2. Gnathopods 1-2 moderately stout to slender, subchelate, equal, or gnathopod 2 stout, article 5 shorter than article 6, lobes present (except in *P. oculatus* and *P. longimanus*), much shorter than article 6, propodus moderately expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson entire.

Variables. Body with 10 teeth (*P. euacanthoides*), with 5 teeth (*P. gagarae*); pleon with 1 or 2 teeth (*P. monocuspis*, *P. bicuspis* etc.), or smooth (*P. assimilis*); anteroventral corner of head with or without tooth; coxae 1-3 acuminate and posteroventrally serrate (*P. euacanthoides*); carpal lobes on gnathopods well developed (*P. monocuspis*), weak (*P. assimilis*), absent (*P. oculatus*, *P. longimanus*); propodi enlarged but palms obsolescent (*P. den*); thin (*P. oculatus*, *P. longimanus*); propodus of gnathopod 2 enlarged, sculptured (*P. cornigerus*); pereopods 3-7 prehensile (*P. commensalis*).

Relationship. Differing from *Neopleustes* and *Arctopleustes* in the unproduced article 3 of the maxillipedal palp.

See *Tepidopleustes*.

Removals. *Parapleustes barnardi* Ledoyer, 1972c, and *P. honomu* J.L. Barnard, 1970a, to *Tepidopleustes*.

Species. See Ishimaru (1984); *P. aestuarius* Watling & Mauer, 1973 (Fox & Bynum, 1975) [364]; *P. assimilis* (Sars, 1883, 1895) (Schellenberg, 1942) (Gurjanova, 1951) (Dunbar, 1954) (Lincoln, 1979a) [216]; *P. behningi* (Gurjanova, 1938b) (= *P. nautilus* J.L. Barnard, 1969a) (Gurjanova, 1951) (Kudrjaschov, 1972b) (Kudrjaschov & Zejagintsev, 1975) (Ishimaru, 1984) [230 + 270]; *P. bicuspis* (Krøyer, 1838b) (= *P. bidentatus* McIntosh, 1874) (Sars, 1895) (Chevreux & Fage, 1925) (Schellenberg, 1942) (Gurjanova, 1951) (Lincoln, 1979a) [216]; *P. bicuspoides* Nagata, 1965b [395]; *P. commensalis* Shoemaker, 1952 (J.L. Barnard, 1969b) (Wicksten, 1982) [370I]; *P. cornigerus* (Shoemaker, 1964) (Karaman & Barnard, 1979) [229B]; *P. den* J.L. Barnard, 1969a [273]; *P. derzhavini* (Gurjanova, 1938b, 1951) (Ishimaru, 1984) [394] (= *P. makiki* J.L. Barnard, 1970a, 1971a) [381Q]; *P. dilatatus* Ishimaru, 1984 [394]; [?*P. euacanthoides* (Gurjanova, 1972) (Karaman & Barnard, 1979) [281]; differs by short, acuminate, serrate coxa 1, its mouthparts were never described; it is *incertae sedis*;] *P. gagarae* (Gurjanova, 1972) (Karaman & Barnard, 1979) [232B]; *P. gracilis* Buchholz, 1874 (*lapsus P. glacilis*) (= *P. brevicornis* Sars, 1883, 1895) (Sexton, 1909) (Gurjanova, 1951) (Ishimaru, 1984) [200]; *P. longimanus* Ishimaru, 1984 (?close to *P. oculatus*) [394]; *P. major* (Bulycheva, 1952) [391]; ?*P. mielcki* (Sokolowsky, 1925) (Stephensen, 1929) [237]; *P. monocuspis* (Sars, 1895) (Stephensen, 1938b, 1940b, 1944a) (Gurjanova, 1951) [216]; *P. oculatus* (Holmes, 1908) (= *P. johanseni* Gurjanova, 1951) (= *P. pacifica* Walker, 1898b) (Barnard & Given, 1960) [230]; *P. pugettensis* (Dana, 1853) (= *P. bairdi* Boeck, 1871a) (= *P. newportensis* J.L. Barnard, 1959d) (J.L. Barnard, 1952c, 1966a,b, 1969a) (Barnard & Given, 1960) (Shoemaker, 1964) [270 + 370]; *P. sinuipalmus* Dunbar, 1954 [258 + N]; *P. trianguloculatus* (Bulycheva, 1952) [391]; *P. tricuspis* Ishimaru, 1984 [394]; "species" Oldevig, 1959 [209B]; "species" Hamond, 1965, 1967 [239]; "species" Feeley & Wass, 1970 [363].

Habitat and distribution. Marine, mostly Arctic-boreal, 0-881 m (but usually shallow), south to Georgia, southern California, western France, Japan, and Hawaii-anchialine, 21 species.

Pleusirus J.L. Barnard

Fig.116F

Pleusirus J.L. Barnard, 1969a: 204.–Gurjanova, 1972: 135.

Type species. *Pleusirus secorrus* J.L. Barnard, 1969a, original designation.

Diagnosis. Body smooth. Rostrum short. Peduncular article 2 of antenna 1 shorter than article 1. Accessory flagellum obsolescent. Labrum incised symmetrically. Mandibular molar feeble, non triturative. Inner plates of labium partly coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 without distal tubercle, dactyl well developed. Coxae 1-4 ordinary. Gnathopods 1-2 stout, eusirid-like, subchelate, equal, article 5 as long as article 6, lobe shorter than article 6, propodus expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson entire.

Relationship. Characterised by the eusirid gnathopods.

Species. *Pleusirus secorrus* J.L. Barnard, 1969a (= *P. s. asiaticus* Kudrjaschov & Tzvetkova, 1975) (Ishimaru, 1985a) [373, 280].

Habitat and distribution. Marine, North Pacific Basin from Hokkaido around to southern California, 0-46 m, 1 species.

Pleustes Bate

Figs 115A, 116B

Pleustes Bate, 1858b: 362.–Stebbing, 1906: 309.–Gurjanova, 1972: 131.–Karaman & Barnard, 1979: 114.

Type species. *Pleustes tuberculata* Bate, 1858b (= *Amphithoe panopla* Krøyer, 1838b), monotypy.

Diagnosis. Body keeled. Rostrum long. Peduncular article 2 of antenna 1 shorter than article 1. Accessory flagellum obsolescent. Labrum incised symmetrically. Mandibular molar feeble, conical, non triturative. Inner plates of labium partly coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 without distal tubercle, dactyl well developed. Coxae 1-4 ordinary, or slightly acuminate distally, coxa 1 variable in size. Gnathopods 1-2 stout, subchelate, equal, article 5 stout, much shorter than article 6, lobes well developed but much shorter than article 6, propodus expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson entire.

Variables. Coxae 4-6 with facial teeth or only marginal teeth, coxa 4 blunt or sharp below, occasionally coxae 1-3 sharp or double-acuminate below.

Relationship. Very difficult to recognise except by the large rostrum exceeding the apex of article 1 on the peduncle of antenna 1.

Species. *Pleustes angulatus* (Shoemaker, 1955a), *P. a. angulatus* Gurjanova, 1972 [231B], *P. a. paradoxus* Gurjanova, 1972 [286]; *P. cataphractus* (Stimpson, 1853) (Stephensen, 1938b) (Gurjanova, 1972); *P. c. japonensis* Gurjanova, 1972; *P. c. obtusirostris* Gurjanova, 1938b, 1951, 1972; *P. c. typicus* Gurjanova, 1951 [200]; *P. depressus* Alderman, 1936 (J.L. Barnard, 1969a) (Carter & Behrens, 1980) [270]; *P. incarinatus* Gurjanova, 1938b, 1951 [389]; *P. obesirostris* Bulycheva, 1952 (Gurjanova, 1972) [391]; ?*P. occidentalis* (Stimpson, 1864) (Stebbing, 1906) [269]; *P. panoplus* (Krøyer, 1838b as *P. panopla*) (= *P. tuberculata* Bate, 1858b) (= *P. panoploides* M. Sars, 1858) (G.O. Sars, 1895) (Shoemaker, 1955a) (Nagata, 1965b), (Gurjanova, 1972) *P. p. sibiricus* Gurjanova, 1972, *P. p. tuberculatus* Gurjanova, 1951, 1972; *P. p. typicus* Gurjanova, 1972 [220 + B]; ?*P. parvus* (Boeck, 1871b, 1876) (Stebbing, 1906) [238]; *P. platypa* Barnard & Given, 1960 (J.L. Barnard, 1969a) (Crane, 1969) (Barnard, Bowers & Haderlie, 1980) [373]; "species" (*P. panoplus* of Kirk, 1879) (not a pleustid presumably) [774].

Habitat and distribution. Marine, circum-Arctic-boreal south to Japan, California, Fundy and New England, 0-1026 m, 9 species.

Pleustomesus Gurjanova

Pleustomesus Gurjanova, 1972: 169.

Type species. *Paramphithoe media* Goes, 1866, original designation.

Diagnosis. Body smooth, keeled. Rostrum long. Peduncular article 2 of antenna 1 much shorter than article 1. Accessory flagellum obsolescent. Labrum incised symmetrically. Mandibular molar large, triturative. Inner plates of labium partly coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 without distal tubercle, dactyl well developed. Coxa 1 short, almost fully covered by coxa 2. Gnathopods 1-2 moderately slender, subchelate, slightly unequal, article 5 shorter than article 6, lobes present or absent, propodus not expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson entire.

Relationship. Like *Pleusymtes* except for the short coxa 1 covered by coxa 2 and long rostrum. Differing from *Pleustes* in the triturative molar. Differing from *Pleusymtes* and *Stenopleustes* in the enlarged rostrum (see key).

Species. *Pleustomesus japonicoides* Gurjanova, 1972 [280]; *P. medius* (Goes, 1866) (Shoemaker, 1930a, 1955a) (Stephensen, 1938b) (Gurjanova, 1951, 1972) (Dunbar, 1954) [220].

Habitat and distribution. Marine, circum-Arctic-boreal, south to Japan Sea, Gulf of St Lawrence, not in eastern Atlantic, 25-80 m, 2 species.

Pleustostenus Gurjanova

Fig.116C

Pleustostenus Gurjanova, 1972: 136.

Type species. *Pleustostenus displosus* Gurjanova, 1972, original designation.

Diagnosis. Body covered with short spines. Rostrum short, obsolete. Peduncular article 2 of antenna 1 as long as article 1. Accessory flagellum obsolescent. Labrum incised symmetrically. Mandibular molar large, triturative. Inner plates of labium partly coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 with distal tubercle, dactyl well developed. Coxa 1 short, covered by coxa 2. Coxae 3-4 not acuminate distally. Gnathopods 1-2 moderately stout to slender, subchelate, unequal, gnathopod 1 slender, article 5 slender, stout, article 5 shorter than article 6, lobes, small propodus not expanded. Dactyls of pereopods 3-7 not ornamented, Epimera unornamented. Rami of uropods 1-2 [?lanceolate, outer not shortened, of uropod 3 lanceolate, equal, outer shortened, peduncle of uropod 3 with long tooth]. Telson [?entire or incised weakly.]

Additional characters. Articles 1-2 of antenna 1 with long anterodorsal tooth.

Relationship. Characterised by the tooth on article 1 (and/or 2) of antenna 1.

Species. *Pleustostenus displosus* Gurjanova, 1972 [232A].

Habitat and distribution. Marine, Pacific Ocean, 57°45'08"N, 151°14'E, 2300 m, 1 species.

Pleusymtes J.L. Barnard

Fig.115B

Pleusymtes J.L. Barnard, 1969c: 425.–Gurjanova, 1972: 132.–Lincoln, 1979a: 432.
Pleustoides Gurjanova, 1972: 134 (*Pleustoides carinatus* Gurjanova, 1972, original designation).

Type species. *Amphithopsis glaber* Boeck, 1861, original designation.

Diagnosis. Body smooth or keeled. Rostrum short. Peduncular article 2 of antenna 1 shorter than article 1. Accessory flagellum obsolescent. Labrum incised almost symmetrically. Mandibular molar large, triturative. Inner plates of labium coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 without distal tubercle, dactyl well developed. Coxae 1-4 ordinary, or coxa 1 slightly shortened, coxae occasionally or slightly acuminate distally. Gnathopods 1-2 moderately stout, or slender, subchelate, often unequal, gnathopod 1 slender, article 5 slightly longer or shorter than article 6, lobe weak or absent, propodus weakly expanded. Gnathopod 2 often stout, article 5 shorter or longer than article 6, lobe moderately large, propodus often expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented or with weak posteroventral tooth. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson entire.

Variables. Article 1 of antenna 1 with ventral tooth (*P. glaber, P. coquilla*, etc.), article 2 almost as long as article 1 (*P. ochrjamkini*); coxae 1-2 sharp anteroventrally (*P. quadridens, P. ochoticus*); carpus of gnathopod 2 short (type), almost as long as propodus (*P. pulchellus*); pleopods slightly aberrant (*P. brachypalma*); rami of uropod 1 extending equally (*P. coquilla*); body keeled (*P. carinata*); head with anteroventral tooth (*P. glabroides*, etc.).

Relationship. Differing from *Stenopleustes* in the lack of a lobe on article 3 of the maxillipedal palp. From *Pleustomesus* in the small rostrum. From *Neopleustes* and *Parapleustes* in the triturative molar. From *Cleonardopsis* in the non-truncate carpal lobes of the gnathopods and the short to absent accessory flagellum.

Species. See Shoemaker (1930a); *P. brachypalma* Ishimaru, 1985a [394]; *P. buttoni* (Dunbar, 1954) [258]; *P. carinata* Gurjanova, 1972 [283]; *P. coquilla* J.L. Barnard, 1971b (Karaman & Barnard, 1979) [268]; *P. glaber* (Boeck, 1861) (= *P. exigua* Goes, 1866) (Sars, 1895) (Chevreux & Fage, 1925) (Schellenberg, 1942) (Gurjanova, 1951) (Bousfield, 1973) (Lincoln, 1979a) [200]; *P. glabroides* (Dunbar, 1954) (Just, 1980) [260]; *P. japonica* (Gurjanova, 1938b, 1951) [280]; *P. kamui* Ishimaru, 1985a [391]; *P. kariana* (Stappers, 1911) (Gurjanova, 1951) (Shoemaker, 1955a) [220]; *P. karstensi* (J.L. Barnard, 1959e) [201]; *P. mucida* Ishimaru, 1985a [394]; *P. ochrjamkini* Bulycheva, 1952 [391]; *P. palmata* (Margulis, 1963) [282]; *P. pulchella* (Sars, 1876, 1885, 1895, as *Parapleustes*) (Stephensen, 1938b, 1944a) (Gurjanova, 1951) [220]; *P. quadrangularis* (Margulis, 1963) [283], *P. q. brevipes* Ishimaru, 1985a [394]; *P. quadridens* (Bulycheva, 1955) (Gurjanova, 1972); *P. q. ochoticus* Gurjanova, 1972 [280 + B]; *P. similis* (Margulis, 1963) [283]; *P. suberitobia* (Gurjanova, 1938b, 1951) [280 to 287]; *P. subglaber* (Barnard & Given, 1960) (J.L. Barnard, 1966a) [373]; *P. uncigera* (Gurjanova, 1938b, 1951) (Shoemaker, 1955a) (Kudrjaschov & Zejagintsev, 1975) [280 + 267]; *P. uschakovi* (Bulycheva, 1952) [391].

Habitat and distribution. Marine, circum-Arctic-boreal south to Japan, California, Chesapeake and Biscay, 0-200 m, 18 species.

Stenopleustes Sars

Figs 115D, 116A

Stenopleustes Sars, 1895: 354.–Stebbing, 1906: 316.–Gurjanova, 1972: 132.–Lincoln, 1979a: 424.
Sympleustes Stebbing, 1899a: 209 (*Amphithoe latipes* M. Sars, 1858, original designation).–Stebbing, 1906: 317.

Type species. *Amphithopsis malmgreni* Boeck, 1871b, selected by Chevreux & Fage, 1925.

Diagnosis. Body smooth or keeled. Rostrum moderately long. Peduncular article 2 of antenna 1 shorter than article 1. Accessory flagellum obsolescent. Labrum incised asymmetrically. Mandibular molar large, conical. Inner plates of labium coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp 4-articulate, powerful, article 3 with distal tubercle, dactyl well developed. Coxae 1-4 ordinary, or coxa 1 slightly shortened, typical gnathopods 1-2 slender, subchelate, equal, article 5 slightly longer or shorter than article 6, lobes weak, propodus rarely expanded. Dactyls of pereopods 3-7 not ornamented. Epimera unornamented or serrate posteriorly. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson entire.

Variables. Body smooth (type), pleonites 1-2 double cuspidate dorsally (*S. nodifer*), or pleon carinate (*S. latipes*, etc.); propodus of female gnathopod 2 expanded, palm sculptured and grossly spinose, carpal lobe large (*S. latipes*), palms of gnathopods narrow but excavate (*S. olriki*); epimera 2-3 serrate posteriorly (*S. inermis*).

Relationship. Differing from *Pleusymtes* in the unproduced article 3 of the maxillipedal palp. From *Neopleustes* and *Parapleustes* in the triturative condition of the molar.

Species. See Field (1974, ecology); Stephensen (1938b); *S. eldingi* Gurjanova, 1930b, 1951 (Stephensen, 1938b) [220]; *S. gracilis* (Holmes, 1905) (Shoemaker, 1949b) (Bousfield, 1973) (Dickinson *et al.*, 1980) [254]; *S. inermis* (Shoemaker, 1949b) (Bousfield, 1973) (Dickinson *et al.*, 1980) [361]; *S. latipes* (M. Sars, 1858) (G.O. Sars, 1895) (= *S. fingalli* Bate & Westwood, 1863) (= *S. ossiani* Bate, 1862) (Chevreux & Fage, 1925) (Gurjanova, 1951) (Lincoln, 1979a) [216 + B]; *S. malmgreni* (Boeck, 1871b, 1876) (Sars, 1895) (Gurjanova, 1951) (Vader, 1969a) [238]; *S. monocuspis* Barnard & Given, 1960 (J.L. Barnard, 1964b) [370]; *S. nodifera* (Sars, 1883, 1895) (Chevreux & Fage, 1925) (Gurjanova, 1951) (Ledoyer, 1973c) (Lincoln, 1979a) [250 + 340 + B]; *S. olrikii* (Hansen, 1888) (Gurjanova, 1951) (Dunbar, 1954) (Just, 1980) [220]; "species" (?not *S. malmgreni* [Boeck]) Marine Biol. Assn. U.K., 1957 [242]; "species" Field, 1974a (ecology) [269].

Habitat and distribution. Marine, circum-Arctic-boreal south to Baja California, Hatteras, Biscay-Azores, (not yet reported north-western Pacific), 0-1410 m, 8 species.

Tepidopleustes Karaman & Barnard

Tepidopleustes Karaman & Barnard, 1979: 113.

Type species. *Parapleustes barnardi* Ledoyer, 1972, original designation.

Diagnosis. Body keeled. Rostrum moderately long. Peduncular article 2 of antenna 1 as long as article 1 (but both short). Accessory flagellum obsolescent. Labrum incised asymmetrically. Mandibular molar feeble, conical, non triturative. Inner plates of labium partly coalesced. Maxillae 1-2 ordinary. Plates of maxilliped short, palp weakly 4-articulate or strongly 3-articulate, powerful, article 3 with distal tubercle, dactyl partly reduced or obsolescent. Coxae 1-4 short. Gnathopods 1-2 slender, subchelate, simple, equal, article 5 slender, as long as article 6, lobes absent, propodus not expanded. Dactyls of pereopods 3-7 not ornamented. Epimeron 3 serrate posteriorly. Rami of uropods 1-3 lanceolate, outer shortened, peduncle of uropod 3 without long tooth. Telson entire.

Variables. Lacinia mobilis large, serrate and matching incisor (*T. honomu*); dactyl of maxillipedal palp absent (*T. honomu*).

Relationship. Characterised by serrate epimeron 3 combined with non-triturative molar, small rostrum, non-eusirid gnathopods, reduced dactyl and produced article 3 of the maxillipedal palp.

Species. *Tepidopleustes barnardi* (Ledoyer, 1972c, 1978b, 1979a, 1986) [698-697]; *T. honomu* (J.L. Barnard, 1970a, 1971a) (Ledoyer, 1986) [381].

Habitat and distribution. Marine, Madagascar, Mauritius and Hawaii, 5-45 m, 2 species.

PLIOPLATEIDAE J.L. Barnard, 1978a

Diagnosis. Head slightly reduced in size. Urosomites 2-3 very small and 'indistinct'; pleon slightly flexed; thorax slightly depressed, calcified, broad, strongly carinate and rugose. Anterior coxae slightly splayed but not much larger than posterior coxae. Eyes small, ommatidial. Antenna 2 short but antenna 1 elongate, antenna 2 basally fused. Mandibular molar vestigial; maxillae feeble. Gnathopods subchelate. Peduncles of pleopods not expanded. Uropod 3 without ramus. Telson much broader than long, not ovate, posterior margin straight, entire (type) or cleft.

See Phliantidae, Ceinidae, and key to Talitroidea.

Description. Rostrum short, erect, with tooth on either side. Accessory flagellum absent. Flagellum of antenna 1 elongate, multiarticulate, that of antenna 2 shorter. Mandibular rakers apparently absent, palp absent. Inner lobes of lower lip absent. Inner plate of maxilla 1 vestigial, spines on outer plate 6-7. Maxilla 2 poorly armed. Plates of maxilliped of medium size, almost subequal, palp thin, elongate, dactyl extremely long and unguiform. Gnathopods apparently with slightly elongate article 3, propodus elongate but expanded apically and subchelate. Article 2 of pereopods 5-7 unexpanded. Dorsal carination pattern with large double tooth on pereonite 1, each following segment with large tooth, rugosity absent on pleonite 3 and urosomites. No peduncle of pleopods expanded; rami of pleopods 1-2 well developed but 1-articulate, those of pleopod 3 vestigial. Uropods 1-2 ordinary; uropod 3 extremely small, without rami. Brood plates broad, setose, curl-tips [unknown].

Variables. Pleopod 3 circular, rami absent; telson cleft (*P. nodiformis*).

Relationship. Similar to Phliantidae in general body form and rugosity pattern but differing in: longer antennae (especially antenna 1), thorn-like rostrum, equalised plates of maxilliped and greatly elongate, thin palp with immense dactyl; distinctly subchelate gnathopods; evenly extending ventral line of coxae; thin article 2 on pereopods 5-7; unexpanded peduncles of pleopods; and very broad, rectangular telson. Genus living in much deeper water than Phliantidae.

Plioplateidae probably are derived from Ceinidae but differ from such genera as *Taihape* and *Waitomo* in the depressed head with complex cuspidation, the cuspidation on body, coxae and antennae, the odd maxilla 2, the lack of large setae on the gnathopods and the presence of inner lobes on the lower lip.

Differing from the equally advanced Kuriidae in the cuspidation of head, body and coxae, the small coxa 4, small article 2 of pereopods 5-7, expanded propodus of the gnathopods, disparity in sizes of antennae 1-2 and extremely large mandibular molar; Kuriidae have a ramus on uropod 3.

Plioplateia K.H. Barnard

Fig.117

Plioplateia K.H. Barnard, 1916: 156.–J.L. Barnard, 1978a: 49.

Type species. *Plioplateia triquetra* K.H. Barnard, 1916, monotypy.

Diagnosis. Maxilla 1 with palp. Palp of maxilliped 4-

articulate. Gnathopods subchelate. Pereopods simple. No pleopodal peduncle expanded, both rami of pleopod 3 vestigial or absent. Uropod 3 without ramus.

Description. Antennae large. Molar prominent. Plates of maxilla 2 separate. Plates of maxilliped subequal in size, palp thin, dactyl unguiform and greatly elongate. Coxae apparently poorly splayed, anterior coxae unusually short, coxa 5 as long as coxa 4. Article 2 of pereopods 5-7 not expanded. Inner rami of pleopods 1-2 slightly shortened (or not in second species). Outer ramus of uropod 1 shortened (or not). Head, pereon and pleonites 1-2 with large dorsal teeth, pereonites with sharp lateral teeth above coxae.

Remarks. Diagnosis made in fashion of Phliantidae for comparison.

Species. *Plioplateia nodiformis* Ledoyer, 1986 [725wM]; *P. triquetra* K.H. Barnard, 1916 (J.L. Barnard, 1978a) [743].

Habitat and distribution. Marine, South Africa and offshore Walters Bank, 50-105 m, 2 species.

PODOCERIDAE Leach, 1814b

Dulichiidae Dana, 1849: 135, 140.
Podoceridae Stebbing, 1906: 694.

Diagnosis. Corophioid with urosomite 1 elongate, twice or more as long as urosomite 2. Uropod 3 minute or absent. Abdomen flexed beneath thorax. Pereopods glandular or not. Accessory flagellum variable, often absent. Body variable, broadly depressed or subcylindrical, occasionally rugose or weakly toothed and carinate; some posterior pereonites or posterior urosomites occasionally fused together; coxae small, usually discontiguous, but occasionally splayed. Antennae very long. Mouthparts basic except upper lip occasionally bilobed and inner plate of maxilla 1 usually

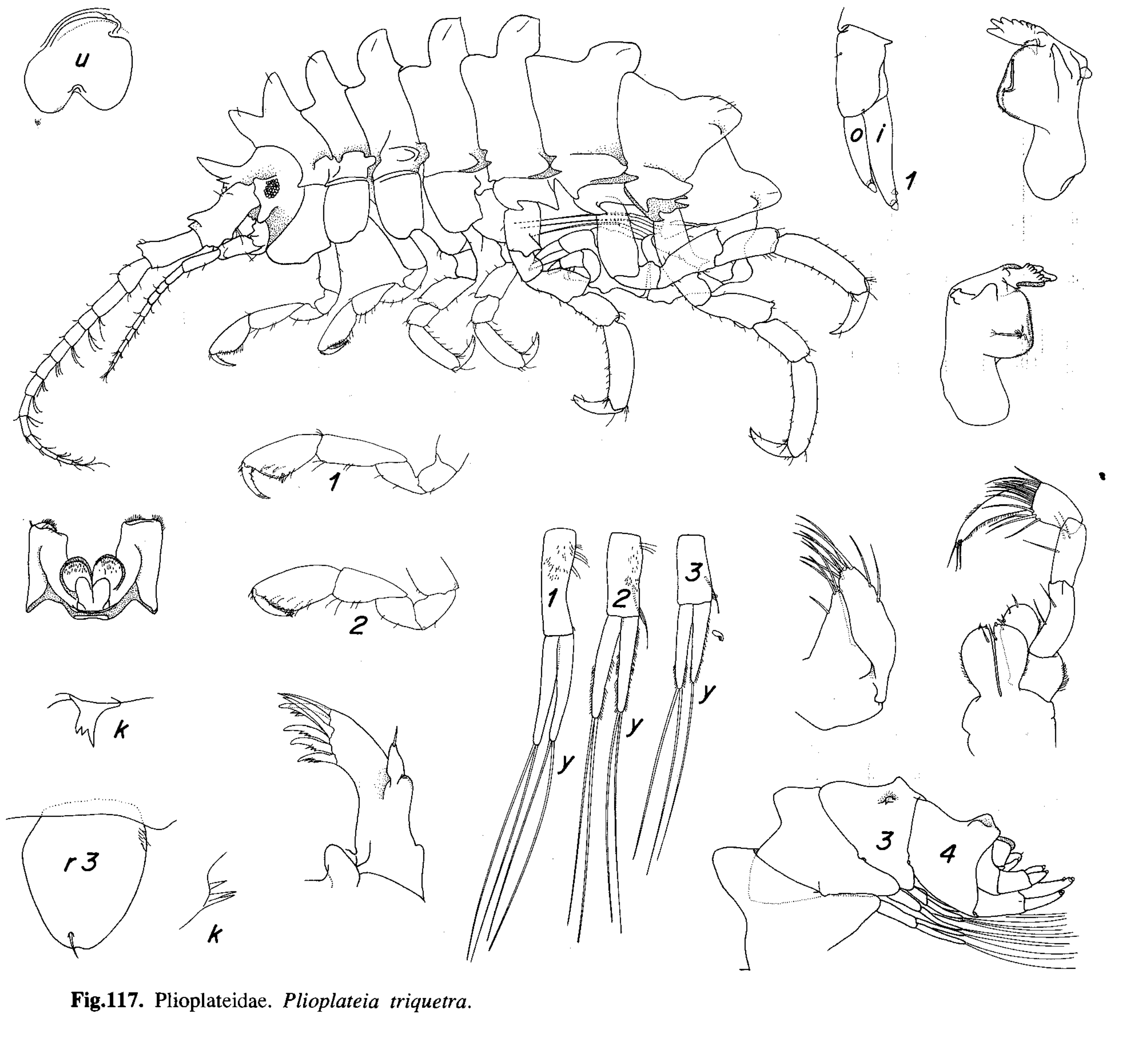


Fig.117. Plioplateidae. *Plioplateia triquetra.*

reduced or absent. Gnathopods ordinary, gnathopod 2 often enlarged in male or occasionally in both sexes. Article 2 of pereopods 3-7 usually rectolinear, rarely expanded on pereopods 5-7, never processiferous. Coxal gills simple, 3-5 pairs, oostegites 3-4 pairs. Pleopods with slender peduncle. Uropod 1 normal, uropod 2 variable, normal to absent, uropod 3 always reduced or absent, with or without small ramus. Telson subcircular or ovate, fleshy, often not very thick, occasionally fused to urosome.

Relationship. Differing from Iciliidae in the presence of only 0-1 ramus on uropod 3 (or uropod 3 absent), the simple (versus processiferous) article 2 of pereopods 5-7, slender peduncles of the pleopods, lack of gill on coxa 7, and fleshiness of the telson.

The elongation of urosomite 1 distinguishes Podoceridae from other corophioids.

Phliantidae, Eophliantidae and Colomastigidae lack mandibular palps. Phliantidae have degraded molars and widely expanded peduncles of the pleopods.

This family is divided into four subfamilies by Laubitz (1983) and these are diagnosed in the following key. The diagnoses are based on the format of Corophioidea.

Removal. *Styloxenodice* Laubitz (1983) to *Parunciola* in Corophiida.

Key to Subfamilies and Genera of Podoceridae

(emended after Laubitz, 1983)

1. Head triangular or rectangular, shape special [Fig.118C]; mandibular palp slender, sparsely setose; pereopods 3-4 glandular; gills on pereonites 2-5 or 3-5; urosomite 1 longer than pleosomites 2 + 3 (Dulichiinae) 4

—— Head anterodorsally elongate; mandibular palp heavy, strongly setose; pereopods 3 and 4 not glandular, gills on pereonites 2-4 or 2-6; urosomite 1 not longer than pleosomites 2 + 3 2

—— Head anterodorsally elongate; mandibular palp slender, poorly setose; pereopods 3 and 4 not glandular, gills on pereonites 3-6; urosomite 1 not longer than pleosomites 2 + 3, (antenna 2 much longer than body) .... (considered as Podocerinae) *Podobothrus*

2. Pereon strongly depressed; antenna 1 shorter than antenna 2; pereopods 3-7 similar; gills on pereonites 2-6; maxilla 1 inner plate reduced or absent (Podocerinae) 7

—— Pereon cylindrical; antenna 1 longer than antenna 2; pereopods 3-7 of increasing length; if gills present on pereonites 2-6 then maxilla 1 inner plate setose 3

3. Pereopods 3 and 4 greatly reduced in size; anterior pereonites elongate, pleosome reduced; accessory flagellum short, of 1 article; gills on pereonites 2-4; maxilla 1 inner plate reduced (Neoxenodicinae, unique) .... *Neoxenodice*

—— Pereopods 3 and 4 reduced in size; anterior pereonites not elongate, pleosome well developed, accessory flagellum long, of 4-5 articles; gills on pereonites 2-6; maxilla 1 inner plate well developed and setose (Xenodicinae, unique) .... *Xenodice*

4. Uropod 1 normal, uropod 2 vestigial; gnathopods 1-2 of equal size in male and female .... *Paradulichia*

—— Uropods 1 and 2 normal; gnathopods 1 and 2 of equal size in female, grossly unequal in male 5

5. Gills on pereonites 3-5; basis of pereopods 3-4 greatly expanded; maxilla 2 inner plate without facial setae .... *Dyopedos*

—— Gills on pereonites 2-5; basis of pereopods 3-4 not greatly expanded; maxilla 2 inner plate with facial setae 6

6. Eyes large, strongly convex; pereopods 5-7 without propodal palm; maxilliped palp with short stout terminal article .... *Dulichia*

—— Eyes abnormal, poorly developed, or absent; pereopods 5-7 with propodal palm; maxilliped palp with long slender dactyl .... *Dulichiopsis*

7. Urosome with only 2 segments, uropod 2 without rami .... *Laetmatophilus*

—— Urosome with 3 urosomites, uropod 2 either biramous or absent 8

8. Uropod 2 absent, uropod 3 present; maxilla 1 outer plate with 8 apical spines .... *Leipsuropus*

—— Uropod 2 biramous, uropod 3 present; maxilla 1 outer plate with 9 apical spines 9

9. Accessory flagellum 1-articulate .... *Podocerus*

—— Accessory flagellum absent .... *Cyrtophium*

Cyrtophium Dana

Cyrtophium Dana, 1852b: 309.–Dana, 1853: 839.–Stebbing, 1906.–J.L. Barnard, 1969c: 427.–Laubitz, 1983: 79.

Type species. *Cyrtophium orientale* Dana, 1853, monotypy.

Diagnosis. Poorly known. Like *Podocerus*. However, antennae long, nearly subequal, both slender, peduncular articles 2-3 of antenna 1 longest, accessory flagellum absent. [?Epistome produced anteriorly. Labrum incised, bilobed. Mandible normal, palp strong, article 3 clavate, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes long, pointed or blunt. Inner plate of maxilla 1 short to vestigial, with or without 1 seta, outer plate with 9 spines, palp 2-articulate. Outer plates of maxilla 2 rather broad, inner plate with only sparse mediomarginal setae. Inner plate of maxilliped with distal spines, outer plate normal, reaching halfway to apex of palp article 2, with spines on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 short, with long nail and setae]. Coxae weakly contiguous, not spiniform.

[?Gnathopod 1 in male poorly subchelate, article 5 shorter than or as long as 6, weakly lobed]. Gnathopod 2 enlarged, article 5 much shorter than 6, lobed, article 6 dilated, dactyl long. [?Pereopods 3-4 longer than gnathopods, similar, with slender article 2, article 4 dilated, dactyls medium]. Pereopod 7 with narrow unlobed article 2, dactyl of pereopods 5-7 elongate, curved. [?Sternal processes of thorax absent. Coxal gills undescribed, present on segments ?2-6. Pleopods normal. Epimeron 3 not bisinuate]. Uropods 1-2 biramous, rami grossly unequal, inner much broader than outer, especially of uropod 2. [?Uropod 3 forming small leaf lacking rami, very short, obtuse distally, with few armaments]. Telson entire, as broader as long, pyriform.

Female. Similar to male; oostegites on coxae 2-4.

Sexual dimorphism. Weak.

Variables. Article 3 of antenna 1 very small (*C. minutum*). Note that *C. laeve* gnathopod 2 not like *Podocerus* because articles 4-5 free, article 5 with well-developed free lobe; and inner rami of uropods 1-2 as wide as outer rami.

Relationship. Very poorly described. Differing from *Podocerus* in the absence of accessory flagellum and the much broader inner ramus of uropod 2 (and usually uropod 1).

Species. *Cyrtophium ? laeve* Heller, 1867 (Stebbing, 1906) [345]; *C. ? minutum* Haswell, 1879b, 1885b (Stebbing, 1906, 1910a) [781]; *C. orientale* Dana, 1853 (Stebbing,

1906) [657].

Habitat and distribution. Marine, ?Mediterranean, ? south-eastern Australia, Strait of Singapore, shallow water, 3 species.

Dulichia Krøyer

Figs 118C, 119G

Dulichia Krøyer, 1845: 521.–Stebbing, 1906: 708.–J.L. Barnard, 1969c: 427.–Bousfield, 1973: 208.–Laubitz, 1977: 944.–Lincoln, 1979a: 576.

Type species. *Dulichia spinosissima* Krøyer, 1845, monotypy.

Diagnosis. Body subcylindrical, dorsally corrugated or provided with elevations or teeth or humps, or carinate, urosome depressed, pereonite 1 very short, last 2 pereonites fused together; urosomites 2-3 coalesced, urosomite 1 elongate. Rostrum short to long, thorn-like,

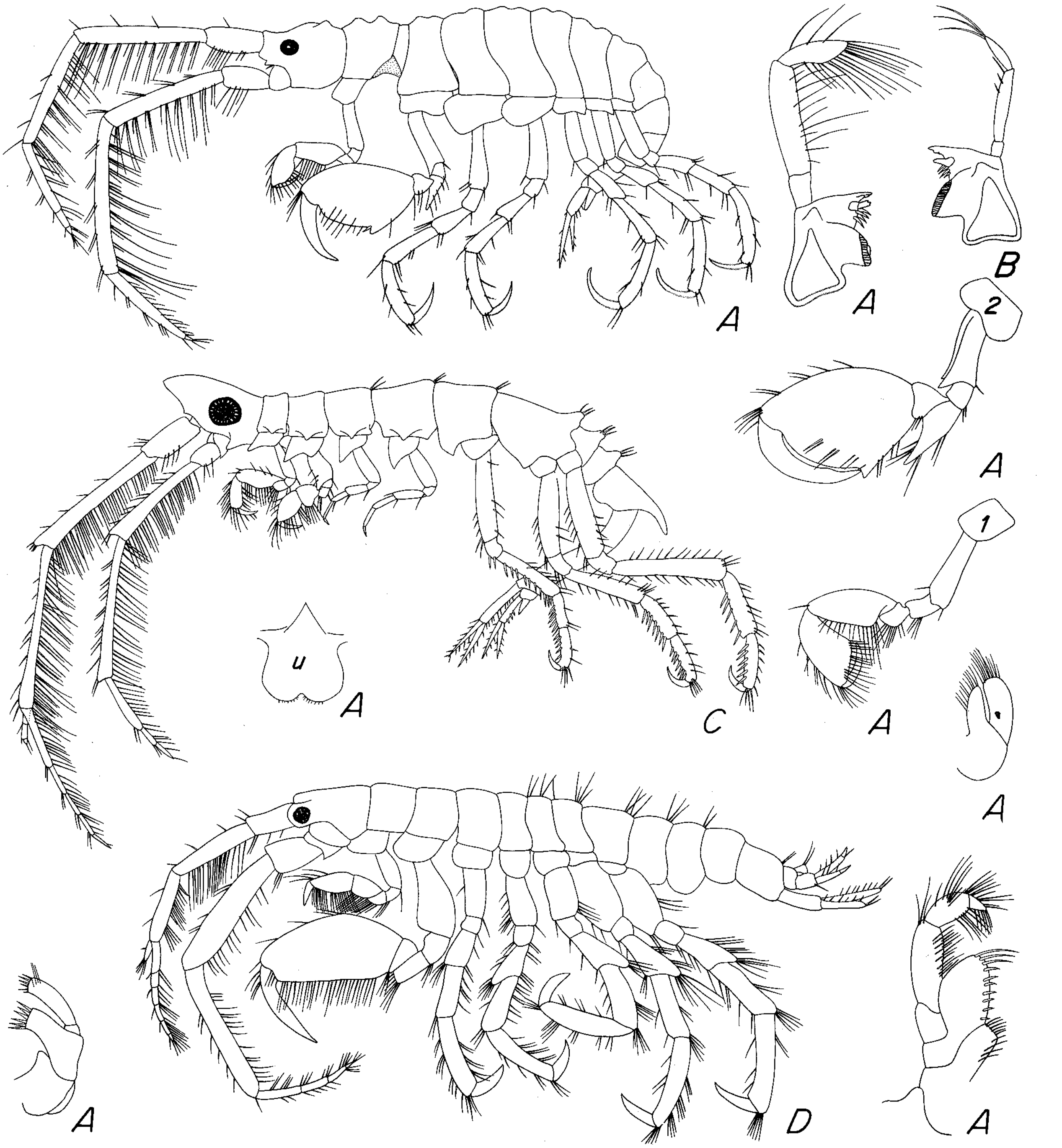


Fig.118. Podoceridae. A, *Laetmatophilus tuberculatus*; B, *Paradulichia typica*; C, *Dulichia spinosissima*; D, *Podocerus variegatus*.

or vertically keeled, in type species all of anterior head thrust into large keel, ocular lobes obsolescent, blunt, antennal sinus weak to deep. Eyes large. Antennae long, 1 longer than 2, both slender, peduncular article 3 of antenna 1 much longer than 1, articles 2-3 longest, accessory flagellum 2 to 3-articulate, main flagellar articles few. Antenna 2 peduncular article 3 short, flagellum with few articles. Epistome unproduced anteriorly. Labrum incised, broad, almost bilobed, or rounded, entire. Mandible normal, palp strong, slender, article 3 rectolinear, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes long, pointed. Inner plate of maxilla 1 triangular, short, without setae, outer plate with 9 spines, palp 2-articulate. Plates of maxilla 2 of ordinary width, inner plate short, with mediofacial row of setae. Inner plate of maxilliped with distal spines, outer plate normal, not reaching apex of palp article 2, with spines on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 very short, with long nail and setae.

Coxae very small, short, discontiguous, of various sizes and shapes, even progressively from 2 to 4, spiniform, coxa 1 dilated, produced forward, coxa 2 larger than 1, often produced or dilated, coxa 4 not longer than coxa 1, not lobed posteriorly, coxa 5 as long as or somewhat longer than 4, coxae 6-7 not much smaller than anterior coxae. Gnathopods 1-2 diverse, gnathopod 2 greatly larger than 1, gnathopod 1 in male poorly subchelate, palm short, article 5 longer and broader than 6, poorly but broadly lobed, article 6 slender. Gnathopod 2 enlarged, subchelate, with article 2 dilated distally, article 5 much shorter than 6, lobed, article 6 dilated, sometimes with false chela, dactyl long.

Pereopods 3-4 normal, similar, with slender article 2, article 4 barely dilated, dactyls short. Pereopods 5-7 elongate, similar to each other, progressively scarcely longer, with linear article 2, not prehensile, dactyl of pereopods 5-7 short, curved, with several inner marginal setae. Sternal processes of thorax absent. Coxal gills present on segments 2-5. Pleopods normal. Epimeron 3

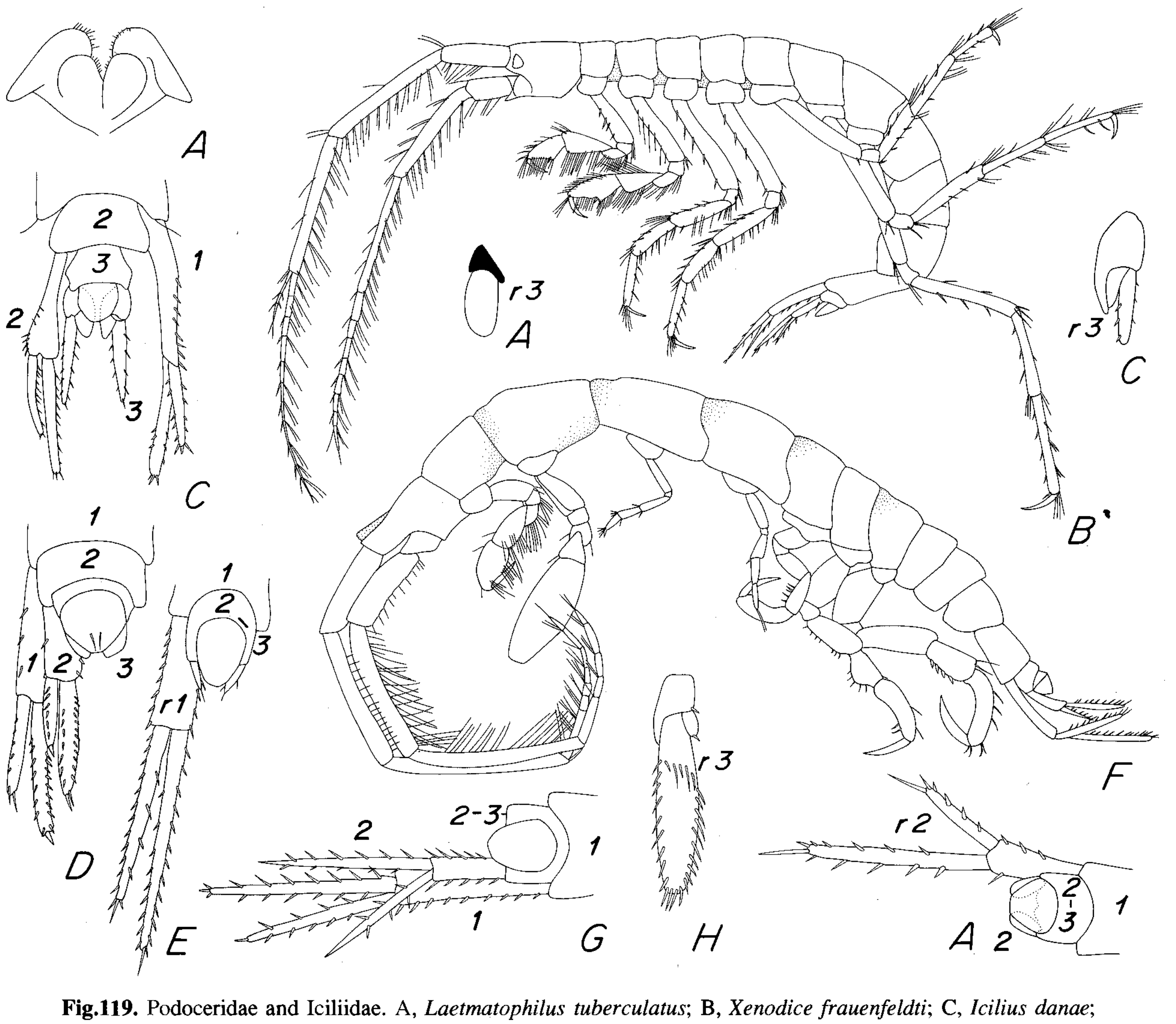


Fig.119. Podoceridae and Iciliidae. A, *Laetmatophilus tuberculatus*; B, *Xenodice frauenfeldti*; C, *Icilius danae*; D, *Podocerus chelonophilus*; E, *Paradulichia typica*; F, *Neoxenodice caprellinoides*; G, *Dulichia spinosissma*; H, *Icilius punctatus*.

sinuate ventrally. Uropods 1-2 biramous, normal, rami slightly unequal, longer than peduncle, peduncles of uropods 1-2 without ventrodistal process. Uropod 3 absent. Telson entire, longer than broad, ovate, almost naked.

Female. Coxae different from male, coxae 1-4 even, thus coxa 2 smaller than in male. Gnathopod 2 smaller than in male, propodus suborbicular, not sculptured. Oostegites broad, present on only segments 2-4.

Sexual dimorphism. Strong. Gnathopod 2.

Variables. Spination of body; spiniform shape of coxae (not spiniform in most species); acuity of head; shape of gnathopods 1-2; articular lengths of pereopods 5-7; dactyl of pereopods 5-7 not denticulate (*D. tuberculata*); length of gill 2; spination of uropod 1; outer ramus of uropod 1 as long as peduncle and terminal spines short (*D. spinossisima*); length of peduncle on uropod 2 versus length of peduncle on uropod 1 or length of telson.

Relationship. The basic member of subfamily Dulichiinae. See *Dulichiopsis*, *Dyopedos* and *Paradulichia*.

Removals. See *Dulichiopsis* and *Dyopedos*.

Species. See Gurjanova (1951), Stephensen (1940b, 1942); *D. falcata* (Bate, 1857d) (Sars, 1895) (Laubitz, 1977) (Lincoln, 1979a) [200 + B]; [*D. malmgreni* Jarzynsky, 1870, *nomen nudum*; (Della Valle, 1893) [299]]; *D. rhabdoplastis* McCloskey, 1970 (Laubitz, 1977) (Vader, 1978) [270I]; *D. spinosissima* Krøyer, 1845 (Sars, 1895) (Boeck, 1871b) (Bousfield, 1973) (Laubitz, 1977) [260 + 220 + B]; *D. tuberculata* Boeck, 1871b (Sars, 1885) (Laubitz, 1977) (Lincoln, 1979a) (= *D. curticauda* Boeck, 1871b, Sars, 1895) (= *D. septentrionalis* Sars, 1879) [216 + B + 220]; *D. wolffi* Laubitz, 1977 (Just, 1980) [251].

Habitat and distribution. Marine, arctic-boreal, 10-682 m, occasionally on sea-urchin spines in detritus rods (tubes formed by amphipod), 5 species.

Dulichiopsis Laubitz

Dulichiopsis Laubitz, 1977: 951.

Type species. *Dulichia nordlandica* Boeck, 1871b, original designation.

Diagnosis. Body subcylindrical, urosome slightly depressed, smooth, pereonite 1 very short, last 2 pereonites fused together; urosomites 2-3 coalesced, urosomite 1 elongate. Rostrum short, ocular lobes obsolescent, scarcely pointed, antennal sinus weak but long. Eyes weak or absent. Antennae very long, nearly subequal, perhaps 1 slightly longer than 2, both slender, peduncular article 3 of antenna 1 immensely longer than 1, article 3 longest, accessory flagellum 3-4 articulate, main flagellar articles few but long. Antenna 2 peduncular article 3 scarcely elongate, flagellar articles few but long. Epistome unproduced anteriorly. Labrum broad, fleshy, bilobed. Mandible normal, palp strong, very slender, article 3 rectolinear, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes short, blunt. Inner plate of maxilla 1 linguiform, short, without setae, outer plate with 9 spines, palp 2-articulate. Plates of maxilla 2 rather broad, inner plate with mediofacial row of setae. Inner plate of maxilliped with distal spines, outer plate normal, reaching halfway to apex of palp article 2, with sparse spines and notches on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 long, with medium nail and setae.

Coxae very small, short, discontiguous, of various sizes and shapes, progressively smaller from 2 to 4, not spiniform, coxa 1 not dilated, not produced forward, coxa 2 larger than 1, coxa 4 scarcely longer than coxa 1, lobed anteriorly, coxa 5 as long as 4, coxae 6-7 not smaller than anterior coxae. Gnathopods 1-2 diverse, gnathopod 2 greatly larger than 1, gnathopod 1 in male poorly subchelate, almost simple, article 5 longer than 6, poorly lobed, article 6 weakly almond-shaped. Gnathopod 2 enlarged, subchelate or grossly chelate, with article 2 distally dilated, article 4 not enlarged, not incipiently merochelate, article 5 very short, shorter than 6, lobed, article 6 dilated, sometimes with false chela, dactyl long.

Pereopods 3-4 normal, similar, with slender article 2, article 4 scarcely dilated, dactyls short. Pereopods 5-7 elongate, similar to each other, not necessarily progressively longer, with linear article 2, prehensile (with proximal spinose palm), dactyl of pereopods 5-7 short, curved, denticulate. Sternal processes of thorax absent. Coxal gills present on segments 2-5. Pleopods normal. Epimeron 3 not bisinuate. Uropods 1-2 biramous, normal, rami slightly unequal, longer than peduncle, peduncle of uropods 1-2 without ventrodistal process. Uropod 3 absent. Telson entire, longer than broad, ovate, almost naked.

Female. Coxae different from male, coxae 1-4 even, coxa 2 therefore smaller than in male. Gnathopod 2 as small as 1 and similar but article 5 only as long as 6, weakly lobed. Oostegites broad, present on only segments 2-4.

Sexual dimorphism. Strong. Gnathopods.

Variables. Length of head relative to pereonite 2; anterior bluntness of head; dactylar knob of male gnathopod 2; propodal spines of female gnathopod 2 clustered or not; gills short and stout or long and slender; length of pereonites 6-7 relative to 5; length of urosome relative to pleosome; proportions of outer ramus on uropod 2.

Relationship. Differing from *Dulichia* in the obsolescent to absent eyes, prehensile pereopods (rather minutely), and the elongate dactyl of the maxillipedal palp.

Species. See Gurjanova (1951), Laubitz (1977), Stephensen (1942, 1944c); *D. abyssi* (Stephensen, 1944c) [216BA]; *D. barnardi* Laubitz, 1977 [229B]; *D. brevidactyla* Ledoyer, 1986 [618A]; *D. cyclops* (Gurjanova, 1946) [206A]; *D. macera* (Sars, 1879, 1885) [220B]; *D. nordlandica* (Boeck, 1871b) (Sars, 1895) (?Ledoyer, 1977) [216B]; *D. remis* (J.L. Barnard, 1964d) [270B].

Habitat and distribution. Marine, arctic-boreal, deep-sea, 200-3229 m, (said to occur on sea-urchin spines in detritus rods (tubes formed by amphipod), 7 species.

Dyopedos Bate

Dyopedos Bate, 1857d: 150.–Laubitz, 1977: 961.–Lincoln, 1979a: 580.

Type species. *Dyopedos porrectus* Bate, 1857d, selected by Laubitz, 1977.

Diagnosis. Body cylindrical, urosome depressed, smooth, pereonite 1 very short, last 2 pereonites fused together; urosomites 2-3 coalesced, urosomite 1 elongate. Rostrum short, ocular lobes obsolescent, blunt, antennal sinus almost absent. Eyes small to large. Antennae long, 1 longer than 2, both slender, peduncular article 3 of antenna 1 immensely longer than 1, article 3 longest, accessory flagellum 1-4 articulate, main flagellar articles very few but elongate. Antenna 2 peduncular article 3 short, flagellar articles few but elongate. Epistome unproduced anteriorly. Labrum broad, fleshy, bilobed. Mandible normal, palp strong, slender, article 3 rectolinear, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes long, blunt. Inner plate of maxilla 1 short, without setae, outer plate with 9 spines, palp 2-articulate. Plates of maxilla 2 rather broad, inner plate with only mediomarginal setae. Inner plate of maxilliped with distal spines, outer plate normal, not reaching apex of palp article 2, with spines and notches on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 short, with long setae.

Coxae very small, discontiguous, of various sizes and shapes, even progressively from 1 to 4, occasionally spiniform, coxa 1 produced forward, coxa 4 not longer than coxa 1, not lobed, coxa 5 somewhat longer than 4, coxae 6-7 not smaller than anterior coxae. Gnathopods 1-2 diverse, gnathopod 2 greatly larger than 1, gnathopod 1 in male poorly subchelate, almost simple, article 5 long, almost linear, barely lobed, longer than 6, article 6 slender, scarcely almond-shaped. Gnathopod 2 enlarged, subchelate or chelate, with article 2 slender, article 5 much shorter than 6, lobed, article 6 dilated, sometimes with false chela, and/or process on posterodistal margin, dactyl long.

Pereopods 3-4 short, similar, with inflated article 2, article 4 scarcely dilated, dactyls short. Pereopods 5-7 not elongate, similar to each other, sometimes progressively longer, with linear article 2, not prehensile, pereopod 6 'usually' shorter than and different from pereopods 5 and 7, with broader article 2, dactyl of pereopods 5-7 short, curved, smooth. Sternal processes of thorax absent. Coxal gills present on segments 3-5. Pleopods normal. Epimeron 3 often bisinuate ventrally. Uropods 1-2 biramous, normal, rami unequal, longer (2) than or as long as (1) peduncle, peduncle of uropods 1-2 without ventrodistal process. Uropod 3 absent. Telson entire, longer than broad, ovate, almost naked.

Female. Coxae different from male, coxae 1-4 even. Gnathopod 2 small, somewhat like gnathopod 1, almost simple, article 5 much shorter than 6, lobed. Oostegites broad, present on only segments 2-4.

Sexual dimorphism. Strong. Gnathopod 2.

Variables. Eyes protruding laterally or anteriorly or not, large and pigmentless or small and pigmented; inner plate of maxilla 2 usually without facial setae but exception, contra Laubitz (1977) = *D. knipowitschi*; coxal cuspidation occurring, rarely immensely long, with long anterior tooth (*D. monacanthus*); proportions of gnathopods 1-2; gill 5 minute (*D. porrectus*); spines and setae of pereopods 5-7, dactyl denticulate or not; length of urosomite 1; spines on ramal apices of uropod 1 present or not.

Relationship. Differing from *Dulichia* and *Dulichiopsis* in the loss of gill 2, inflated article 2 of pereopods 3-4 and short pereopods 5-7.

Species. See Gurjanova (1951), Laubitz (1977), Shoemaker (1955a), Stephensen (1940b, 1942, 1944c); *D. arcticus* (Murdoch, 1885) [200a]; *D. bispinus* (Gurjanova, 1930b) (Stephensen, 1942) [200]; *D. hirticornis* (Sars, 1876, 1885) [220B]; *D. knipowitschi* (Gurjanova, 1933b) (Stephensen, 1942) (= *D. aspina* Stephensen, 1933b) [220 + B]; *D. monacanthus* (Metzger, 1875) (Sars, 1895) (Lincoln, 1979a) [200 + B]; *D. normani* (Sars, 1895) [238]; *D. porrectus* Bate, 1857d (Sars, 1895) (Chevreux & Fage, 1925) (Lincoln, 1979a) [200 + B]; *D. spinosus* (Stephensen, 1944c) [209B]; *D. unispinus* (Gurjanova, 1951) [290].

Habitat and distribution. Marine, arctic-boreal, 0-1200 m, 9 species.

Laetmatophilus Bruzelius

Figs 118A, 119A

Laetmatophilus Bruzelius, 1859: 10.–Stebbing, 1906: 695.–J.L.

Barnard, 1969c: 430.–Laubitz, 1983: 79.

Type species. *Laetmatophilus tuberculatus* Bruzelius, 1859, monotypy.

Diagnosis. Body dorsally corrugated, provided with elevations, teeth or humps, carinate or smooth, depressed, last 2-3 pereonites often fused together, pereonite 1 disjunct; urosomites 2-3 coalesced, urosomite 1 elongate. Rostrum short, ocular lobes obsolescent, blunt, antennal sinus moderate. Eyes ordinary. Antennae elongate, nearly subequal, 1 scarcely shorter than 2, both of medium stoutness; peduncular article 3 of antenna 1 much longer than 1, articles 2 or 3 longest, accessory flagellum absent; main flagellar articles very few, first elongate. Antenna 2 peduncular article 3 scarcely elongate, flagellar articles few, first elongate. Epistome produced anteriorly. Labrum incised, broad, bilobed. Mandible normal, palp strong, article 3 clavate, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes long, pointed. Inner plate of maxilla 1 short, without setae, outer plate with 9 spines, palp 2-articulate. Plates of maxilla 2 ordinary, inner plate with only sparse mediomarginal setae. Inner plate of maxilliped with distal spines, outer plate reaching apex of palp article 2, with spines on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 very short, with long nail and setae.

Coxae very small, relatively short, 1-3 discontiguous, 3-7 contiguous, of various sizes and shapes, progressively elongate from 1 to 3, scarcely spiniform, coxa 1 not dilated, not produced forward, small in contrast to coxae 2-4, coxa 4 not longer than coxa 1, not lobed, coxa 5 usually shorter than 4, coxae 6-7 not smaller than anterior coxae. Gnathopods 1-2 diverse, gnathopod 2 greatly larger than 1, gnathopod 1 in male subchelate, palm short and oblique, article 5 longer than 6, unlobed, article 6 barely expanded. Gnathopod 2 enlarged, weakly subchelate, article 2 not dilated except apically, with article 4 incipiently merochelate, article 5 very short, unlobed, article 6 dilated, sometimes with false chela or process on posteroproximal margin, dactyl long.

Pereopods 3-4 longer than gnathopods, similar, with slender article 2, article 4 slightly dilated, dactyls long. Pereopods 5-7 similar to each other, not progressively longer, not prehensile, with linear article 2, dactyl long, curved. Sternal processes of thorax present. Coxal gills present on segments 2-6. Pleopods normal. Epimeron 3 not bisinuate. Uropod 1 biramous, normal, rami unequal, inner much longer than peduncle, peduncle without ventrodistal process; uropod 2 forming small leaf lacking rami. Uropod 3 absent. Telson entire, short, broader than long, ovate.

Female. Coxae different from male, usually much longer. Gnathopod 2 with thicker less sculptured propodus. Oostegites broad, present on only segments 2-4.

Sexual dimorphism. Weak.

Variables. Dorsal body teeth; inner plate of maxilla 2 small (*L. dabberi*); shapes of gnathopods 1-2 and antennae.

Relationship. Differing from *Cyrtophium*, *Leipsuropus*, and *Podocerus* in the presence of only 2 urosomites and the lack of rami on uropod 2.

Species. See Stephensen (1940b, 1942, 1944c); *L. acuticephalus* Ledoyer, 1978b [697]; *L. dabberi* Barnard & Drummond, 1981 [782]; *L. durbanensis* K.H. Barnard, 1916 (Griffiths, 1974b) [743]; *L. hala* J.L. Barnard, 1970a (Ledoyer, 1979a, 1986) [600]; *L. hystrix* (Haswell, 1880a) (Stebbing, 1906, 1910a) [781]; *L. intermedius* Ledoyer, 1979a, 1986 [698]; *L. ledoyeri* Ruffo, 1986 [340]; *L. leptocheir* K.H. Barnard, 1937 [674]; *L. purus* Stebbing, 1888 (Schellenberg, 1926a) (Griffiths, 1975) [435 + 743 + 431]; *L. tridens* K.H. Barnard, 1916 (Griffiths, 1975) [740]; *L. tuberculatus* Bruzelius, 1859 (Sars, 1895) (Lincoln, 1979a) (= *L. armatus* Norman, 1869a) (Sars, 1895) (Enequist, 1950) (Ledoyer, 1977) (Lincoln, 1979a) (= *L. spinosissimus* Boeck, 1871b) [238 + 236 + 355 + B]; "species", Sivaprakasam, 1970b [6641].

Habitat and distribution. Marine, cosmopolitan, 0-900 m, 11 species.

Leipsuropus Stebbing

Leipsuropus Stebbing, 1899b: 241.–Stebbing, 1906: 698.–J.L. Barnard, 1969c: 430.–Laubitz, 1983: 79.

Type species. *Cyrtophium parasiticum* Haswell, 1879a, monotypy.

Diagnosis. Body dorsally corrugated, provided with elevations, teeth or humps, carinate, depressed, pereonites 6-7 partially fused, urosomites free, urosomite 1 elongate. Rostrum short, ocular lobes obsolescent, blunt, antennal sinus deep. Eyes ordinary. Antennae long, 1 shorter than 2, both stout; peduncular article 3 of antenna 1 much longer than 1, article 2 longest, accessory flagellum vestigial, main flagellar articles very few. Antenna 2 peduncular article 3 scarcely elongate, peduncle stout, flagellum composed of mainly 1 long article. Epistome produced anteriorly. Labrum incised, broad. Mandible normal, palp strong, article 3 clavate, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes short, blunt. Inner plate of maxilla 1 vestigial, without setae, outer plate with 8 spines, palp 2-articulate. Outer plates of maxilla 2 rather broad, inner more narrow, with only mediomarginal setae. Inner plate of maxilliped with distal spines, outer plate normal, reaching apex of palp article 2, with spines on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 very short, with long setae.

Coxae small, relatively short, weakly contiguous, of various sizes and shapes, progressively elongate from 1 to 4, scarcely spiniform, coxa 1 dilated, produced forward, small in contrast to enlarged coxae 2-4, coxa 2 larger than 1, dilated, coxa 4 longer than coxa 1, not lobed, coxa 5 shorter than 4, coxae 6-7 smaller than anterior coxae. Gnathopods 1-2 diverse, densely setose, gnathopod 2 greatly larger than 1, gnathopod 1 in male weakly subchelate, article 5 longer than 6, poorly lobed, article 6 expanded, dactyl long. Gnathopod 2 enlarged, subchelate, with article 2 dilated, article 5 obsolescent, unlobed, article 6 dilated, with false chela or process on posteroproximal margin, dactyl long.

Pereopods 3-4 normal, similar, with scarcely inflated article 2, article 4 barely dilated, dactyls short. Pereopods 5-7 similar to each other, not progressively longer, with linear article 2, dactyl of pereopods 5-7 medium, curved. Sternal processes of thorax absent. Coxal gills [undescribed, present on segments ?2-6]. Pleopods normal. Epimeron 3 not bisinuate. Uropod 1 biramous, normal, rami slightly unequal, longer than peduncle, peduncle without ventrodistal process; uropod 2 absent. Uropod 3 forming small setose leaf lacking rami. Telson entire, short, broader than long, ovate, almost pointed apically.

Female. Gnathopod 2 small but larger than 1, (but Dr Laubitz *in litt.* reports gnathopod 2 almost as large as in male in females) transversely subchelate, article 5 short, lobed, appendage poorly setose. Oostegites broad, present on only segments 2-4.

Sexual dimorphism. Strong. Gnathopod 2.

Relationship. Differing from *Cyrtophium*, *Laetmatophilus*, and *Podocerus* in the absence of uropod 2 though all 3 urosomites are free; also the outer plate of maxilla 1 bears 8 spines (versus 9).

Species. *Leipsuropus parasiticus* (Haswell, 1879a, 1885b) (Barnard & Drummond, 1981) [784].

Habitat and distribution. Marine, south-eastern Australia from Port Jackson to Westernport, 12-24 m, 1 species.

Neoxenodice Schellenberg

Fig.119F

Neoxenodice Schellenberg, 1926b: 474.–J.L. Barnard, 1969c: 431.–Laubitz, 1983: 80.

Type species. *Neoxenodice caprellinoides* Schellenberg, 1926b, monotypy.

Diagnosis. Body cylindrical, smooth, anterior pereonites elongate, pleosome reduced, urosomites free, urosomite 1 elongate. Rostrum short, ocular lobes obsolescent, blunt, antennal sinus deep. Eyes absent. Antennae of medium length, equal, both slender, peduncular article 3 of antenna 1 longer than 1, article 3 longest, accessory flagellum 1-2-articulate, main flagellar articles few. Antenna 2 peduncular article 3 elongate, flagellum with few articles. Epistome unproduced anteriorly. Labrum incised, broad. Mandible with reduced molar, palp strong, article 3 scarcely clavate, almost as long as 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes short, blunt. Inner plate of maxilla 1 short, with 1 thick apical seta, outer plate with 9 (?7) spines, palp 2-articulate. Plates of maxilla 2 ordinary, inner plate with only mediomarginal setae. Inner plate of maxilliped with distal spines, outer plate short, not reaching halfway to apex of palp article 2, with small spines on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 short, with medium setae.

Coxae very small, strongly discontiguous, progressively shorter from 1 to 4, coxa 1 not dilated, not produced forward, coxa 4 not lobed, coxa 5 at least as long as 4, coxae 6-7 not smaller than anterior coxae. Gnathopods 1-2 diverse, gnathopod 2 greatly larger than 1, gnathopod 1 in male subchelate, palm oblique, article 5 as long as 6, unlobed. Gnathopod 2 enlarged, weakly subchelate, with article 2 barely dilated, article 5 much shorter than 6, lobed, article 6 dilated, dactyl long.

Pereopods 3-4 tiny, similar, not glandular, with slender article 2, article 4 barely dilated, dactyls short. Pereopods 5-7 similar to each other, progressively longer, weakly prehensile, with almost linear article 2, pereopod 5 much shorter than pereopods 6-7, dactyl of pereopods 5-7 very long, curved, reaching up to area of prehensility on article 5. Sternal processes of thorax absent. Coxal gills present on segments 2-4. Pleopods [undescribed]. Epimeron 3 not bisinuate. Uropods 1-2 biramous, normal, rami slightly unequal, longer than peduncle, peduncle of uropods 1-2 without ventrodistal process. Uropod 3 forming small setose leaf lacking rami. Telson entire, short, broader than long, ovate.

Female. Oostegites broad, present on coxae 3-4 or 2-4.

Sexual dimorphism. Absent.

Variables. Eyes well developed or not; minor variables in antennae, gnathopod 2 and uropods 1-2.

Relationship. In a monotypic subfamily and characterised by extreme reduction of pereopods 3-4, elongate anterior pereonites and reduced pleosome.

Also differing from Xenodocinae in reduced accessory flagellum (2 versus 4+), and reduced, asetose inner plate of maxilla 1. Also from Dulichiinae in head shape (see figures), with urosomite 1 not longer than pleonites 2-3 together and non-glandular percopods 3-4.

Species. *Neoxenodice caprellinoides* Schellenberg, 1926b, (J.L. Barnard, 1962d) (Ledoyer, 1986) [870A]; *N. cryophile* Lowry, 1976 [876].

Habitat and distribution. Marine, Antarctica and Cape Basin, South Atlantic, 104-4893 m, 2 species.

Paradulichia Boeck

Figs 118B, 119E

Paradulichia Boeck, 1871b: 265.–Stebbing, 1906: 713.–J.L. Barnard, 1969c: 431.–Laubitz, 1977: 975.

Type species. *Paradulichia typica* Boeck, 1871b, monotypy.

Diagnosis. Body cylindrical, smooth, pereonites 1-2 short, last 2 pereonites fused together; urosomites 2-3 coalesced, urosomite 1 very elongate. Rostrum short, ocular lobes obsolescent, blunt, antennal sinus weak. Eyes large. Antennae elongate, 1 longer than 2, both slender, peduncular article 3 of antenna 1 much longer than 1, peduncular articles 2-3 longest, accessory flagellum 3-5 articulate. Antenna 2 peduncular article 3 short, main flagellar articles very few. Epistome [?unproduced anteriorly]. Labrum broad, bilobed. Mandible normal, palp strong, very slender, article 3 rectolinear, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes long, blunt. Inner plate of maxilla 1 triangular, large, without setae, outer plate with 9 spines, palp 2-articulate. Plates of maxilla 2 ordinary, inner plate slightly shortened, without mediomarginal setae. Inner plate of maxilliped with distal spines (fide Dr Laubitz but in illustrations appearing as setae), outer plate short, reaching halfway to apex of palp article 2, with only spine-setae on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 short, with long setae.

Coxae very small, short, not contiguous, not spiniform, coxa 1 not dilated, not produced forward, coxa 4 not longer than coxa 1, not lobed, coxa 5 somewhat longer than 4, coxae 6-7 not smaller than anterior coxae. Gnathopods 1-2 of subequal size, small, both with sublinear articles, gnathopod 1 in male poorly subchelate, article 5 long, linear, unlobed, palm short, gnathopod 2 subchelate, article 5 slightly longer than 6, poorly lobed, article 6 expanded.

Pereopods 3-4 longer than gnathopods, similar, with slender article 2, article 4 dilated, dactyls short. Pereopods 5-7 similar to each other, scarcely progressively longer, not prehensile, with linear article 2, dactyls short, curved. Sternal processes of thorax absent. Coxal gills present on segments 2-5. Pleopods normal. Epimeron 3 not bisinuate. Uropod 1 biramous, rami slightly unequal, much longer than peduncle, peduncle without ventrodistal process; uropod 2 very small, with only 1 ramus or forming small leaf lacking rami. Uropod 3 absent. Telson entire, as long as broad, ovate.

Female. Oostegites broad, present on only segments 2-4.

Sexual dimorphism. None.

Variables. Uropod 2 with 1-2 articles (*P. typica*).

Relationship. Differing from *Dulichia, Dulichiopsis,* and *Dyopedos* in the vestigial uropod 2 and in the similarity of male and female gnathopods.

Species. ?*Paradulichia secunda* Blake, 1929 (Laubitz, 1977) [254]; *P. typica* Boeck, 1871b (Sars, 1895) (Stephensen, 1940b) (Gurjanova, 1951) (= *P. spinifera* Gurjanova, 1946, 1951) (Laubitz, 1977) [200 + B].

Habitat and distribution. Marine, Arctic, North Atlantic south to Cape Cod region, 17-1102 m, 2 species.

Podobothrus Barnard & Clark

Podobothrus Barnard & Clark, 1985: 1048.

Type species. *Podobothrus bermudensis* Barnard & Clark, 1985, original designation.

Diagnosis. Body posterodorsally provided with humps, carinate, slightly depressed, last 2 mesosome segments fused together; urosomite free, together not longer than pleosome, 3 coalesced with telson, urosomite 1 elongate. Rostrum absent, ocular lobes obsolescent, blunt, antennal sinus deep. (Head as long as pereonites 1-2 together). Eyes very large, pigmentless, on lateral head bulges. Antennae immensely long, 1 shorter than 2, both slender, peduncular article 3 of antenna 1 much longer than 1, article 3 longest, accessory flagellum 1-articulate, main flagellar articles very few but each elongate. Antenna 2 peduncular article 3 scarcely elongate, flagellar articles few but each elongate. Epistome unproduced anteriorly. Labrum subrounded, weakly incised, broad. Mandible normal, palp weak, slender, article 3 rectolinear, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes long, pointed. Inner plate of maxilla 1 vestigial, without setae, outer plate with 9 spines, palp 2-articulate. Outer plates of maxilla 2 rather broad, inner short and narrow, inner plate with only sparse mediomarginal setae. Inner plate of maxilliped with distal spines, outer plate normal, not reaching apex of palp article 2, with spines on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 short, with long setae.

Coxae very small, short, discontiguous, alike, progressively elongate from 1 to 4, not spiniform, coxa 1 not dilated, not produced forward, coxa 4 longer than coxa 1, not lobed, coxa 5 as long as 4, coxae 6-7 not smaller than anterior coxae. Gnathopods 1-2 diverse, gnathopod 2 greatly larger than 1, gnathopod 1 in male almost simple, article 5 long, almost linear, barely lobed basally, as long as 6, article 6 very slender, dactyl long. Gnathopod 2 enlarged, weakly subchelate, with article 2 not dilated, article 5 shorter than 6, more slender than 6, unlobed, article 6 dilated, dactyl fitting oblique palm.

Pereopods 3-4 longer than gnathopods, similar, with slender article 2, article 4 not dilated, dactyls long. Pereopods 5-7 similar to each other and to pereopods 3-4, with linear article 2, dactyl of pereopods 5-7 long, curved. Sternal processes of thorax absent. Coxal gills present on segments 3-6. Pleopods normal. Epimeron 3 not bisinuate. Uropods 1-2 biramous, normal, rami strongly unequal, longer than peduncle, peduncles without ventrodistal process. Uropod 3 forming small leaf lacking rami, almost naked. Telson entire, as broad as long, ovate, spinose.

Female. Unknown. Oostegites [?moderately narrow, present on segments ?2- 5].

Sexual dimorphism. Unknown.

Relationship. Differing from *Podocerus* in the smaller disjunct coxae 3-7, feeble gnathopods, much more elongate spines on rami of uropods 1-2, thin, poorly setose mandibular palp and poorly setose but immense antennae.

This genus does not fit some precepts of Laubitz' key to Podoceridae reproduced herein because *Podobothrus* is clearly a member of Podocerinae but has a poorly setose mandibular palp and no gills on coxa 2.

Differing from *Cyrtophium* in presence of accessory flagellum, short antenna 1; from *Xenodice* in short (relative to antenna 2) antenna 1, depressed body, lateral ocular bulges and more strongly disjunct coxae; and from *Neoxenodice* in the long pereopods 3-4 and fused pereonites.

Species. *Podobothrus bermudensis* Barnard & Clark 1985 [367Z].

Habitat and distribution. Marine, Bermuda, sea-cave, 1 species.

Podocerus Leach

Figs 118D, 119D

Podocerus Leach, 1814b: 433.–Stebbing, 1906: 700.–J.L. Barnard, 1970a: 237.–Lincoln, 1979a: 570.

Platophium Dana, 1852b: 309.–Dana, 1853: 837 (*Platophium brasiliense* Dana, 1853, monotypy).

Dexiocerella Haswell, 1885b: 107 (*Cyrtophium dentatum* Haswell, 1879b (= *Cyrtophium cristatum* Thomson, 1879a), here selected).

Type species. *Podocerus variegatus* Leach, 1814b, monotypy.

Diagnosis. Body often dorsally corrugated or provided with elevations, teeth, humps, or carinate or smooth, depressed, last 2-3 pereonal segments often fused, urosomite 1 elongate. Rostrum short, ocular lobes short, blunt, antennal sinus deep. Eyes large to weak, often bulging laterally. Antennae of medium to great length, 1 shorter than 2, 1 slender, antenna 2 stout; peduncular article 3 of antenna 1 longer than 1, article 2 longest, accessory flagellum 1 to 2-articulate, main flagellar articles very few. Antenna 2 peduncular article 3 scarcely elongate, peduncle moderately stout, flagellum short, poorly articulate. Epistome produced anteriorly. Labrum incised, bilobed. Mandible normal, palp strong, article 3 clavate, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes long, pointed or blunt. Inner plate of maxilla 1 short to vestigial, with or without 1 seta, outer plate with 9 (?11) spines, palp 2-articulate. Outer plates of maxilla 2 rather broad, inner plate with only sparse mediomarginal setae. Inner plate of maxilliped with distal spines, outer plate normal, reaching halfway to apex of palp article 2, with spines on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 short, with long nail and setae.

Coxae very small, short, weakly discontiguous, of various sizes and shapes, not progressively elongate from 1 to 4, often spiniform, coxa 1 dilated, produced forward, coxa 2 shorter or longer than 1, often produced, coxa 4 not longer than coxa 1, not lobed, coxa 5 as long as 4, coxae 6-7 not much smaller than anterior coxae. Gnathopods 1-2 diverse, gnathopod 2 greatly larger than 1, gnathopod 1 in male poorly subchelate, article 5 shorter than or as long as 6, weakly lobed. Gnathopod 2 enlarged, weakly subchelate or essentially simple, very setose, with article 2 barely dilated, with article 4 enlarged, incipiently merochelate, extended and fused distally along posterior margin of article 5, article 5 much shorter than 6, mostly fused to 4 or cryptic, article 6 dilated, dactyl long.

Pereopods 3-4 longer than gnathopods, similar, with slender article 2, article 4 dilated, dactyls medium. Pereopods 5-7 similar to each other, progressively slightly longer or pereopod 6 longer, pereopods 5-7 with narrow to broad unlobed or barely lobed article 2, dactyl of pereopods 5-7 medium, curved. Sternal processes of thorax absent. Coxal gills [undescribed, present on segments ?2-6]. Pleopods normal. Epimeron 3 not bisinuate. Uropods 1-2 biramous, rami grossly unequal, inner much longer than (2) or as long as (1) peduncle, peduncle of uropods 1-2 with or without ventrodistal process, that of uropod 2 smaller. Uropod 3 forming small leaf lacking rami, very short, obtuse distally, with few armaments. Telson entire, short, broader than long, ovate or semicircular, spinose.

Female. Gnathopod 2 smaller, merochelate, carpus distinct but subcryptic, propodus short and inflated. Oostegites broad, present on segments 2-5 or 2-4.

Sexual dimorphism. Strong. Gnathopod 2.

Variables. Lateral ocular lobes often bulging laterally; shape and setosity of male and female gnathopods 1-2; article 5 of gnathopod 1 longer than 6 (e.g. *P. cheloniae*); article 2 of pereopods 3-4 inflated (e.g. *P. cheloniae*); posterodorsal teeth, humps, carinae; telson longer than broad (*P. manawatu*).

Relationship. The basic member of the subfamily because of the presence of 3 pairs of uropods, accessory flagellum and 9 apical spines on the outer plate of maxilla 1.

See *Cyrtophium*, *Laetmatophilus*, *Leipsuropus* and *Podobothrus*.

Species. *Podocerus africanus* K.H. Barnard, 1916, 1937 (Griffiths, 1975) [690]; *P. andamanensis* (Giles, 1890) (Stebbing, 1906) [662]; *P. brasiliensis* (Dana, 1853) (Nayar, 1959) (J.L. Barnard, 1970a) (Rabindranath, 1972d) (?= *P. synaptochir* Walker, 1904) [751 + ?423 + ?T]; *P. capillimanus* Nicholls, 1938 (Thurston, 1974b) [890]; *P. cheloniae* (Stebbing, 1888, 1906) [?330I]; *P. chelonophilus* (Chevreux & de Guerne, 1888) (Chevreux 1900a) (Chevreux & Fage, 1925) (Mateus & Afonso, 1974) [352I]; *P. crenulatus* Myers, 1985c [576]; *P. cristatus* (Thomson, 1879a) (?J.L. Barnard, 1962a) (= *P. dentatum* Haswell, 1879b), *P. c. rotundatus* Schellenberg, 1931 [781 + ?600]; *P. danae* (Stebbing, 1888, 1906) [851B]; *P. fulanus* J.L. Barnard, 1962a, 1979b [370]; *P. gloriosae* Ledoyer, 1986 [618B]; *P. hanapepe* J.L. Barnard, 1970a (Ledoyer, 1972c, 1986) (Myers, 1985c) [600]; *P. hystrix* Stebbing, 1910a (Griffiths, 1974c) [781 + 743]; *P. inconspicuus* (Stebbing, 1888) (Nagata, 1965c) (Griffiths, 1975) (= *P. palinuri* K.H. Barnard, 1916) [600 + W]; *P. karu* J.L. Barnard, 1972b [775]; *P. laevis* (Haswell, 1885b) (Sivaprakasam, 1969a) (= *P. haswelli* Chevreux & de Guerne, 1888) [781 + ?670]; *P. lobatus* (Haswell, 1885b) (?Pirlot, 1938) [781 + ?597]; *P. madagascarensis* Ledoyer, 1986 [698]; *P. manawatu* J.L. Barnard, 1972b [775]; *P. mangarevae* Chevreux, 1908c (= *P. zeylanicus* fide Ruffo, 1969) (?Ledoyer, 1979a) [556 + ?698]; *P. multispinis* K.H. Barnard, 1926 (Griffiths, 1975), *P. m. levis* K.H. Barnard, 1926 [743]; *P. palinuroides* Ledoyer, 1986 (= species of Ledoyer, 1978b, 1979a) [697-698]; *P. pyurae* Griffiths, 1975 [743I]; *P. schieckei* Ruffo, 1986 [348]; *P. senegalensis* Chevreux, 1926b (Pirlot, 1939) [441]; *P. septemcarinatus* Schellenberg, 1926a, 1931 (K.H. Barnard, 1932) (Stephensen, 1947a) (= *P. hystricoides* Monod, 1926) [870 + B]; *P. spongicolus* Alderman, 1936 (Hewatt, 1946) [370]; *P. talegus* J.L. Barnard, 1965a, *P. t. lawai* J.L. Barnard, 1970a, *P. t. levuensis* Myers, 1985c [550 + ?483]; *P. tulearensis* Ledoyer, 1986 [698]; *P. variegatus* Leach, 1814b (Chevreux & Fage, 1925) (Lincoln, 1979a) (= *P. darwinii* Bate, 1857d) [352]; *P. walkeri* Rabindranath, 1972d (Ledoyer, 1979b) [660]; *P. w. pedonculata* Ledoyer, 1979a, 1986 [698]; *P. wanganui* J.L. Barnard, 1972b [775]; *P. zeylanicus* (Walker, 1904) (Nayar, 1967) (Ruffo, 1969) (?Ledoyer, 1986) [685]; "species" (*P. cristatus* identification of Chilton, 1926, Ledoyer, 1972c) [774]; "species" K.H. Barnard, 1932 [833]; "species" Nagata, 1960 [395]; "species" Ledoyer, 1978b, 1979a [697 + 698]; "species" Goddard, 1984 [268, mimic to nudibranch].

Habitat and distribution. Marine, cosmopolitan, 0-750 m, 33 species.

Xenodice Boeck, 1871

Fig.119B

Xenodice Boeck, 1871b: 266.–Stebbing, 1906: 699.–J.L. Barnard, 1969c: 431.–Laubitz, 1983: 79.

Type species. *Xenodice frauenfeldti* Boeck, 1871b, monotypy.

Diagnosis. Body cylindrical, smooth, mesosome segments free, urosomites free, together shorter than pleosome, urosomite 1 elongate. Rostrum short, ocular lobes short, weakly pointed, antennal sinus moderate. (Head as long as pereonites 1-2 together). Eyes weak. Antennae long, 1 slightly longer than 2, both slender, peduncular article 3 of antenna 1 much longer than 1, article 3 longest, accessory flagellum 4 to 5-articulate. Antenna 2 peduncular article 3 scarcely elongate. Epistome unproduced anteriorly. Labrum broad, fleshy, bilobed. Mandible normal, palp strong, article 3 thinly clavate, shorter than 2. Labium with entire outer lobes, with well-developed inner lobes, mandibular lobes long, blunt. Inner plate of maxilla 1 triangular, with row of medial setae, outer plate with 9 spines, palp 2-articulate. Plates of maxilla 2 ordinary, inner plate with only mediomarginal setae. Inner plate of maxilliped with distal spines, outer plate normal, not reaching apex of palp article 2, with spines on medial margin, palp with 4 articles, article 2 long, article 3 unlobed, article 4 short, with long setae.

Coxae very small, short, discontiguous, alike, even, not spiniform, coxa 1 not dilated, not produced forward, coxa 4 longer than coxa 1, not lobed, coxa 5 as long as 4, coxae 6-7 not smaller than anterior coxae. Gnathopods 1-2 alike, of subequal size, small, densely setose, gnathopod 2 slightly dominant, gnathopod 1 in male weakly subchelate, article 5 slightly longer than 6, lobed, article 6 more slender than 5, dactyl long. Gnathopod 2 barely enlarged, subchelate, with article 2 not dilated, article 5 as long as 6, lobed, article 6 slightly dilated, with false chela, dactyl ordinary.

Pereopods 3-4 longer than gnathopods, similar, with slender article 2, article 4 scarcely dilated, dactyls medium. Pereopods 5-7 similar to each other, elongate, progressively longer, not prehensile, with linear article 2, articles 4-6 of pereopod 7 elongated, dactyl of pereopods 5-7 short to medium, curved. Sternal processes of thorax absent. Coxal gills present on segments 2-6. Pleopods normal. Epimeron 3 bisinuate. Uropods 1-2 biramous, normal, rami slightly unequal, longer than (2) or as long as (1) peduncle, peduncle of uropod 1 with vestigial ventrodistal process. Uropod 3 forming tiny naked leaf lacking rami. Telson entire, as broad as long, ovate, almost naked.

Female. Gnathopods smaller, gnathopod 1 with article 5 slender, longer than 6, unlobed, on gnathopods 1-2 as long as 6 and more distinctly lobed than in male. Oostegites narrow, present on only segments 2-4.

Sexual dimorphism. Weak.

Relationship. Differing from other dulichiids by possession of plesiomorphic characters: well-developed accessory flagellum, strongly setose inner plate of maxilla 1, slender oostegites and better development of pleosome with larger more projecting epimera.

Species. *Xenodice frauenfeldti* Boeck, 1871b (Sars, 1895) (Stephensen, 1940b, 1942, 1944c) (Gurjanova, 1951) [216 + B].

Habitat and distribution. Marine, North Atlantic, North Sea, Kattegat, Arctic Ocean, 56-1270 m, 1 species.

PONTOGAMMARIDAE Bousfield, 1977

[see Barnard & Barnard (1983)]

PONTOPOREIIDAE Dana, 1855

[see Barnard & Barnard (1983)]

PSEUDAMPHILOCHIDAE Schellenberg, 1931

Diagnosis. Amphilochoidea with coxae 1-4 ordinary, coxa 1 expanded ventrally and broader than coxa 2, coxa 4 of medium size and well excavate posteriorly. Peduncle of uropod 3 weakly elongate. Telson cleft, of medium length.

See Amphilochidae, Bolttsiidae, Cyproideidae, key to Amphilochoidea, and key to Eusiridae.

Description. Antennae longer than in other amphilochids but individual articles of similar dimensions. Accessory flagellum obsolescent. Antenna 2 longer than antenna 1, article 4 of peduncle longer than article 4. Upper lip scarcely incised (unusual). Mandibular incisor of ordinary width, toothed, lacinia mobilis present, raker row sparse (unusual), molar simple and obsolescent, palp stout (unusual). Lower lip with well-developed unnotched outer lobes bearing ordinary blunt mandibular lobes, outer lobes widely separated by well-developed unfused inner lobes. Inner plate of maxilla 1 small, with 1 seta, outer plate with 9 spines, palp thin, 2-articulate. Plates of maxilla 2 broad but outer much narrower than inner, latter naked medially.

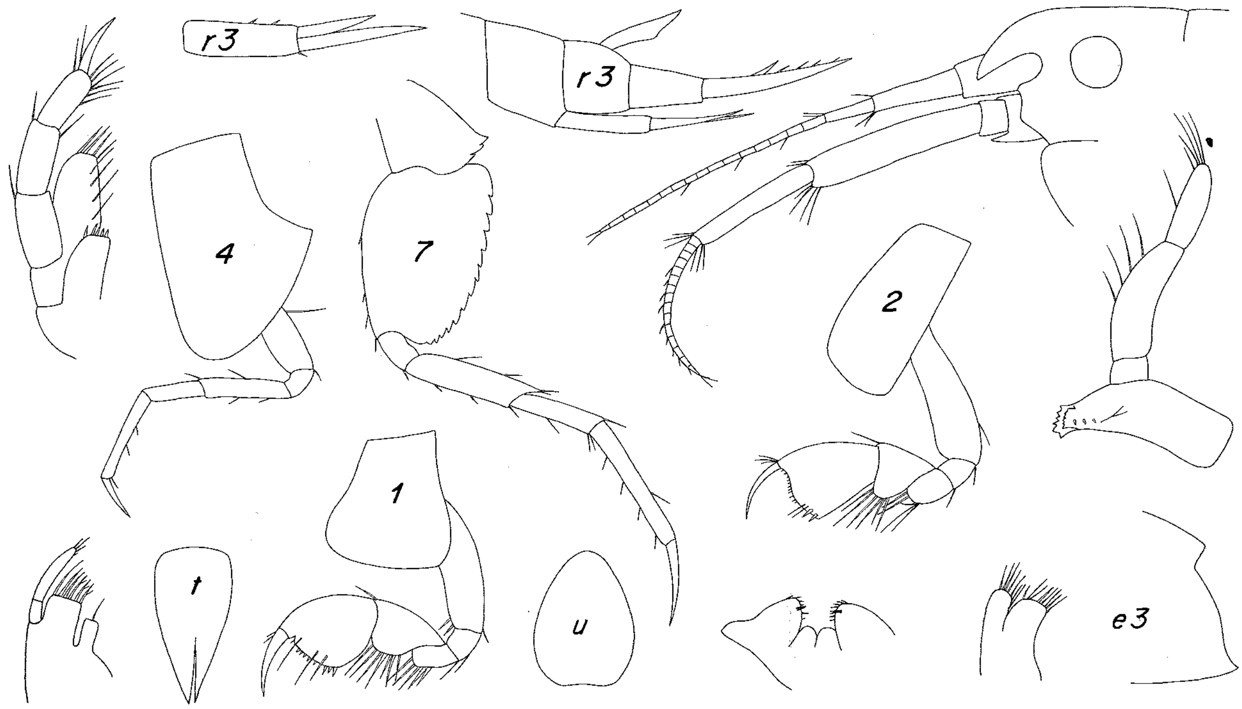


Fig.120. Pseudamphilochidae. *Pseudamphilochus shoemakeri.*

Maxilliped ordinary but inner plate slightly broader than normal.

Gnathopods small, alike, carpus short, weakly lobate, propodus longer, moderately expanded, palm almost transverse. Pereopods 3-7 ordinary. Outer ramus of uropod 1 strongly reduced, of uropod 2 scarcely shorter than inner; peduncle of uropod 3 not greatly elongate (unusual), inner ramus half as long as outer (unusual). Telson elongate, leaf-like, apex sharp but telson split more than one third its length (unusual).

Relationship. Relatively good ancestral kind to other amphilochids because of strong rostrum, round eye, mouthparts, hammer-like small gnathopods of general form, and elongate telson (but split).

The unusual characters of the diagnosis spoil what would otherwise be a tight definition of amphilochoidids. The type genus needs extensive study. Though coxa 1 is broadened, *Pseudamphilochus* differs from Stilipedidae (= Astyridae) in the propodus of the gnathopods being larger than the carpus and is not an iphimediid because no anterior coxa is acuminate.

Pseudamphilochus Schellenberg

Fig.120

Pseudamphilochus Schellenberg, 1931: 92.

Type species. *Pseudamphilochus shoemakeri* Schellenberg, 1931, monotypy.

Diagnosis. With the characters of the family.

Species. *Pseudamphilochus shoemakeri* Schellenberg, 1931 [833].

Habitat and distribution. Marine, South Georgia, 12-15 m, 1 species.

SALENTINELLIDAE Bousfield, 1977

[see Barnard & Barnard (1983)]

SEBIDAE Walker, 1908

Diagnosis. Antenna 1 peduncle elongate, accessory flagellum 2-articulate, elongate. Mandibular molar obsolescent. Plates of maxilliped of medium size. Gnathopods 1-2 chelate, or gnathopod 1 strongly subchelate, gnathopod 1 larger than 2. Uropod 3 uniramous. Telson entire.

See Anamixidae, Clarenciidae, Lysianassidae, Liljeborgiidae, Leucothoidae and Pagetinidae.

Description. Body compressed, smooth or weakly carinate, urosomites free or 2-3 coalesced. Head ordinary, lateral lobes well developed but eyes usually absent. Antennae 1-2 reaching equally; article 2 of antenna 1 generally longer than article 1; flagella of both antennae short, generally not longer than longest article of respective peduncle. Epistome and labrum separate, epistome dominant, labrum weakly excavate below. Mandibular incisor broad, toothed, lacinia mobilis present, several thick rakers present, molar bulbous, weak, almost smooth, with spine, palp attached opposite molar, article 3 short, barrel shaped, scarcely setose. Labium with widely separated outer lobes, well-developed blunt mandibular lobes, inner lobes barely evident but with middle notch and separating outer lobes widely. Inner plate of maxilla 1 tiny, with few apical setae, outer plate with about 5-8 spines, palp elongate, 1-articulate; plates of maxilla 2 feeble, poorly setose; plates of maxilliped of medium size, poorly armed, palp stout, 4-articulate, dactyl long, falcate.

Coxae 1-4 large, coxa 1 generally largest, others decreasing slightly in progression, coxa 4 weakly lobate and excavate posteriorly, coxa 5 slightly shorter than 4. Carpus of gnathopod 1 thick, lobate, propodus broad, carpus of gnathopod 2 generally thin, propodus usually thin and longer than carpus in both pairs. Pereopods short, 3-4 ordinary, article 2 of pereopods 5-7 expanded, weakly lobate, weakly setulate. Gills 2-6, sac-like; oostegites very slender or of medium expansion, weakly setose.

Pleopods ordinary, each ramus with 3-5 articles. Urosome short. Epimera ordinary. Outer rami of uropods 1-2 slightly shortened, rami somewhat thick and stubby; poorly armed; peduncle of uropod 3 short, ramus long, tipped with spine or article 2. Telson of regular length, entire.

Sexual dimorphism. Weak to absent, occasionally male gnathopod 1 with distinctly sculptured palm.

Relationship. Differing from Lysianassidae in the long peduncle of antenna 1, with article 2 elongate. When uropod 3 is uniramous in Lysianassidae it is never elongate, otherwise all Lysianassidae have biramous uropod 3.

The Anamixidae, Liljeborgiidae and Leucothoidae have biramous uropod 3.

The Pagetinidae have vestigial outer plates on the maxillipeds.

Key to Genera of Sebidae

1. Article 3 of gnathopod 2 elongate; coxa 4 weak, poorly lobed, poorly excavate; maxilla 2 with 2 plates .... *Seba*

— Article 3 of gnathopod 2 ordinary, short; coxa 4 ordinary, large, with broad quadrate posterior lobe and small posterodorsal excavation; maxilla 2 with 1 plate 2

2. Gnathopod 2 much smaller than gnathopod 1, carpus unlobate, article 1 longer than article 2, head protruding anteroventrally and sinus absent .... *Relictoseborgia*

— Gnathopods scarcely diverse, carpi lobate, article 1 as long as article 2, head not protruding and with antennal sinus .... *Seborgia*

Seba Bate

Figs 121B,C

Seba Bate, 1862: 159.–K.H. Barnard, 1957: 6.–Karaman, 1971e: 84.
Teraticum Chilton, 1884: 257 (*Teraticum typicum* Chilton, 1884, monotypy).
Grimaldia Chevreux, 1889a: 284 (*Grimaldia armata* Chevreux, 1889a, original designation).
Paravalettia K.H. Barnard, 1916: 112 (*Paravalettia chelata* K.H. Barnard, 1916, monotypy).

Type species. *Seba innominata* Bate, 1862, monotypy.

Diagnosis. Labium with inner lobes indistinct and fused to outer lobes. Palp of maxilla 1 1-articulate. Maxilla 2 ordinary, with 2 plates. Coxa 4 scarcely the largest or not the largest, not orthodox, all posterior margin excavate, therefore posteroventral lobe feeble. Gnathopods diverse, gnathopod 1 much the larger, subchelate or chelate, propodus broad, gnathopod 2 strongly chelate with elongate article 3, carpus and propodus very slender. Urosomites 2-3 fused together. Oostegites moderately expanded, generally with 5-7 apical and subapical setae.

Description. Body slender. Rostrum small, anteroventral cephalic sinus well developed, corner sharp, not extended. Antennae 1-2 of medium length, extending equally, peduncular article 2 usually longer than article 1, article 3 much shorter, accessory flagellum 2-articulate, article 2 short, flagellum of antenna 2 very short. Labrum broader than long, weakly to scarcely bilobed. Incisor strong, toothed, laciniae mobiles well developed, rakers several, molar feeble, usually forming broad smooth hump or obsolescent, nontriturative; palp large, article 2 elongate, articles 1 and 3 short, often equal in length or article 3 much longer than 1, setae of article 2 sparse or absent, of 3 mostly E, one to few. Inner plate of maxilla 1 of medium length, naked or with setule, blunt, outer plate with 6-8 (?9) spines, palp elongate. Maxilla 2 formed of 2 articulate weakly setose similar plates, occasionally inner very short. Plates of maxilliped moderately developed, poorly setose, outer usually with sparse spines medially, palp long, 4-articulate, dactyl unguiform, nail fused or accessory setule present.

Coxae 1-4 of medium length, not necessarily increasing in length towards coxa 4, coxa 1 weakly or scarcely dilated, not broader than coxae 2-3, coxa 4 not very large, poorly lobate and poorly excavate posteriorly, coxae 5-7 moderately shortened and slightly lobate. Carpus of gnathopods short to medium, first lobate, second unlobate, propodus chelate, usually diverse, first very large, broad, second very slender and elongate, palms strongly protuberant or palm on gnathopod 2 weaker and often strongly sculptured, dactyls large, fitting palm, carpus and posterior margin of propodus on gnathopod 1 usually with 1 clump of setae each or more broadly setose, of gnathopod 2 sparsely setose to naked. Pereopods 5-7 scarcely divergent though pereopod 7 occasionally with diverse article 2; article 4 often expanded and lobate. Coxal gills 2-6, sac-like or thin. Oostegites of medium breadth and medium setation.

Uropods weakly spinose or almost naked, outer rami of uropod 1 (rarer uropod 2) often shortened. Peduncle of uropod 3 short, ramus much longer than peduncle, with apical spine on article 2. Telson linguiform, weakly longer than broad, entire, rounded or weakly pointed apically, poorly setulose.

Sexual dimorphism. Male gnathopod 1 often with more sculptured palm than female.

Variables. Article 3 of mandibular palp as long as article 2 (*S. hirsuta*), shorter than 2 but longer than 1 (*S. aloe*), only as long as 1 (*S. ekepuu*); article 3 of maxillipedal palp produced (*S. antarctica* identification of K.H. Barnard, 1932); palm of gnathopod 1 diverse within one species, parachelate or transverse, teeth 2 or 3 (*S. saundersi* identification of Schellenberg, 1931); dactyl of gnathopod 1 with mid inner tooth (*S. typica*); palm of gnathopod 1 not chelate (*S. hirsuta*); article 4 of pereopods 5-7 thin or expanded within 1 species (male and female *S. aloe* and *S. subantarctica*); outer ramus of uropod 1 shortened (most species), of uropod 2 shortened (several), of uropod 2 not shortened (*S. armata*, *S. dubia*).

Relationship. More strongly advanced than *Seborgia* in the more diverse and strongly chelate gnathopods, poorly developed coxa 4, elongate article 3 on gnathopod 2, fused urosomites but possibly more plesiomorphic in the lack of diversity in coxae 1-3 which in *Seborgia* have coxa 1 broader than coxae 2-3, a character of many families of amphipods such as Liljeborgiidae, and in the normal maxilla 2.

Species. See Karaman (1971b); *S. aloe* Karaman, 1971e (Bellan-Santini, 1974, 1984) [340BA]; *S. antarctica* Walker, 1906a, 1907 (K.H. Barnard, 1930, 1932) (Schellenberg, 1931) (Nicholls, 1938) (Holman & Watling, 1983) [870 + I]; *S. armata* (Chevreux, 1889a) (Chevreux, 1900a) (Chevreux & Fage, 1925) [240B]; *S. chiltoni* Moore, 1987 (? = *S. typica* identification of Chilton, 1921d, 1924a; Ledoyer, 1978b, 1986) [783 + ?690]; *S. dubia* Schellenberg, 1926a (Holman & Watling, 1983) [881B]; *S. ekepuu* J.L. Barnard, 1970a (Ledoyer, 1979a, 1986) [600]; ?*S. georgiana* Schellenberg, 1931 [833]; *S. gloriosae* Ledoyer, 1986 [618B]; *S. hirsuta* Ledoyer, 1978b [783 + 697]; [?*S. innominata* Bate, 1862 (Karaman, 1971b) [dubious] [348]]; *S. saundersi* Stebbing, 1875b, 1888 (= *S. chelata*

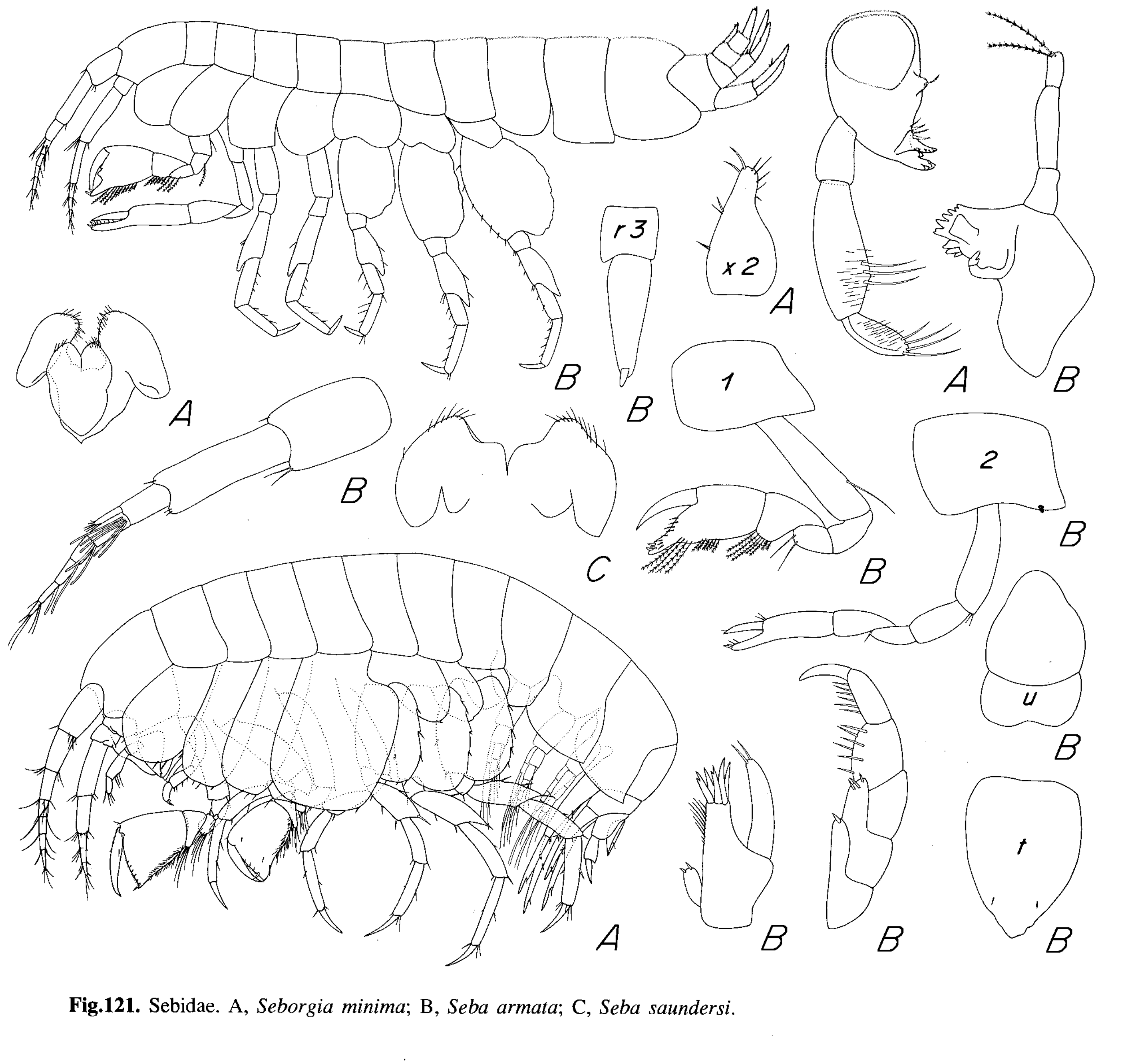


Fig.121. Sebidae. A, *Seborgia minima*; B, *Seba armata*; C, *Seba saundersi*.

K.H. Barnard, 1916) (K.H. Barnard, 1932, 1937) (Bellan-Santini & Ledoyer, 1974) (Griffiths, 1975) (Holman & Watling, 1983) [800]; *S. stoningtonensis* Thurston, 1974a [872]; *S. subantarctica* Schellenberg, 1931 (Holman & Watling, 1983) [867]; *S. tropica* McKinney, 1980a [470]; *S. typica* (Chilton, 1884, 1906b, ?1921d, 1924a) (J.L. Barnard, 1972b) (Ledoyer, 1978b, 1986) (Holman & Watling, 1983) [775 + 685]; species a, Holman & Watling, 1983 [872B]; species b, Holman & Watling, 1983 [765].

Habitat and distribution. Marine, cosmopolitan but stronger in southern oceans, 0-1900 m, 15 species.

Seborgia Bousfield

Fig.121A

Seborgia Bousfield, 1970: 164.

Type species. *Seborgia minima* Bousfield, 1970, original designation.

Diagnosis. Labium with discrete fleshy inner lobes. Palp of maxilla 1 2-articulate. Maxilla 2 composed of only 1 plate. Coxa 4 much the largest, with orthodox broad posterior lobe and small posterodorsal excavation. Gnathopods alike or weakly diverse, weakly chelate; article 3 of gnathopod 2 short. Urosomites separate. Oostegites rectolinear, with 3 or fewer apical setae.

Description. Body ordinary to slender. Anteroventral cephalic sinus well developed, corner neither sharp nor extended. Labrum broader than long, weakly bilobed. Incisor strong, toothed, laciniae mobiles well developed, rakers several, molar feeble, conical, with seta, nontriturative; palp large, article 2 elongate, articles 1 and 3 short, subequally long, setae of article 2 = group of several inner middle, of 3 = mostly E, few. Inner plate of maxilla 1 short, naked or with setule, outer plate with 7 spines, palp article 1 elongate. Maxilla 2 formed of attenuate narrow extension from basal plate, poorly setose. Plates of maxilliped moderately developed, poorly setose, lacking spines, palp long, 4-articulate, dactyl unguiform, with nail.

Coxae 1-4 elongate, slightly longer progressively towards coxa 4, coxa 1 dilated, broader than coxae 2 or 3, coxa 4 very large and ordinary, coxae 5-7 very short and poorly lobed. Carpus of gnathopods very short, lobate, propodus broad and expanding distally, palms transverse or weakly parachelate, dactyls large, fitting palm, carpus and posteroproximal parts of propodus setose and often pubescent. Pereopods 5-7 scarcely divergent. Coxal gills 2-6, sac-like, with peduncles. Oostegites very slender, poorly armed.

Uropods weakly spinose, rami lacking apical spines, outer rami of uropods 1-2 shortened. Peduncle of uropod 3 weakly elongate, ramus as long as peduncle, with subapical notch (type) as if apical spine partly fused to base. Telson linguiform, weakly longer than broad, entire, rounded or obtuse apically, poorly setulose.

Variables. Rostrum large; antenna 1 longer than 2 (*S. schiecki*).

Relationship. Much more primitive than *Seba* in the diagnostic characters. The diversity in the 2 species, though moderate, does not warrant generic distinction because both species share the strong diagnostic differences from *Seba*. *Relictoseborgia* differs from *Seborgia* in the smaller gnathopod 2 with poorly lobate carpus, longer ramus of uropod 3 and slightly different shape of head at anteroventral angle.

Species. *Seborgia minima* Bousfield, 1970 [595F]; *S. schiecki* Ruffo, 1985a [662Q].

Habitat and distribution. Freshwater, epigean from Lake Tegano on Rennel Island in Bismarck Archipelago, and Andaman Island, interstitial near the sea, 2 species.

Relictoseborgia Karaman

Relictoseborgia Karaman, 1982a: 91.

Type species. *Seborgia relicta* Holsinger *in* Holsinger & Langley, 1980, original designation.

Diagnosis. Labium with discrete fleshy inner lobes. Palp of maxilla 1 2-articulate. Maxilla 2 composed only of one plate. Coxa 4 much the largest, with orthodox posterior lobe and small posterodorsal excavation. Gnathopod 1 weakly chelate, much larger than gnathopod 2 in both sexes; article 3 of gnathopod 2 short. Urosomites separate. Oostegites rectolinear, with 2-4 setae.

Descriptive differences from *Seborgia*. Body ordinary. Anteroventral cephalic sinus obsolescent, corner sharp and extended. Carpus of gnathopod 2 unlobed. Coxal gills with peduncles, 2-articulate. Ramus of uropod 3 longer than peduncle, simple.

Species. *Relictoseborgia relicta* (Holsinger *in* Holsinger & Langley, 1980) (Karaman, 1982a) [184].

Habitat and distribution. Freshwater, subterranean, Edwards Aquifer, Texas, USA, 1 species.

STEGOCEPHALIDAE Dana, 1855

Diagnosis. Body laterally compressed but from lateral view appearing stout and globular, coxae 1-4 forming lateral shield with deeply convex ventral margin, coxa 4 very large, coxae 2-3 narrowest and thinly rectangular, coxa 1 shortest, broad basally but strongly tapering, acuminate, but not covered by following coxae. Antennae very short, peduncle of antenna 1 very short, articles 2-3 scarcely developed, accessory flagellum 1-2 articulate. Mandible without molar and palp. Gnathopods feeble, simple. Article 2 of pereopod 5 hidden behind coxae, rectolinear.

See Amphilochidae, Lysianassidae, Stenothoidae and Stilipedidae.

Description. Body slick, rarely carinate. Head short, large area covered by coxa 1. Eyes absent or never conspicuous. Article 1 of primary flagellum on antenna 1 often elongate and heavily armed with aesthetascs or filaments. Mouthparts usually projecting as very broad conical bundle ('parasitic'); epistome often carinate. Labrum highly variable, elongate, broad, entire or incised. Mandible variable, of ordinary dimensions and toothed at narrow incisor or increasingly broadened, flattened, with broad crenellated or smooth incisor, laciniae mobiles present or absent in varying degrees. Outer lobes of labium usually separated by strong medial gape, inner lobes absent, mandibular lobes usually well developed. Maxilla 1 strong, inner plate large and well setose medially, outer plate with diverse apical spines and often medial armament largely setae or 'hairs', palp variable, large or small, 1-2 articulate. Maxilla 2 with large inner plate strongly setose medially, outer plate smaller or absent, often short and appressed to inner or elongate and attached in geniculate fashion to basolateral lobe of inner plate, apical spine-setae often hooked or hooded. Inner plate of maxilliped variable, usually broad and short, often excavate apically and with medial alae, outer plate very large, broad and mostly poorly armed, palp subdominant, 3-4 articulate, dactyl weak, article 2 occasionally with apicomedial process.

Coxa 1 much shorter than 2 but matching its ventral crescentic curve; coxa 4 strongly excavate, coxae 5-7 short and fitting mould of excavation on coxa 4, coxae 6-7 rarely vestigial (*Tetradeion*). Gnathopods generally with articles 3-7 not broader than article 2, article 3 occasionally elongate on gnathopod 2 but propodus not mitten shaped, article 4 short, rigid, with carpus attached eccentrically by flexible joint, propodus usually as long as or longer than carpus, narrow, tapering, usually lacking palm, carpus occasionally short and broad or diverse between pairs in same taxon, dactyls short, smooth, weakly ('simple') or strongly pectinate on inferior margins; gnathopods thus forming small pointed probes.

Pereopods 3-4 ordinary or rarely prehensile. Article 2 of pereopod 5 always rectolinear, that of pereopod 6 often rectolinear, weakly expanded or strongly expanded but almost never as strongly expanded as that on pereopod 7, expansion of 6 often of generic value but sometimes bridged by intermediate taxa; article 2 of pereopod 7 broad, posteroventrally lobate, lobe truncate, rounded or pointed, articles 3-7 of pereopods 5-7 together short, alike, occasionally reduced to 6 or 3 articles on pereopod 7. Coxal gills usually 2-7, oostegites narrow to medium.

Epimeron 1 usually rounded, epimera 2-3 rounded, quadrate, weakly toothed or epimeron 3 with strong midposterior tooth. Urosomites 2-3 coalesced or free. Uropods 1-3 usually similar, peduncles elongate, rami extending equally, peduncle of uropod 3 often longer than rami, outer occasionally 2-articulate, or rami vestigial or absent (*Tetradeion* and *Stegophippsiella*). Telson short relative to body but in context occasionally appearing elongate (longer than broad), often feebly short, entire, often pointed, or cleft and pointed, cleft never reaching base.

Variables. Coxal shield in *Parandaniexis* reduced sufficiently to confound identification, possibly mistaken as Amphilochidae, with coxa 1 very small (but not hidden) and coxa 4 altered to complex crescent and spike with loss of dominance.

Relationship. The loss of both palp and molar on the mandible is approached only in the Phliantidae, Eophliantidae, Temnophliantidae and Dexaminidae (Prophliantinae) but in those taxa the accessory flagellum is absent. The characteristic globular shape from side view distinguishes the family from most other families but the characteristic shape of coxae 1-4 is especially distinctive from globular lysianassids.

The close resemblance to lysianassids, although disjoined by the distinctive coxal shield of Stegocephalidae, is found in the frequent elongation of article 3 on gnathopod 2, the slick body, the short antennae, the resemblance of maxillae in setosity to cyphocarid-group genera and the small head. The absence of molar and palp on the mandible is an ultimate distinction though confounded by several aberrant lysianassids. Most stegocephalids would key to *Stephensenia* in Lysianassidae but that genus appears to be a fossorial amphipod quite distinct from the stegocephalids in its setosity and non-conformity of anterior coxae. Some stegocephalids like *Andaniotes* resemble some lysianassids like *Aristias* in the setosity of maxillae 1 to 2 but the stegocephalids have coxa 1 fully free and visible and coxae 2 to 3 are narrowed.

Some Stenothoidae lack a mandibular palp and all have a shield-like coxa 4 but coxa 1 is always very small and hidden by coxa 2, the accessory flagellum is vestigial or absent, uropod 3 is uniramous and the outer plate of the maxilliped is small.

The Amphilochidae have a very small coxa 1 partially hidden by following coxae but the mouthparts project in a quadrate bundle.

The Pseudamphilochidae have mandibular palps.

The loss of mandibular structure and the elytriform shape of the mandible help distinguish Stegocephalidae from Iphimediidae, many of which have conically grouped mouthparts, and the beginnings of a lateral shield, with acuminate coxa 1 but coxa 1 is broader in Stegocephalidae. Most Iphimediidae have narrow inner plates on maxilla 2 and one or both pairs of gnathopods of Iphimediidae lack the rigid plan of Stegocephalidae, being either subchelate, chelate, or flagellar. Most Iphimediidae seem to have a much longer article 2 of antenna 1 than do the Stegocephalidae.

There is much resemblance of Stegocephalidae to the Stilipedidae (= Astyridae), especially in the stilipedid rudiments of a coxal shield with coxa 1 broadened, the foliaceous maxillae but which, unlike Stegocephalidae have the palp of maxilla 1 and the outer plate of maxilla 2 but not the inner plate of maxilla 1 foliaceous; the similar maxilliped with enlarged outer plate, the frequently gaping lower lip lacking inner lobes, the probing gnathopods, frequently incised upper lip, and short peduncle of antenna 1. But Stilipedidae have elongate antennal flagella, elongate pereopods 5-7, mandibular palps, conspicuous heads, and often have molars. *Pseudandaniexis mixtus* (described as *Parandaniexis mixtus*) is removed to *Alexandrella* in Stilipedidae by Watling & Holman (1980).

No Pardaliscidae have the long shield formed of diverse coxae 1-4.

Most Stegocephalidae have strongly parasitic mouthparts and most have the globular body form of pelagic hyperiids but in fact most stegocephalids appear to inhabit benthic sessile invertebrates.

Taxonomy. The classification of genera remains cloudy especially in *Phippsiella*, *Stegocephalus*, *Stegocephalopsis*, *Stegocephaloides* and 2 anomalous taxa *Stegocephaloides camoti* and *Stegocephalopsis katalia*. A problem unknown to Stebbing (1906) and overlooked by Schellenberg (1925b, 1929b), Gurjanova (1951) and J.L. Barnard (1969c) is that the type species of *Stegocephalopsis*, *Cancer ampulla* Phipps, has a 1-articulate palp on maxilla 1 according to Bruggen (1909). Except for this problem it would be very easy to streamline the taxa by making the following synonyms: *Phippsiella* = *Stegocephalopsis* and *Stegocephalus* = *Stegocephaloides*. This would ignore the original premise of Schellenberg (1925b) in attributing importance to the acuteness of the posteroventral lobe on article 2 of pereopod 7 when *Phippsiella* and *Stegocephalopsis* were erected. Some other debatable attributes have since surfaced, such as the importance of hooked-non-hooked spines on the outer plate of maxilla 2 (implicating *Stegocephalopsis katalia* and *Phippsiella minima* both unhooked), or the absence of left lacinia mobilis (*Phippsiella nipoma*), or the giant sheath-based left lacinia mobilis (*Stegocephaloides katalia*), the series of stages between 4 and 3 palpar articles on the maxillipedal palp (vestigial on *S. katalia* and absent on *Stegocephaloides wagini* and *Stegocephalopsis pacifica*), the presence of article 2 on the outer ramus of uropod 3 (*Stegocephalopsis camoti*), the intermediate expansion of article 2 on pereopod 6 (*Stegocephalopsis katalia*), the degree of acuteness on the posteroventral lobe of article 2 on pereopod 7 (*Stegocephaloides camoti* being intermediate), the length of the accessory flagellum relative to the first flagellar article of the primary flagellum (too short in *Stegocephalus hancocki* for *Stegocephalus*) and varying problems about shortness and elongation of the peduncle of uropod 3 intragenerically (such as *Stegocephalopsis pacifica* too long for *Stegocephalopsis* and *Stegocephaloides attingens* too short for *Stegocephaloides*, and *Stegocephalus viscaina* too long for *Stegocephalus*). Many of these characters are unknown in several taxa so that our solution for the moment is shown in couplet 8 of Key 1 (*et seq.*) but obviously monographic work is required.

Key 1 to Genera of Stegocephalidae

1. Outer plate of maxilla 2 absent .... *Bathystegocephalus*

—— Outer plate of maxilla 2 present 2

2. Outer plate of maxilla 2 gaping, geniculate (attached to lateral process from base of inner plate) (Fig.123B) 3

—— Outer plate of maxilla 2 appressed to inner plate 11

3. Telson entire .... *Tetradeion*

—— Telson cleft 4

4. Rami of uropod 3 obsolescent or absent .... *Stegophippsiella*

—— Rami of uropod 3 well developed 5

5. Palp article 2 of maxilliped produced distomedially .... *Phippsia*

—— Palp article 2 of maxilliped unproduced 6

6. Labrum elongate, more than twice as long as broad, symmetrically incised .... (*Stegocephalopsis*, *Phippsiella*) *Stegocephalina*

—— Labrum ordinary, about as long as broad, asymmetrically incised 7

7. Palp of maxilla 1 2-articulate .... *Phippsiella*

—— Palp of maxilla 1 1-articulate 8

8. Outer ramus of uropod 3 2-articulate .... *Stegocephaloides camoti*

—— Outer ramus of uropod 3 1-articulate 9

9. Posteroventral lobe on article 2 of pereopod 7 rounded .... *Stegocephalopsis* (part) (and *S. katalia*)

—— Posteroventral lobe on article 2 of pereopod 7 sharp 10

10. Article 2 of pereopod 6 expanded .... *Stegocephalus*

—— Article 2 of pereopod 6 rectolinear .... *Stegocephaloides*

11. Palp of maxilla 1 2-articulate 12

—— Palp of maxilla 1 1-articulate 14

12. Pereopod 4 prehensile (subchelate) .... *Parandaniexis*

—— Pereopod 4 simple 13

13. Mandibular incisor toothed .... *Alexandrella* of Stilipedidae (= *Pseudandaniexis*)

—— Mandibular incisor smooth .... *Andaniexis*

14. Telson entire, [outer ramus of uropod 3 usually 2-articulate] 15

—— Telson cleft, [outer ramus of uropod 3 variable] 17

15. Article 1 of main flagellum on antenna 1 much longer than peduncle, article 5 of peduncle on antenna 2 much longer than article 4 .... *Parandania*

—— Article 1 of main flagellum on antenna 1 subequal to peduncle, article 5 of peduncle on antenna 2 subequal to or shorter than article 4 16

16. Dactyls of gnathopods with large teeth or pectinations, mandibular incisor toothed .... *Andaniella*

—— Dactyls of gnathopods with minute teeth or setules, mandibular incisor minutely crenulate .... *Andaniopsis*

17. Mandibular incisor toothed .... *Steleuthera*

—— Mandibular incisor minutely crenulate or smooth 18

18. Article 5 of antenna 2 very elongate .... *Euandania*

—— Article 5 of antenna 2 subequal to article 4 19

19. Palp of maxilliped with 3 articles, articles 1-2 assumed to be coalesced .... *Stegosoladidas*

—— Palp of maxilliped 4-articulate .... *Andaniotes* (catchall genus) and *Glorandaniotes*

Key 2 to Genera of Stegocephalidae

1. Mandibular incisor strongly toothed 2

—— Mandibular incisor smooth or weakly crenulate 9

2. Telson entire 3

—— Telson cleft 4

3. Pereopod 7 with 3 articles, outer plate of maxilla 2 geniculate .... *Tetradeion*

—— Pereopod 7 with 7 articles, outer plate of maxilla 2 not geniculate .... *Andaniella*

4. Rami of uropod 3 obsolescent .... *Stegophippsiella*

—— Rami of uropod 3 well developed 5

5. Outer plate of maxilla 2 absent, inner ramus of uropod 3 shortened .... *Bathystegocephalus*

—— Outer plate of maxilla 2 present, rami of uropod 3 subequal 6

6. Outer plate of maxilla 2 not geniculate .... *Steleuthera*

— Outer plate of maxilla 2 geniculate 7

7. Labrum extremely elongate .... *Stegocephalina*

—— Labrum weakly elongate or not 8

8. Palp of maxilla 1 2-articulate .... *Phippsiella*

—— Palp of maxilla 1 1-articulate .... couplet 8 of Key 1

9. Telson entire 10

—— Telson cleft 13

10. Palp of maxilla 1 2-articulate 11

—— Palp of maxilla 1 1-articulate 12

11. Pereopod 4 prehensile (subchelate) .... *Parandaniexis*

—— Pereopod 4 simple .... *Andaniexis*

12. Article 5 of antenna 2 greatly elongate .... *Parandania*

—— Article 5 of antenna 2 subequal to article 4 .... *Andaniopsis*

13. Outer plate of maxilla 2 geniculate, palp article 2 of maxilliped produced distomedially .... *Phippsia*

—— Outer plate of maxilla 2 not geniculate, palp article 2 of maxilliped simple 14

14. Article 5 of antenna 2 elongate .... *Euandania*

—— Article 5 of antenna 2 subequal to article 4 15

15. Palp of maxilliped 4-articulate .... *Glorandaniotes*, *Andaniotes*

—— Palp of maxilliped 3-articulate .... *Stegosoladidas*

Andaniella Sars

Figs 122B, 123H

Andaniella Sars, 1895: 210.

Type species. *Andaniella pectinata* Sars, 1883, monotypy.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 shorter than peduncle. Article 4 of peduncle on antenna 2 longer than article 5. Labrum ordinary, almost symmetrically incised. Mandibular incisor toothed. Labium ordinary, with 1 bidigitate distal finger. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 ordinary, spines without hooks. Inner plate of maxilliped scarcely reaching base of palp article 1, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods inferiorly toothed very strongly. Pereopods 3-4 simple. Article 2 of pereopod 6 unexpanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 2-articulate, peduncle longer than rami. Telson broader than long, entire, pointed.

Relationship. *Andaniella* is the basic member of a group with normal maxilla 2 and uncleft telson combined. It however is unique for its large teeth on the dactyls of the gnathopods. Most genera of the group have a 2-articulate outer ramus on uropod 3. Differing from *Steleuthera* in the uncleft telson.

See *Andaniexis*, *Andaniopsis*, *Parandania* and *Parandaniexis*.

Species. See Stephensen (1925a, 1935d, 1940b, 1944a); *A. integripes* Bellan-Santini & Ledoyer, 1986 [799+B]; *A. pectinata* (Sars, 1883, 1895) (Shoemaker, 1931b) (Gurjanova, 1951) [216 + B + I].

Habitat and distribution. Marine, Arctic and boreal North Atlantic, and Marion Island, among hydroids, bryozoans, ascidian (*Molgula conchilega*), 6-700 m, 2 species.

Andaniexis Stebbing

Figs 122F, 123A

Andania Boeck, 1871b: 128 [homonym, Lepidoptera] (*Andania abyssi* Boeck, 1871b, selected by Boeck, 1876). *Andaniexis* Stebbing, 1906: 94 (new name).

Type species. *Andania abyssi* Boeck, 1871b, selected by Boeck, 1876.

Diagnosis. Body smooth or carinate. Article 1 of flagellum on antenna 1 almost as long as peduncle. Article 4 of peduncle on antenna 2 much shorter article 5. Labrum very broad, symmetrically incised. Mandibular incisor broad and smooth. Labium ordinary, with 1 bidigitate distal finger. Maxilla 1 ordinary, palp 2-articulate. Outer plate of maxilla 2 ordinary, spines without hooks. Inner plate of maxilliped not reaching base of palp article 2, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple (with weak pectinations). Pereopods 3-4 simple. Article 2 of pereopod 6 unexpanded (or expanded moderately). Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 2-articulate, peduncle as long as rami. Telson as broad as long, entire, pointed.

Variables. Pleonites 1-4 carinate (*A. spinescens*); article 2 of pereopod 6 linear (type); weakly expanded (*A. australis*, *A. stylifer*, *A. subabyssi*); moderately expanded (*A. mimonectes*, *A. oculata*, *A. spongicola*).

Relationship. Differing from *Andaniella* in the smooth incisor; from *Andaniella* and *Andaniopsis* together in the 2-articulate palp of maxilla 1.

Species. See Gurjanova (1951); Shoemaker (1930a); Stephensen (1925a, 1933b, 1935d); *A. abyssi* (Boeck, 1871b) (Sars, 1895) [355 + B]; *A. australis* K.H. Barnard, 1932 (J.L. Barnard, ?1962d, 1964a) (Ledoyer, 1986) [835BA]; *A. mimonectes* Ruffo, 1975b (Bellan-Santini, 1984) [345BA]; *A. oculata* Birstein & Vinogradov, 1970 [231B]; ?*A. spinescens* (Alcock, 1894) [609A]; *A.*

spongicola Pirlot, 1933a [602B]; *A. stylifer* Birstein & Vinogradov, 1960 [528A]; *A. subabyssi* Birstein & Vinogradov, 1955, 1958 (Gurjanova, 1962) [322A]; *A. tridentata* Ledoyer, 1986 [618A].

Habitat and distribution. Marine, cold water cosmopolitan, pelagic or often on benthic corals and sponges, 190-6400 m, 9 species.

Andaniopsis Sars

Figs 122G, 123L

Andaniopsis Sars, 1895: 208.

Type species. *Andania nordlandica* Boeck, 1871b, monotypy.

Fig.122. Stegocephalidae and Pardaliscidae. A, *Parandaniexis mirabilis*; B, *Andaniella pectinata*; C, *Tetradeion crassum*; D, *Phippsia gibbosa*; E, *Stegocephalus inflatus*; F, *Andaniexis abyssi*; G, *Andaniopsis nordlandica*; H, *Stegocephalina ingolfi*; I, *Phippsiella minima*; J, *Stegocephaloides christianensis*; K, *Andaniotes islandica*.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 as long as peduncle. Article 4 of peduncle on antenna 2 scarcely longer than article 5. Labrum ordinary, asymmetrically incised. Mandibular incisor broad, weakly crenellated. Labium ordinary, each lobe with [?1 bidigitate distal finger]. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 ordinary, spines without hooks. Inner plate of maxilliped scarcely reaching base of palp article 2, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 unexpanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 2-articulate, peduncle scarcely longer than rami. Telson broader than long, entire, pointed.

Relationship. Differing from *Andaniella* in the poorly toothed incisor, the simple dactyls of the gnathopods, and the longer inner plate of the maxilliped.

Species. *Andaniopsis nordlandica* (Boeck, 1871b) (Sars, 1895) (Stephensen, 1935d) (Gurjanova, 1951) [238 + B]; species, J.L. Barnard, 1967a [309B].

Habitat and distribution. Marine, cold North

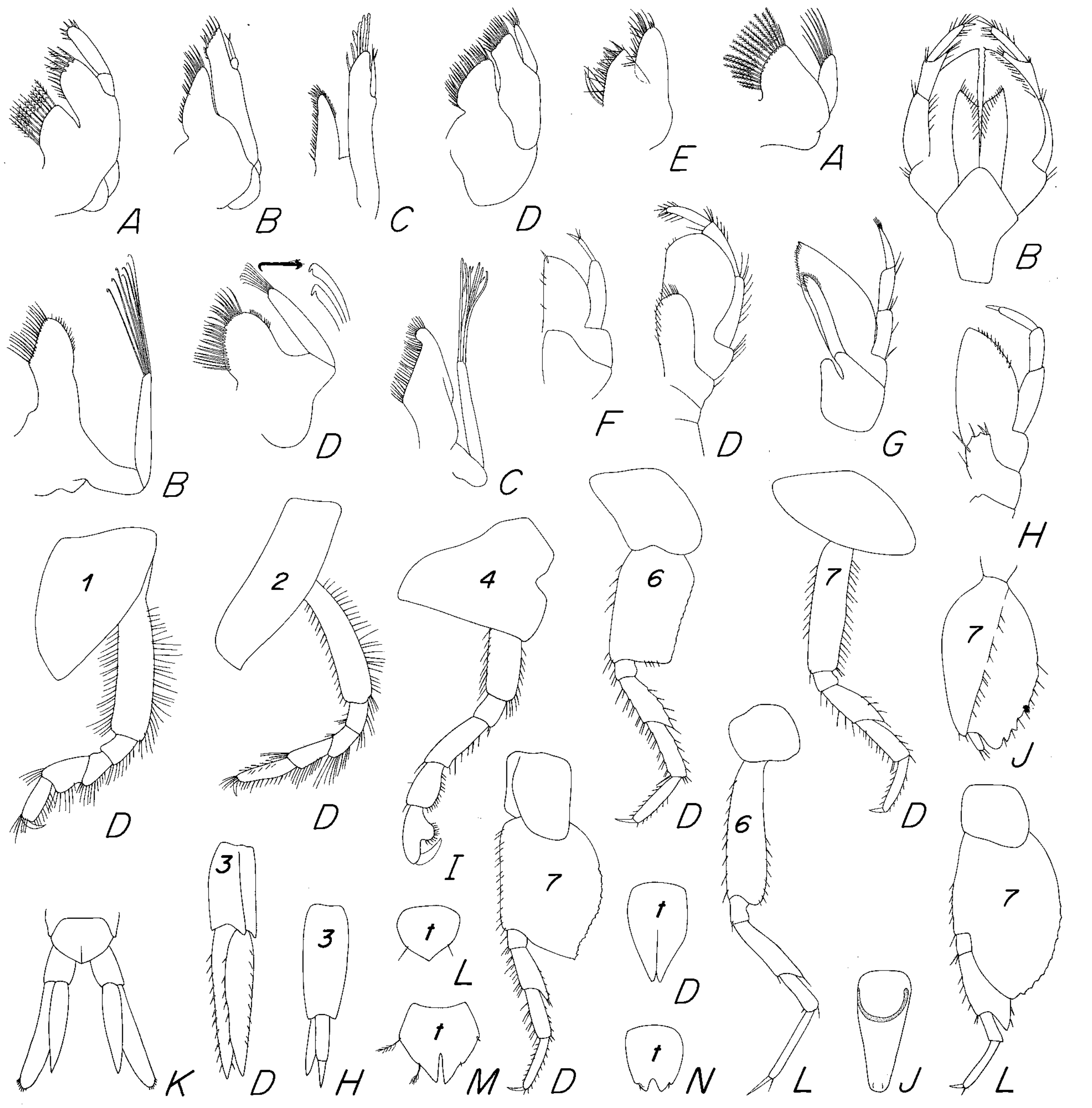


Fig.123. Stegocephalidae and Pardaliscidae. A, *Andaniexis abyssi*; B, *Phippsia gibbosa*; C, *Stegocephalina ingolfi*; D, *Stegocephalus inflatus*; E, *Pseudandaniexis mixtus*; F, *Andaniotes simplex*; G, *Stegophippsiella pacis*; H, *Andaniella pectinata*; I, *Parandaniexis mirabilis*; J, *Tetradeion crassum*; K, *Bathystegocephalus globosus*; L, *Andaniopsis nordlandica*; M, *Tosilus arroyo*; N, *Steleuthera maremboca*.

Atlantic, North Pacific (?), 49-1748 m, 2 species.

Andaniotes Stebbing

Figs 122K, 123F

Andaniotes Stebbing, 1897: 30.
Metandania Stephensen, 1925a: 136 (*Metandania islandica* Stephensen, 1925a, original designation).

Type species. *Anonyx corpulentus* Thomson, 1882, monotypy.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 longer or weakly shorter than peduncle. Article 4 of peduncle on antenna 2 scarcely longer than or subequal to article 5. Labrum very broad, entire or weakly incised. Mandibular incisor smooth. Labium with gaping extended lobes, without bidigitate distal fingers. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 ordinary, spines without hooks. Inner plate of maxilliped not reaching base of palp article 1, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 expanded or not. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 1 or 2 (type)-articulate, peduncle longer than rami. Telson as broad as long, cleft, pointed.

Variables. Urosomites free (type); or 2-3 coalesced (*A. wallaroo*); rami of uropod 3 in male minute (type); upper lip entire (*A. wallaroo*); palp of maxilla 1 reduced (*A. ingens*); article 2 of pereopod 6 rectolinear (*A. ingens*); weakly expanded (*A. linearis*, *A. wallaroo*).

Relationship. Differing from *Steleuthera* in the smooth incisor.
See *Euandania*, *Glorandaniotes* and *Stegosoladidas*.

Removal. *Andaniotes simplex* K.H. Barnard, 1930, to *Stegosoladidas*.

Species. See Chilton (1921d); Schellenberg (1931, 1955); *A. corpulentus* (Thomson, 1882) (= *A. abyssorum* Stebbing, 1888) (?= *A. islandica* Stephensen, 1925a) (Stebbing, 1897) (Hurley, 1955) (Watling & Holman, 1981) [426 + B + I]; *A. ingens* Chevreux, 1906a (Thurston, 1974a) [870 + B]; *A. linearis* K.H. Barnard, 1932 (Nicholls, 1938) (Watling & Holman, 1981) [870 + B]; *A. wallaroo* J.L. Barnard, 1972a [782].

Habitat and distribution. Marine, cold water, cosmopolitan, often in ascidians and sponges, 0-2012 m, 4 species.

Bathystegocephalus Schellenberg

Fig.123K

Bathystegocephalus Schellenberg, 1926c: 221.

Type species. *Stegocephalus globosus* Walker, 1909c, monotypy.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 scarcely shorter than peduncle. Article 4 of peduncle on antenna 2 shorter than article 5. Labrum ordinary, asymmetrically incised. Mandibular incisor toothed. Labium with gaping extended lobes each with 1 bidigitate distal finger. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 *absent*. Inner plate of maxilliped not reaching base of palp article 1, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 unexpanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 1-articulate, inner slightly shortened, peduncle shorter than rami. Telson broader than long, cleft.

Relationship. Characterised by the absence of the outer plate on maxilla 2; therefore difficult to relate either to normal or geniculate alternatives of maxilla 2. Otherwise closest to *Phippsiella* of the geniculate maxilla 2 group and *Steleuthera* of the group bearing normal maxilla 2.

Species. *Bathystegocephalus globosus* (Walker, 1909c) (Pirlot, 1933a) (Birstein & Vinogradov, 1964) [600B].

Habitat and distribution. Marine, Indian Ocean and Indonesia, bathypelagic, 100-457(?1371) m, 1 species.

Euandania Stebbing

Euandania Stebbing, 1899a: 206.

Type species. *Andania gigantea* Stebbing, 1883, original designation.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 longer than peduncle. Article 4 of peduncle on antenna 2 shorter than article 5. Labrum very broad, weakly but asymmetrically incised. Mandibular incisor smooth. Labium ordinary, with gaping extended lobes, without distal fingers. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 ordinary or asetose, spines without hooks. Inner plate of maxilliped reaching base of palp article 1, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 expanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 1-articulate, peduncle longer than rami. Telson as broad as long, cleft.

Additional character. Pleonite 6 shorter than peduncle of uropod 3 (versus *Andaniotes*).

Relationship. If restricted to the type species, this genus differs from *Andaniotes* (if it is also restricted to

A. corpulentus and *A. wallaroo*) in the elongate first flagellar article of antenna 1 and the elongate article 5 of antenna 2; differing from *Steleuthera* in the smooth incisor.

See *Parandania*.

Species. *Euandania gigantea* (Stebbing, 1883, 1888) (Birstein & Vinogradov, 1960, 1962b) (J.L. Barnard, 1961a) (Watling & Holman, 1981) [420BA]; *E. nonhiata* Andres, 1985 [871 + B].

Habitat and distribution. Marine, cold water cosmopolitan, (?0) 835-3430 m, 2 species.

Glorandaniotes Ledoyer

Glorandaniotes Ledoyer, 1986: 957.

Type species. *Glorandaniotes fissicaudata* Ledoyer, 1986, original designation.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 almost as long as peduncle. Article 4 of peduncle on antenna 2 as long as article 5. Labrum ordinary, asymmetrically and weakly incised. Mandibular incisor smooth. Labium ordinary, with gaping extended lobes, each with 1 small simple distal finger. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 ordinary, spines without hooks. Inner plate of maxilliped reaching base of palp article 1, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 expanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 2-articulate, peduncle not longer than rami. Telson scarcely longer than broad, cleft about 40%.

Relationship. We do not know how to distinguish this from *Andaniotes*.

Species. *Glorandaniotes fissicaudata* Ledoyer, 1986 [618A].

Habitat and distribution. Marine, south-east of Glorioses Islands, 3712 m, 1 species.

Parandania Stebbing

Parandania Stebbing, 1899a: 206.

Type species. *Andania boecki* Stebbing, 1888, original designation.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 longer than peduncle. Article 4 of peduncle on antenna 2 shorter than article 5. Labrum ordinary, asymmetrically and weakly incised. Mandibular incisor smooth. Labium ordinary, with gaping extended lobes, each with 1 small simple distal finger. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 ordinary, spines without hooks. Inner plate of maxilliped reaching base of palp article 2, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 unexpanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 1-articulate, peduncle longer than rami. Telson scarcely longer than broad, entire.

Variables. Outer ramus of uropod 3 with small article 2 (version of J.L. Barnard, 1961a).

Relationship. Differing from *Euandania* in the uncleft telson. Differing from *Andaniella* in the elongate article 5 of antenna 2 and the smooth incisor.

See *Parandaniexis*.

Species. *Parandania boecki* (Stebbing, 1888) (Birstein & Vinogradov, 1955, 1958, 1960, 1962b, 1963, 1964) (J.L. Barnard, 1961a, 1964d) (Gurjanova, 1962) (Thurston, 1976a) [420B].

Habitat and distribution. Marine, cold water cosmopolitan, mesopelagic or deeper, 300-2200 m (confirmed), usually 550-960m, 1 species.

Parandaniexis Schellenberg

Figs 122A, 123I

Parandaniexis Schellenberg, 1929b: 197.–Watling & Holman, 1980: 651.

Type species. *Parandaniexis mirabilis* Schellenberg, 1929b, monotypy.

Diagnosis. Body posterodorsally toothed. Article 1 of flagellum on antenna 1 longer than peduncle. Article 4 of peduncle on antenna 2 much shorter than article 5. Labrum very broad, scarcely incised. Mandibular incisor broad, smooth. Labium with gaping extended lobes, with 1 scarcely bidigitate distal finger. Maxilla 1 ordinary, palp 2-articulate. Outer plate of maxilla 2 ordinary, spines without hooks. Inner plate of maxilliped not reaching base of palp article 1, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopod 3 simple, 4 subchelate. Article 2 of pereopod 6 unexpanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 1-articulate, peduncle longer than rami. Telson longer than broad, entire.

Additional character. Coxa 1 small.

Relationship. Differing from *Andaniella*, a close ancestral form, and from all other stegocephalids in the prehensile pereopod 4 possibly used in polychaete predation; like *Parandania* it also differs from *Andaniella* in the elongate article 5 of antenna 2.

Species. *Parandaniexis dewitti* Watling & Holman, 1980 [834A]; *P. inermis* Ledoyer, 1986 [618A]; *P. mirabilis* Schellenberg, 1929b (J.L. Barnard, 1967a) (Andres, 1977) [423A].

Habitat and distribution. Marine, cosmopolitan, cold water, demersal, predacious on polychaetes, abyssal, 2740-5330 m, 3 species.

Phippsia Stebbing

Figs 122D, 123B

Aspidopleurus Sars, 1895: 203 [homonym, Pisces] (*Stegocephalus gibbosus* Sars, 1883, monotypy).
Phippsia Stebbing, 1906: 89 (new name).

Type species. *Stegocephalus gibbosus* Sars, 1883, monotypy.

Diagnosis. Body posterodorsally toothed on pleonite 3. Article 1 of flagellum on antenna 1 longer than peduncle or 'elongate'. Article 4 of peduncle on antenna 2 shorter than article 5. Labrum ordinary, symmetrically incised. Mandibular incisor crenellated. Labium ordinary, with bidigitate distal finger. Maxilla 1 ordinary, but palp short and 2-articulate. Outer plate of maxilla 2 gaping and geniculate, spines with hooks. Inner plate of maxilliped reaching base of palp article 2, palp 4- articulate, article 2 produced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 unexpanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 1-articulate, peduncle shorter than rami. Telson as broad as long, cleft.

Additional character. Coxa 4 extremely large.

Relationship. Like *Phippsiella* but palp article 2 of maxilliped distomedially produced.

Species. See Gurjanova (1951); Stephensen (1927a, 1935d, 1944a); *P. gibbosa* (Sars, 1883, 1895) [238B]; *P. romeri* Schellenberg, 1925b [220 + B].

Habitat and distribution. Marine, cold North Atlantic and Arctic, 190-1000 m, 2 species.

Phippsiella Schellenberg

Fig.122I

Phippsiella Schellenberg, 1925b: 200.

Type species. *Stegocephalus similis* Sars, 1895, monotypy.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 2 longer (male) or shorter (female) than peduncle. Article 4 of peduncle on antenna 2 scarcely longer than article 5. Labrum ordinary to elongate, asymmetrically or symmetrically incised. Mandibular incisor toothed. Labium ordinary, each lobe with 1 bidigitate or simple distal finger. Maxilla 1 ordinary, palp 2-articulate. Outer plate of maxilla 2 gaping and geniculate, spines usually with hooks. Inner plate of maxilliped variable in reaching base of palp article 2, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 expanded. Pereopod 7 with 7 articles, *article 2 lobe rounded below* (*versus Stegocephalus*). Uropod 3 biramous, outer ramus 1-articulate, peduncle subequal to or shorter than rami. Telson longer than broad, cleft.

Variables. Palp of maxilliped unknown (*P. kergueleni*), others 4-articulate; article 2 of pereopod 6 moderately expanded (*P. longicornis*, *P. abyssicola*, *P. minima*, *P. pajarella*, *P. nipoma*, *P. viscaina*), broadly expanded (*P. similis*, almost *P. nipoma*); labrum elongate (*P. minima*); left lacinia mobilis absent (*P. nipoma*).

Relationship. Juveniles of *Stegocephalus inflatus* look like species of *Phippsiella*, especially because palp of maxilla 1 is 2-articulate, with the articles later fusing in adulthood. *Phippsiella* is the basic genus of the group with geniculate outer plate on maxilla 2. It is probably closest to *Steleuthera* of the group with normal maxilla 2 but is obviously not directly descendent.

See *Bathystegocephalus*, *Phippsia*, *Stegocephalina*, *Stegocephalopsis*, *Stegocephalus*, *Stegophippsiella* and *Tetradeion*.

Species. See Gurjanova (1951); Stephensen (1925a, 1933b, 1935d); *P. abyssicola* Oldevig, 1959 [202A]; *P. kergueleni* Schellenberg, 1926c [851]; *P. longicornis* Gurjanova, 1962 [290A]; *P. minima* Stephensen, 1925a (not Shoemaker, 1931b) (Steele, 1967a) [216B]; *P. nipoma* J.L. Barnard, 1961a, 1962d (Kamenskaya, 1981a) [422BA]; *P. pajarella* J.L. Barnard, 1967a [309B]; *P. pseudophippsia* Bellan-Santini, 1984 [301B]; *P. rostrata* K.H. Barnard, 1932 [833B]; *P. similis* (Sars, 1895) (Gurjanova, 1951) [216B + I]; *P. viscaina* J.L. Barnard, 1967a [309B].

Habitat and distribution. Marine, cosmopolitan cold water, often among *Lophohelia*, 18-3580 m, 10 species.

Stegocephalina Stephensen

Figs 122H, 123C

Stegocephalina Stephensen, 1925a: 134.

Type species. *Stegocephalina ingolfi* Stephensen, 1925a, monotypy.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 longer than peduncle. Article 4 of peduncle on antenna 2 longer than article 5. Labrum elongate, symmetrically incised. Mandibular incisor toothed. Labium ordinary, with gaping extended lobes, with 2-bidigitate distal fingers. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 gaping and geniculate, spines without hooks. Inner plate of maxilliped reaching base of palp article 3, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 expanded. Pereopod 7 with 7 articles, *posteroventral lobe of article 2 rounded below (versus Stegocephalus).* Uropod 3 biramous, outer ramus 1-articulate, peduncle shorter than rami. Telson longer than broad, cleft.

Additional character. Maxilla 1 and lower lip also elongate.

Relationship. Differing from *Stegocephalus* primarily in the greatly elongate upper lip; secondarily differing in the simple setae on the outer plate of maxilla 2 and the multidigitation of the apical lobes on the lower lip.

Like *Phippsiella* but palp of maxilla 1 1-articulate.

Species. *Stegocephalina ingolfi* Stephensen, 1925a [209B].

Habitat and distribution. Marine, south-west of Iceland, 1505 m, 1 species.

Stegocephaloides Sars

Fig.122J

Stegocephaloides Sars, 1895: 201.--Karaman, 1974b: 55.

Type species. *Stegocephaloides christianiensis* Boeck, 1871b, original designation.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 as long or shorter than peduncle. Article 4 of peduncle on antenna 2 shorter than article 5. Labrum ordinary, asymmetrically lobed. Mandibular incisor toothed (often weakly). Labium ordinary, with generally simple distal fingers. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 gaping and geniculate, spines with hooks. Inner plate of maxilliped reaching apex of palp article 1, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 rectolinear. Pereopod 7 with 7 articles, *article 2 lobe pointed below (versus Phippsiella and Stegocephalopsis).* Uropod 3 biramous, outer ramus 1-articulate, peduncle as long as rami. Telson longer than broad, cleft.

Additional character. Accessory flagellum usually much shorter than article 1 of primary flagellum.

Variables. Peduncle of uropod 3 platelike (*S. camoti*); outer ramus of uropod 3 2-articulate (*S. camoti*); peduncle of uropod 3 short (*S. attingens*).

Relationship. Like *Stegocephalus* in the pointed posteroventral lobe on article 2 of pereopod 7 but article 2 of pereopod 6 rectolinear (not expanded), and the peduncle of uropod 3 elongate in most of the species.

Removals. *Stegocephaloides katalia* J.L. Barnard, 1962d, and *S. vanhoffeni* Schellenberg, 1926a, to *Stegocephalopsis.*

Species. See Bonnier (1896); Gurjanova (1951); Stephensen (1925a, 1935d, 1940b); *S. attingens* K.H. Barnard, 1916 (J.L. Barnard, 1961a) [740B]; *S. auratus* (Sars, 1883, 1895) (Gurjanova, 1951) [240B]; ?*S. australis* K.H. Barnard, 1916 (Griffiths, 1974c, 1975) (Ledoyer, 1986) [701B]; ?*S. camoti* J.L. Barnard, 1967a [309B]; *S. christianiensis* (Boeck, 1871b) (Sars, 1895) (Chevreux, 1911d) (Chevreux & Fage, 1925) (J.L. Barnard, 1964a) (Karaman, 1974b) (Lincoln, 1979a) [355 + B]; *S. wagini* (Gurjanova, 1936b, 1951) [220B].

Habitat and distribution. Marine, Atlantic Arctic-boreal, probably to South Africa, doubtful to east Pacific, 40-1938 m, 6 species (3 doubtful).

Stegocephalopsis Schellenberg

Stegocephalopsis Schellenberg, 1925b: 200.

Type species. *Cancer ampulla* Phipps, 1774, monotypy.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 2 longer (male) or shorter (female) than peduncle. Article 4 of peduncle on antenna 2 scarcely longer than article 5. Labrum ordinary to elongate, asymmetrically or symmetrically incised. Mandibular incisor toothed. Labium ordinary, each lobe with 1 bidigitate or simple distal finger. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 gaping and geniculate, spines usually with hooks. Inner plate of maxilliped variable in reaching base of palp article 2, palp 3-4 articulate (articles 1-2 occasionally coalesced), article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 rectolinear. Pereopod 7 with 7 articles, *article 2 lobe rounded below (versus Stegocephalus).* Uropod 3 biramous, outer ramus 1-articulate, peduncle subequal to rami. Telson longer than broad, cleft.

Variables. Palp of maxilliped 3-articulate (*S. pacifica*), article 4 vestigial (*S. katalia*); left lacinia mobilis huge and basally sheathed (*S. katalia*); article 2 of pereopod 6 slightly expanded (*S. katalia*); peduncle of uropod 3 elongate (*S. katalia*, *S. pacifica*); spines on outer plate of maxilla 2 simple (*S. katalia*).

Relationship. Differing from *Stegocephalus* and *Stegocephaloides* in the rounded posteroventral lobe on article 2 of pereopod 7 and from *Phippsiella* in the 1-articulate palp on maxilla 1, the rectolinear article 2 of pereopod 6, the short peduncle of uropod 3 and possibly in the hip-shaped epimeron 3, a factor needing further inquiry.

Removal. *Stegocephalopsis wagini* Gurjanova, 1936b, to *Stegocephaloides*.

Species. See Gurjanova (1951); Shoemaker (1955a); Stephensen (1925a, 1933b, 1935d, 1944a); *S. ampulla* (Phipps, 1774) (Bruggen, 1909) (Gurjanova, 1951, 1962) [200 + B]; ?*S. katalia* (J.L. Barnard, 1962d) [416A]; *S. latus* (Haswell, 1879a, 1885b) [783]; ?*S. pacifica* (Bulycheva, 1952) (Gurjanova, 1962) [391]; ?*S. vanhoffeni* (Schellenberg, 1926a) (K.H. Barnard, 1930) [870B]; ?*S. vegae* Oldevig, 1959) [287].

Habitat and distribution. Marine, Arctic, 18-672 m, but other doubtful species occurring in Japan, Antarctica, Africa and Australia, 6 species (5 doubtful).

Stegocephalus Krøyer

Figs 122E, 123D

Stegocephalus Krøyer, 1842: 150.

Type species. *Stegocephalus inflatus* Krøyer, 1842, monotypy.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 longer or shorter (type) than peduncle. Article 4 of peduncle on antenna 2 shorter than article 5. Labrum ordinary, asymmetrically lobed. Mandibular incisor toothed (often weakly). Labium ordinary, with several bidigitate distal fingers. Maxilla 1 ordinary, palp 1-articulate. Outer plate of maxilla 2 gaping and geniculate, spines with hooks. Inner plate of maxilliped reaching apex of palp article 1, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 expanded or intermediate. Pereopod 7 with 7 articles, *article 2 lobe pointed below (versus Phippsiella)*. Uropod 3 biramous, outer ramus 1-articulate, peduncle shorter than rami. Telson longer than broad, cleft.

Variable. Inner ramus of uropod 3 shortened (*S. hancocki*).

Relationship. Like *Phippsiella* but palp of maxilla 1 1-articulate; juveniles closely resembling *Phippsiella* but palp of maxilla 1 becoming fused in adult (see Steele, 1967a).

See *Stegocephalina*, *Stegocephaloides* and *Stegocephalopsis*.

Removal. *Stegocephalus latus* Haswell, 1879a, to *Stegocephalopsis*.

Species. See Gurjanova (1951, 1962); Shoemaker (1955a); Stephensen (1925a, 1933b, 1935d, 1940b, 1944a); *S. hancocki* Hurley, 1956 (Gurjanova, 1962) [310B]; *S. inflatus* Krøyer, 1842 (Sars, 1895) (= *Phippsiella minima* identification of Shoemaker, 1931a, = juvenile) (Steele, 1967a) [200 + B].

Habitat and distribution. Marine, cold water Arctic-boreal, 4-2220 m, 2 species.

Stegophippsiella Bellan-Santini & Ledoyer

Figs 103L, 123G

Stegophippsiella Bellan-Santini & Ledoyer, 1974: 694.

Type species. *Stegophippsiella pacis* Bellan-Santini & Ledoyer, 1974, original designation.

Diagnosis. Body toothed posterodorsally only on pleonite 3. Article 1 of flagellum on antenna 1 scarcely shorter than peduncle. Article 4 of peduncle on antenna 2 longer than article 5. Labrum elongate, asymmetrically incised. Mandibular incisor toothed. Labium ordinary, with gaping extended lobes, each with 1 bidigitate distal finger. Maxilla 1 ordinary, palp 1-articulate, slightly shortened. Outer plate of maxilla 2 gaping and geniculate, spines with hooks. Inner plate of maxilliped reaching base of palp article 2, article 2 unproduced, palp ?4-articulate, article 4 if present spine-like. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 expanded. Pereopod 7 with 7 articles. Uropod 3 non-ramous. Telson scarcely longer than broad, cleft.

Additional character. Uropod 3 peduncle with apical notches marking obsolescent rami.

Relationship. Like *Phippsiella* and others of its group but rami of uropod 3 obsolescent or absent.

Species. *Stegophippsiella pacis* Bellan-Santini & Ledoyer, 1974 [851].

Habitat and distribution. Marine, Kerguelen Islands, 1-50 m, 1 species.

Stegosoladidus Karaman & Barnard

Stegosoladidas Karaman & Barnard, 1987: 869.

Type species. *Andaniotes simplex* K.H. Barnard, 1930, original designation.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 [?longer than peduncle]. Article 4 of peduncle on antenna 2 [?longer than article 5]. Labrum [?ordinary, elongate, very broad, asymmetrically incised]. Mandibular incisor smooth. Labium very short, with gaping extended lobes, with [?1 or 2 bidigitate distal fingers]. Maxilla 1 ordinary, palp 1-articulate (slender relative to *Andaniotes corpulentus*). Outer plate of maxilla 2 ordinary, spines without hooks. Inner plate of maxilliped not reaching base of palp article 1, palp 3-articulate (articles 1-2 coalesced), article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 expanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus [?2-articulate, peduncle ?longer than rami]. Telson [?as broad as long], incised.

Relationship. Like *Andaniotes* but plates of maxilliped very short, palp with only 3 articles, apparently articles 1-2 of primordial palp fused (or article 4 lost and article 1 elongate).

Species. *Stegosoladidus simplex* (K.H. Barnard, 1930) [779].

Habitat and distribution. Marine, New Zealand, Three Kings Islands, 183 m, 1 species.

Steleuthera J.L. Barnard

Fig.123N

Steleuthera J.L. Barnard, 1964a: 15.

Type species. *Steleuthera maremboca* J.L. Barnard, 1964a, original designation.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 longer than peduncle. Article 4 of peduncle on antenna 2 shorter than article 5. Labrum ordinary, asymmetrically incised. Mandibular incisor toothed. Labium [?ordinary, lobes with ?1 bidigitate distal finger]. Maxilla 1 ordinary, palp short, 1-articulate. Outer plate of maxilla 2 ordinary, spines without hooks. Inner plate of maxilliped not reaching base of palp article 2, palp 4-articulate, article 2 unproduced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 unexpanded. Pereopod 7 with 7 articles. Uropod 3 biramous, outer ramus 1-articulate, peduncle, peduncle shorter than rami. Telson as broad as long, scarcely cleft.

Additional character. Accessory flagellum 2-articulate.

Relationship. The basic member of a group with appressed (normal) plates of maxilla 2, cleft telson and toothed incisor.

See *Andaniella*, *Andaniotes*, *Bathystegocephalus*, *Euandania* and *Phippsiella*.

Species. *Steleuthera maremboca* J.L. Barnard, 1964a [502A].

Habitat and distribution. Marine, off Peru, abyssal, 6324-6328 m, 1 species.

Tetradeion Stebbing

Figs 122C, 123J

Tetradeion Stebbing, 1899a: 207.

Type species. *Cyproidea crassa* Chilton, 1883, original designation.

Diagnosis. Body smooth. Article 1 of flagellum on antenna 1 shorter than peduncle. Article 4 of peduncle on antenna 2 shorter than article 5. Labrum elongate, asymmetrically incised. Mandibular incisor toothed. Labium ordinary, with gaping extended lobes, with multidigitate distal fingers. Maxilla 1 ordinary, palp 2-articulate. Outer plate of maxilla 2 gaping and geniculate, spines with hooks. Inner plate of maxilliped exceeding base of palp article 2, palp 4-articulate, article 2 produced. Dactyls of gnathopods simple. Pereopods 3-4 simple. Article 2 of pereopod 6 unexpanded. Pereopod 7 with 3 articles. Uropod 3 biramous, outer ramus 2-articulate (or with nail), peduncle longer than rami. Telson longer than broad, entire.

Additional characters. Article 3 of antenna 2 very elongate, antenna 2 geniculate between articles 3 and 4; inner ramus of uropod 3 much shorter than outer; coxae 6-7 covered by 5 and 4; article 2 of antenna 1 crested and produced.

Relationship. Like *Phippsiella* and others of its group but telson elongate and uncleft and pereopod 7 reduced to 3 articles.

Species. *Tetradeion crassum* (Chilton, 1883, 1924b) (Hurley, 1955) (J.L. Barnard, 1972b) [775].

Habitat and distribution. Marine, New Zealand, often off *Elzerina blainvillei*, 0-3 m, 1 species.

STENOTHOIDAE Boeck, 1871b

Diagnosis. Accessory flagellum 0 to 2-articulate; mandibular molar evanescent; outer plates of maxillipeds vestigial; coxa 1 very small and partially covered by following coxae; coxa 4 enlarged, shield-like, not posterodorsally excavate; article 2 of pereopod 3 rectolinear; uropod 3 uniramous; telson entire.

See Amphilochidae, Anamixidae, Cressidae, Leucothoidae, Pagetinidae and Phliantidae.

Description. Rostrum inconspicuous; body smooth or carinate, very compressed laterally, generally shiny; labrum incised; mandibular palp feeble, 0 to 3-articulate; labium usually with inner lobes amalgamated, outer lobes with blunt extremities; inner plate of maxilla 1 feeble, usually naked, palp variable; maxilla 2 small, stout, poorly setose, inner plate often unproduced; gnathopod 1 usually feeble, variable, gnathopod 2 usually enlarged, subchelate, occasionally feeble; most of pereopod 5 usually hidden by coxae; epimera plain, usually of poor taxonomic value; uropod 3 with one ramus, ramus usually 2-articulate; subgroup thaumatelsonins (diverse and variable) often with telson hugely enlarged and fleshy, urosomites often variously fused together, one or more body segments often with large projection or unusually elongate.

Relationship. The Cressidae are very close but have the telson fused with pleonite 6 and article 2 of pereopod 5 expanded.

The Amphilochidae resemble stenothoids but uropod 3 is biramous and the outer lobes of the maxillipeds are well developed.

Taxonomy. The genera are artificially separated on the basis of the 1 to 2-articulate palp of maxilla 1, the 0 to 3-articulate condition of the mandibular palp, occasionally the presence or absence of accessory flagellum (which is often badly observed), and the breadth of article 2 on pereopods 6 to 7 (which is relatively workable but occasionally transformational species and genera have intermediate degrees of expansion which cause minor confusion). These are very poor characters because fusion or loss of articles is undoubtedly polyphyletic. Virtually no attention has been paid to gnathopods and other possible characters although we have isolated a few new genera herein where separation is fairly clear. Because many species are poorly described, the stenothoids await a monographer who can give them synoptic treatment.

Key to Genera of Stenothoidae

1. Article 2 of pereopod 7 rectolinear 2

—— Article 2 of pereopod 7 expanded 21

2. Telson thickened and fleshy 3

—— Telson flat and laminar 11

3. Gnathopod 2 chelate 4

—— Gnathopod 2 subchelate or simple 5

4. Gnathopod 1 chelate .... *Raumahara*

—— Gnathopod 1 subchelate or simple .... *Prothaumatelson*

5. Mandibular palp 3-articulate 6

—— Mandibular palp 0 to 1-articulate 7

6. Pleonite 3 with dorsal process, article 1 of antenna 1 nasiform .... *Antatelson*

—— Pleonite 3 and antenna 1 smooth .... *Thaumatelson*

7. Uropod 3 reduced, inner ramus of uropods 1-2 shortened .... *Chucullba*

—— Uropods 1-3 ordinary 8

8. Antenna 1 not nasiform, article 2 of pereopods 5-7 not linear .... *Goratelson*

—— Antenna 1 nasiform, article 2 of pereopods 5-7 rectolinear 9

9. Gnathopods 1-2 alike .... *Parathaumatelson*

—— Gnathopods 1-2 dissimilar 10

10. Telson hugely elevated dorsally, pleonites 5-6 fused, pleonite 4 weakly extended posterodorsally .... *Ausatelson*

—— Telson fleshy but flat, pleonites 4-6 free, pleonite 4 strongly extended posterodorsally .... *Pseudothaumatelson*

11 .Article 2 of pereopods 5-7 weakly expanded, not fully rectolinear .... *Goratelson*

—— Article 2 of pereopods 5-7 fully rectolinear 12

12. Pleonite 4 with dorsal process 13

—— Pleonite 4 lacking dorsal process 17

13. Pleonites 5-6 coalesced .... *Parathaumatelson*

—— Pleonites 5-6 free 14

14. Gnathopods chelate .... *Raumahara*

—— Gnathopods subchelate or simple 15

15. Telson fleshy .... *Pseudothaumatelson*

—— Telson flat and laminar 16

16. Mandibular palp 1-articulate, inner plate of maxilla 1 2-articulate, inner plates of maxilliped fused together .... *Zaikometopa*

—— Mandibular palp 2-3 articulate, inner plate of maxilla 1 1-articulate, inner plates of maxillipeds separated .... *Hardametopa*

17. Palp of maxilla 1 2-articulate .... *Probolisca*

—— Palp of maxilla 1 1-articulate 18

18. Mandibular palp absent .... *Parametopella*

—— Mandibular palp present 19

19. Mandibular palp 2 to 3-articulate .... *Metopella*

—— Mandibular palp 1-articulate 20

20. Inner plates of maxillipeds partly fused, gnathopod 1 subchelate, carpus slightly elongate, unlobed .... *Metopelloides*

—— Inner plates of maxillipeds fully separated, gnathopod 1 simple, carpus short, lobed .... *Vonimetopa*

21. Article 2 of pereopod 6 not expanded or expanded less than on pereopod 7 22

—— Article 2 of pereopod 6 expanded as widely as on pereopod 7 26

22. Article 2 of pereopods 5-7 evenly but weakly expanded .... *Goratelson*

—— Article 2 of pereopods 5-7 diversely expanded 23

23. Pleonite 3 with dorsal process .... *Mesoproboloides*

—— Pleonite 3 smooth 24

24. Mandibular palp 0 to 1-articulate .... *Stenothoides*

—— Mandibular palp 2 to 3-articulate 25

25. Article 2 of pereopod 7 tapering, basally expanded .... *Mesometopa*

—— Article 2 of pereopod 7 evenly expanded .... *Mesoproboloides excavata, Metopella*

26. Palp of maxilla 1 1-articulate 27

—— Palp of maxilla 1 2-articulate 30

27. Mandibular palp absent 28

—— Mandibular palp present 29

28. Article 5 of gnathopod 1 not elongate, gnathopod 2 not enlarged .... *Parametopa*

—— Article 5 of gnathopod 1 elongate, gnathopod 2 enlarged .... *Wallametopa*

29. Mandibular palp 2 to 3-articulate .... *Metopa*

—— Mandibular palp 1-articulate .... *Stenula*

30. Mandibular palp absent 31

—— Mandibular palp present 32

31. Antenna 2 as long as antenna 1, coxa 2 bevelled anteroventrally .... *Stenothoe*

—— Antenna 2 half as long as antenna 1, coxa 2 subquadrate and protrusive anteroventrally .... *Knysmetopa*

32. Article 2 of pereopod 5 with small posteroventral lobe .... *Torometopa*

—— Article 2 of pereopod 5 evenly linear 33

33. Mandibular palp 1-articulate .... *Prostenothoe*

—— Mandibular palp 2 to 3-articulate 34

34. Accessory flagellum 2-articulate .... *Metopoides*

—— Accessory flagellum 0 to 1-articulate 35

35. Carpus of gnathopod 1 relatively short and lobate, propodus elongate and expanded .... *Aurometopa*

—— Carpus of gnathopod 1 relatively long, not lobate, propodus short and barely expanded .... *Proboloides*

Antatelson J.L. Barnard

Figs 124B, 126H

Antatelson J.L. Barnard, 1972a: 312.

Type species. *Thaumatelson walkeri* Chilton, 1912d, original designation.

Diagnosis. Antenna 1 bearing nasiform process on article 1. Accessory flagellum absent. Palp of mandible 3-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, scarcely different from each other in size and shape, gnathopod 1, palm scarcely oblique and shorter than posterior margin of propodus; article 4 incipiently chelate; article 5 short, weakly lobed; article 6 expanded, rectangular.

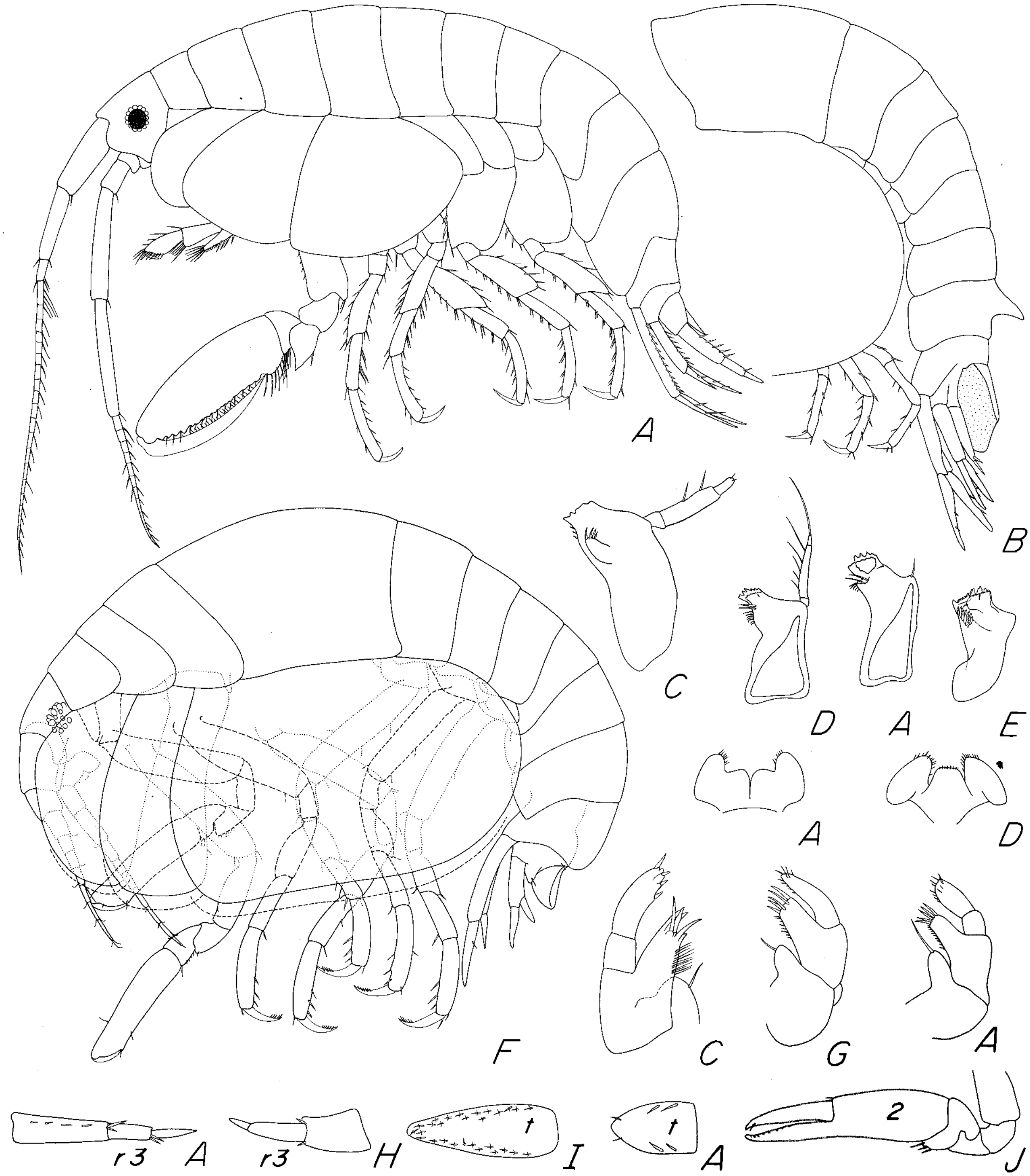


Fig.124. Stenothoidae. A, *Stenothoe marina*; B, *Antatelson walkeri*; C, *Thaumatelson herdmani*; D, *Proboloides gregarus*; E, *Parathaumatelson nasicum*; F, *Chucullba warea*; G, *Metopa alderi*; H, *Prothaumatelson nasutum*; I, *Raumahara rongo*; J, *Raumahara carinatum*.

Gnathopod 2, palm transverse, articles 4-5 short, 5 lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 elongate and tumid. Pleonites 4-6 coalesced, pleonite 3 with erect dorsal process. Telson huge, vertically elevated and laterally compressed, fleshy, lateral surface area equal to lateral area of urosome.

Variables. Rostrum huge (*A. rostratum*); palm of gnathopod 2 subtransverse (*A. antennatum*), oblique (*A. rostratum*); pleonite 3 lacking dorsal process (*A. antennatum*).

Relationship. See *Ausatelson*.

Species. *Antatelson antennatum* Bellan-Santini & Ledoyer, 1974 [851]; *A. cultricauda* (K.H. Barnard, 1932) [833]; *A. rostratum* Bellan-Santini & Ledoyer, 1974 [851]; *A. walkeri* (Chilton, 1912d) (Schellenberg, 1931) (Thurston, 1974a,b) [880].

Habitat and distribution. Marine, Antarctic, austral, 20-200 m, 4 species.

Aurometopa Barnard & Karaman

Aurometopa Barnard & Karaman, 1987: 869.

Type species. *Metopoides aurorae* Nicholls, 1938, original designation.

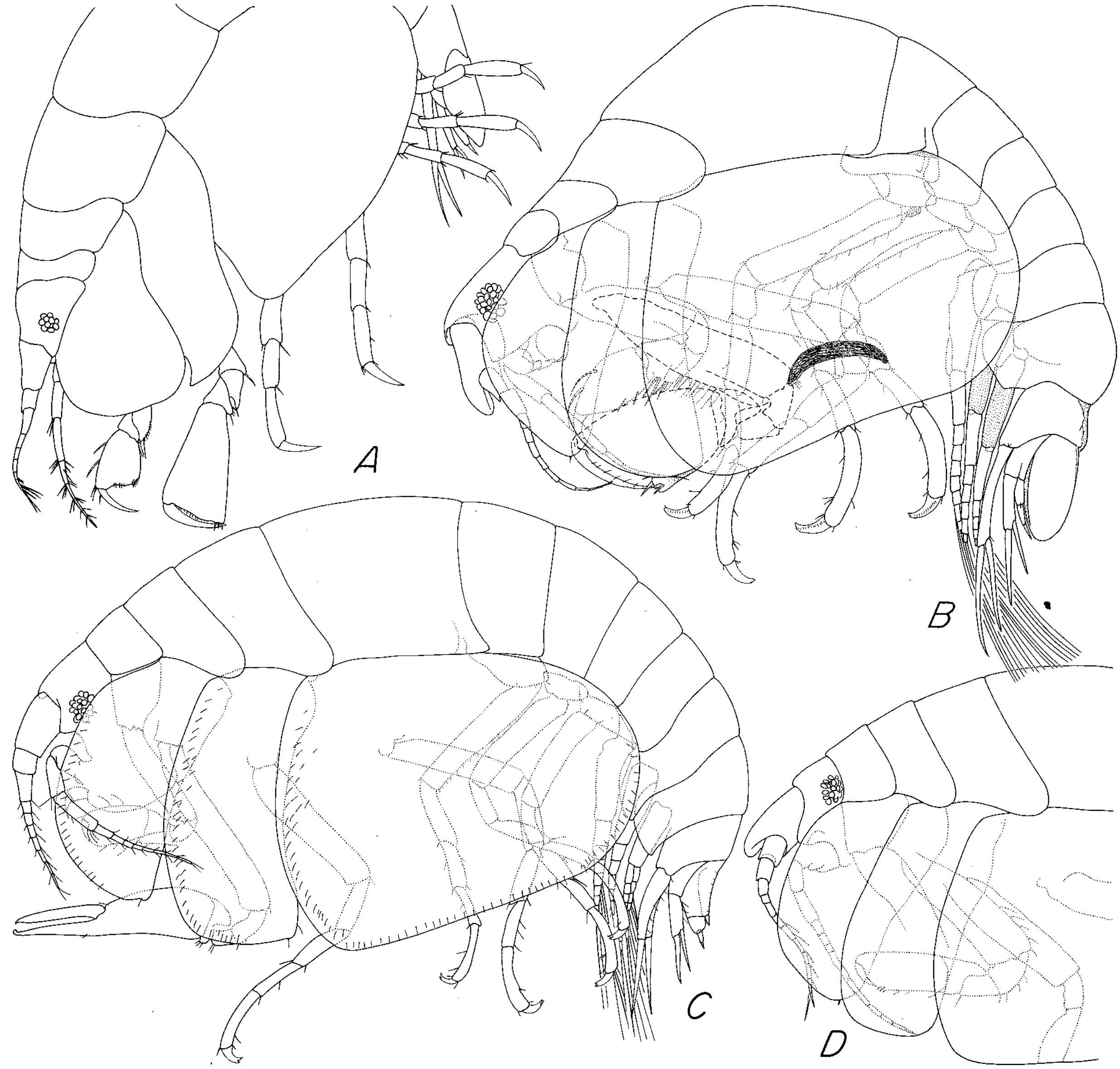


Fig.125. Stenothoidae. A, *Thaumatelson herdmani*; B, *Ausatelson kolle*; C, *Raumahara rongo*; D, *Parathaumatelson nasicum*.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum [not discerned]. Palp of mandible 3-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, scarcely different from each other in shape, gnathopod 1 small, palm oblique and shorter than posterior margin of propodus; article 4 not incipiently chelate; article 5 short, lobed; article 6 expanded. Gnathopod 2 enlarged, palm strongly oblique, article 5 short, lobed. Pereopod 5 with rectolinear article 2, pereopod 7 with expanded lobate article 2; pereopod 6 with intermediate article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not weakly extended posterodorsally. Telson ordinary, flat.

Relationship. Differing from *Metopoides* and *Proboloides* in the relatively short and weakly lobate carpus of gnathopod 1 with unexpanded elongate propodus. From *Torometopa* in the perfectly rectolinear article 2 of pereopod 5.

Aurometopa has article 2 of pereopod 6 differing from pereopod 7 unlike the other genera mentioned.

Species. *Aurometopa aurorae* (Nicholls, 1938) (J.L. Barnard, 1972b) [850].

Habitat and distribution. Marine, Macquarie Island, 0 m, 1 species.

Ausatelson J.L. Barnard

Fig.125B

Ausatelson J.L. Barnard, 1972a: 312.

Type species. *Ausatelson ule* J.L. Barnard, 1972a,

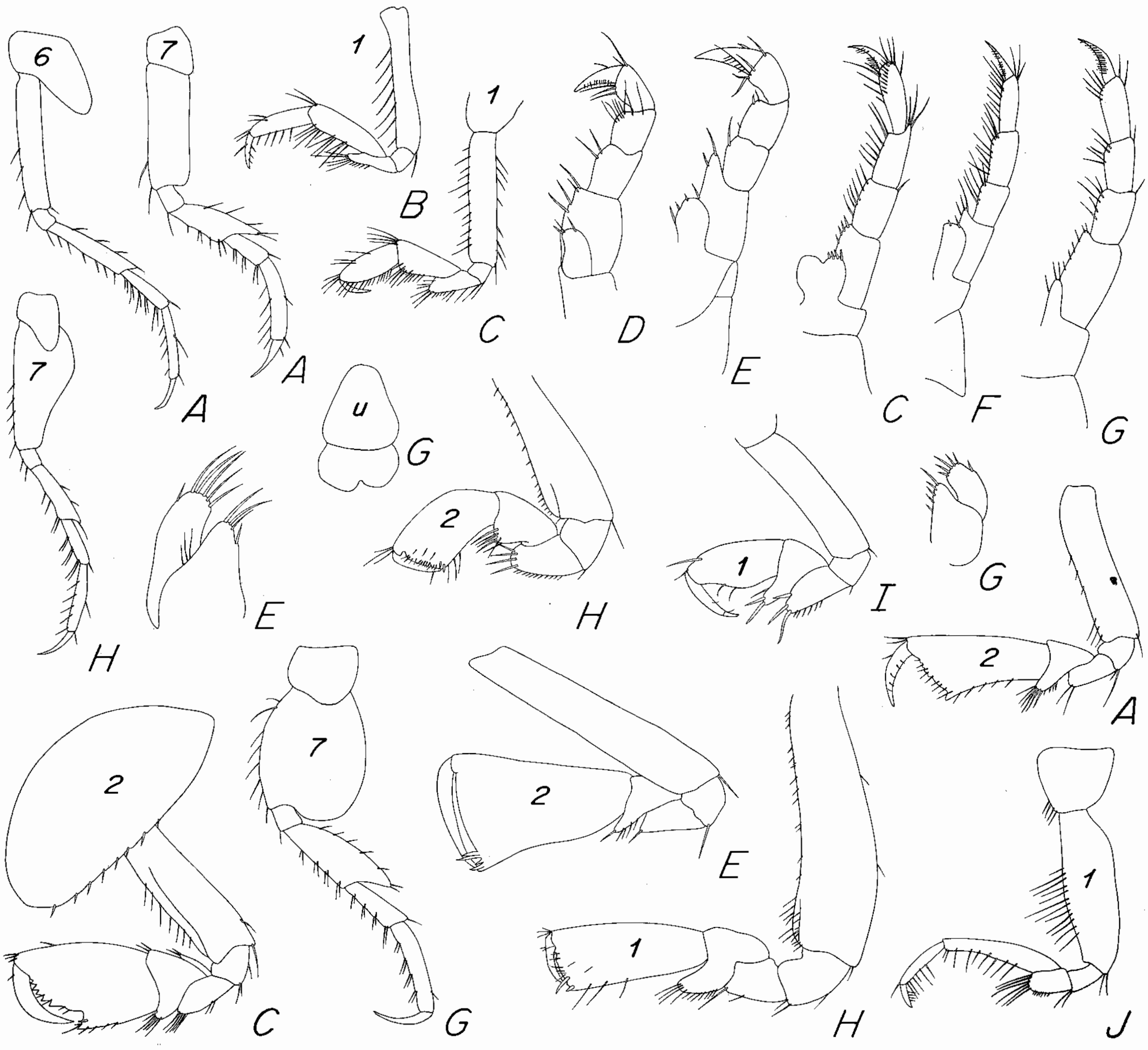


Fig.126. Stenothoidae. A, *Metopella longimana*; B, *Metopa pusilla*; C, *Metopa alderi*; D, *Prothaumatelson hermani*; E, *Thaumatelson herdmani*; F, *Proboloides gregarius*; G, *Stenothoe marina*; H, *Antatelson walkeri*; I, *Raumahara carinatum*; J, *Metopa robusta*.

original designation.

Diagnosis. Antenna 1 bearing nasiform process on article 1. Accessory flagellum absent. Palp of mandible 1-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 obsolescent. Inner plates of maxillipeds partially fused together. Gnathopod 1 small, almost simple, palm oblique and longer than posterior margin of propodus; article 4 not incipiently chelate; article 5 short, unlobed; article 6 barely expanded. Gnathopod 2 enlarged, palm weakly oblique: article 4 short, lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 highly elongate and tumid. Pleonites 5-6 coalesced; pleonite 3 dorsally tumid but lacking erect dorsal process; pleonite 4 weakly extended posterodorsally. Telson huge, vertically elevated and laterally compressed, fleshy, lateral surface area equal to lateral area of urosome.

Variables. Tiny accessory flagellum present or absent; setae on mandibular palp appressed or separate; coxa 4 with lateral crescentic pit on broad ventrolateral hollow; hump of pleonite 3 protuberant or not.

Relationship. Differing from *Prothaumatelson* in the non-carpochelate gnathopod 2. From *Thaumatelson* in the presence of a nasiform process on antenna 1 and the oblique palm of gnathopod 2.

Closest to *Antatelson* but palm of gnathopod 2 oblique and mandible with 1-articulate (versus 3-articulate) palp.

Species. *Ausatelson kolle* J.L. Barnard, 1974b [785]; *A. ule* J.L.Barnard, 1972a [788].

Habitat and distribution. Marine, southern Australia, 0-12 m, 2 species.

Chucullba J.L. Barnard

Fig.124F

Chucullba J.L. Barnard, 1974b: 108.

Type species. *Chucullba alla* J.L. Barnard, 1974b, original designation.

Diagnosis. Antenna 1 bearing (type) or lacking nasiform process on article 1. Accessory flagellum absent. Palp of mandible absent; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, scarcely different from each other in size and shape, gnathopod 1 slightly stouter than 2, palm scarcely oblique and much shorter than posterior margin of propodus; article 5 short, barely lobed; article 6 linear; gnathopod 2 palm almost transverse, article 5 unlobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 highly elongate and tumid. Pleonites 5-6 coalesced; pleonite 3 lacking dorsal process; pleonite 4 elevated posterodorsally. *Inner rami of uropods 1-2 shortened; uropod 3 with only 1 article.* Telson flat but of medium size, sides vertically elevated, fleshy, lateral surface area much smaller than lateral area of urosome.

Variables. Dactyls of pereopods pectinate (*C. warea*).

Relationship. Differing from *Parathaumatelson* in the short inner rami of uropods 1-2 and loss of 2 articles on uropod 3. This is the only stenothoid with reduced uropod 3.

Species. *Chucullba alla* J.L. Barnard, 1974b [787]; *C. warea* J.L. Barnard, 1974b [788].

Habitat and distribution. Marine, southern Australia, intertidal, 2 species.

Goratelson J.L. Barnard

Goratelson J.L. Barnard, 1972a: 315.

Type species. *Goratelson warroo* J.L. Barnard, 1972a, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum vestigial. Palp of mandible absent; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 unproduced. Inner plates of maxillipeds partially fused together. Gnathopods 1-2 subchelate, scarcely different from each other in shape, gnathopod 1 small, subchelate, palm fully oblique and occupying all of posterior margin of propodus; article 5 short, lobed; article 6 expanded; gnathopod 2 enlarged, similar to 1 but propodus and dactyl relatively more robust and shorter. Pereopods 5-7 with rectangular weakly expanded article 2. Pereonite 4 short. Pleonites 4-6 mostly coalesced; pleonite 3 dorsally tumid but lacking erect dorsal process; pleonite 4 not extended posterodorsally. Telson flat but huge, slightly elevated laterally, fleshy, lateral surface area almost equal to lateral area of urosome.

Relationship. Unique among the aberrant thaumtelsonins in the lack of produced inner plate on maxilla 2, short pereonite 4 and stout rectangular article 2 of pereopods 5-7. Probably independently evolved from non-thaumatelsonin ancestry; note non-elevated, flat telson, albeit fleshy and huge.

Species. *Goratelson warroo* J.L. Barnard, 1972a [788].

Habitat and distribution. Marine, Western Australia, Cape Naturaliste, 0 m, 1 species.

Hardametopa n.gen.

Type species. *Metopa nasuta* Boeck, 1871b, here selected.

Etymology. From type locality, Hardangerfjord, and classic genus *Metopa*.

Diagnosis. Antenna 1 bearing nasiform process on article 1. Accessory flagellum absent. Palp of mandible 2 to 3-articulate; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopod 1 small, simple, article 4 incipiently chelate; article 5 elongate, unlobed; article 6 linear. Gnathopod 2 scarcely enlarged, palm strongly oblique, article 5 short, lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 elongate and tumid. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 weakly extended posterodorsally. Telson ordinary, flat.

Variables. Antenna 1 not nasiform, pleonite 4 not carinate and carpus of gnathopod 1 short and almost lobed (*H. carinata*).

Relationship. Differing from *Metopella* in the elongate-crested pereonite 4.

Species. *Hardametopa carinata* (Hansen, 1888) (Just, 1980) [216]; *H. nasuta* (Boeck, 1871b) (Sars, 1895) (Lincoln, 1979a) (Just, 1980) [200].

Habitat and distribution. Marine, Arctic-boreal south to Britain and Gulf of St Lawrence, 4-250 m, 2 species.

Knysmetopa Barnard & Karaman

Knysmetopa Barnard & Karaman, 1987: 870.

Type species. *Parametopa grandimana* Griffiths, 1974c, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. *Antenna 2 half as long as antenna 1.* Accessory flagellum absent. Palp of mandible absent; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. *Coxa 2 not bevelled anteriorly.* Gnathopods 1-2 subchelate, strongly different from each other in size and shape, gnathopod 1 small, subchelate, palm oblique and as long as posterior margin of propodus; article 4 chelate and freely projecting, article 5 elongate, unlobed; article 6 slightly expanded, Gnathopod 2 greatly enlarged, palm strongly oblique, articles 4-5 short, lobed. Pereopod 5 with rectolinear article 2, pereopods 6-7 with expanded and lobate article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Coxa 4 adze-shaped and pointing posteriorly as in *Stenothoe*.

Relationship. Differing from *Stenothoe* in the short antenna 2 and non-bevelled anteroventral angle of coxa 2. From *Wallametopa* in the subchelate gnathopod 1. From *Parametopa* in the absence of a nasiform process on antenna 1, huge enlargement of gnathopod 2 and rearward pointing adze-shaped coxa 4.

Species. *Knysmetopa grandimana* (Griffiths, 1974c) [743].

Habitat and distribution. Marine, South Africa, 200 m, 1 species.

Mesometopa Gurjanova

Mesometopa Gurjanova, 1938b: 280.

Type species. *Metopa esmarki* Boeck, 1871b, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum absent. Palp of mandible 2 to 3-articulate; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 [?ordinary]. Inner plates of maxillipeds [?well separated]. Gnathopod 1 small, simple, article 4 incipiently chelate; article 5 elongate, unlobed; article 6 linear, dactyl long. Gnathopod 2 scarcely enlarged, palm oblique; article 5 short, lobed. Pereopods 5-6 with rectolinear article 2, pereopod 7 with basally expanded article 3, without posteroventral lobe. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not weakly extended posterodorsally. Telson ordinary, flat.

Variables. Gnathopod 1 weakly subchelate (e.g. *M. sinuata*).

Relationship. Differing from *Stenothoides* in the presence of 2+ articulate mandibular palp. From *Mesoproboloides* in the 1-articulate palp on maxilla 1. From *Parametopella* in the slight basal expansion on article 2 of pereopod 7.

Species. *Mesometopa esmarki* (Boeck, 1871b) (Stebbing, 1906) [371]; *M. extensa* Gurjanova, 1948, 1951 [391B]; *M. gibbosa* Shoemaker, 1955a [267]; *M. neglecta* (Hansen, 1888) (Sars, 1895) (Shoemaker, 1955a) (Just, 1980), *M. n. roya* J.L. Barnard, 1966a [200 + B]; *M. sinuata* Shoemaker, 1964 [368].

Habitat and distribution. Marine, arctic-boreal, south to California, Japan and south-western Norway, 6-351 m, 5 species.

Mesoproboloides Gurjanova

Mesoproboloides Gurjanova, 1938b: 278.–Moore, 1981b: 959 (key).

Type species. *Metopella cornuta* Schellenberg, 1926a, original designation.

Diagnosis. Antenna 1 bearing or lacking nasiform process on article 1. Accessory flagellum absent. Palp of mandible 3-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 [?barely produced]. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, scarcely different from each other except in size. Gnathopod 1 small, palm oblique and shorter than posterior margin of propodus; article 4 incipiently chelate; article 5 short, lobed; article 6 elongate. Gnathopod 2 slightly enlarged, palm oblique, article 5 short, lobed, article 6 slightly expanding apicad, elongate. Pereopod 5 with rectolinear article 2, pereopods 6-7 with weakly (6) and well (7) expanded article 2; pereopod 7 with scarcely distinct posteroventral lobe on article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 with dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Article 1 of antenna 1 ventrodistally lobate (e.g. *M. cruxlorraina*), article 2 lobate (*M. cornuta*); coxa 4 excavate (e.g. *M. excavata*); gnathopod 1 barely subchelate (*M. excavata*); basis of pereopod 6 rectolinear (*M. spinosa*); basis of pereopod 7 tapering distally (*M. similis*), broad and lobate (*M. spinosa*); pleonite 3 lacking dorsal process but article 2 of pereopods 5-7 too aberrant to be in *Metopella* (*M. excavata*).

Relationship. Differing from *Stenothoides* and *Mesometopa* in the 2-articulate (versus 1-articulate) palp of maxilla 1.

Species. *Mesoproboloides cornuta* (Schellenberg, 1926a) [881]; *M. cruxlorraina* Moore, 1981b [783]; ?*M. excavata* Fenwick, 1977 [774] (see note above); *M. similis* (Schellenberg, 1926a) [881]; *M. spinosa* Bellan-Santini & Ledoyer, 1974 [851].

Habitat and distribution. Marine, Antarctic, austral, north to Tasmania and New Zealand, 3-50 m, 5 species.

Metopa Boeck

Figs 124G, 126B,C,J

Metopa Boeck, 1971b: 140.–Stebbing, 1906: 172.–Lincoln, 1979a: 80.
Metopina Norman, 1900b: 45 [homonym, Diptera] (*Metopa palmata* Sars, 1895, original designation).
Sthenometopa Norman, 1902: 480 (new name for *Metopina*).
?*Prometopa* Schellenberg, 1926a: 310 (*Prometopa tuberculata* Schellenberg, 1926a, monotypy) [see separately].

Type species. *Leucothoe clypeata* Krøyer, 1842, selected by Boeck, 1876.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum absent or vestigial. Palp of mandible 2 to 3-articulate; palp of maxilla 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds mostly fused together or well separated (type). Gnathopods 1-2 subchelate, different from each other in size and shape: gnathopod 1 small, almost simple (variable), article 4 incipiently chelate; article 5 elongate, barely lobed; article 6 scarcely expanded, almost linear. Gnathopod 2 enlarged, palm oblique; articles 4-5 short, 5 lobed. Pereopod 5 with rectolinear article 2, pereopods 6-7 with expanded, lobate article 2. Pereonite 4 short. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Body carinate or toothed (e.g. *M. cristata*); article 4 of gnathopod 1 very elongate, palm well developed, almost transverse (e.g. *M. leptocarpa*), dactyl stubby and setose (*M. palmata*), article 5 short, almost lobate (e.g. *M. stelleri*); gnathopod 2 hugely and doubly parachelate (*M. norvegica*), weakly parachelate (*M. palmata*); article 2 of pereopod 4 of intermediate expansion (e.g. *M. cistella*).

Relationship. Differing from *Prometopa* and *Metopoides* in the lack of accessory flagellum; from *Proboloides* and *Metopoides* in the 1-articulate palp of maxilla 1; and from *Stenothoe* in the presence of a mandibular palp and 1-articulate palp of maxilla 1.

Species. See Chevreux & Fage (1925), Gurjanova (1951),Schellenberg (1942), Stephensen (1931a, 1940b, 1944a), Shoemaker (1930a, 1955a); *M. abyssalis* Stephensen, 1931a [209B]; *M. abyssi* Pirlot, 1933a [601B]; *M. aequicornis* Sars, 1879, 1885 (Stephensen, 1938b) (Gurjanova, 1951) [202B]; *M. affinis* Boeck, 1871b (Sars, 1895) (Stephensen, 1938b) (Gurjanova, 1951) [238]: *M. alderi* (Bate, 1857d) (Sars, 1895) (Stephensen, 1938b) (Lincoln, 1979a) (= *M. spectabilis* Sars, 1879, 1895) [200 + I]; *M. angustimana* Gurjanova, 1948, 1951 [391B]; *M. beringiensis* Oldevig, 1959 [274]; *M. boeckii* Sars, 1895 (Gurjanova, 1951) (= *M. norvegica* Bate & Westwood, 1868, homonym) [220]; *M. borealis* Sars, 1883, 1895 (Lincoln, 1979a) [240]; *M. bruzelii* (Goes, 1866) (Sars, 1895) (Lincoln, 1979a) (Just, 1980) [200]; *M. bulychevae* Gurjanova, 1955b [322B]; *M. cistella* J.L. Barnard, 1969a [372]; *M. clypeata* (Krøyer, 1842, 1845, 1846a) (Gurjanova, 1951) (Shoemaker, 1955a) [200 + B]; *M. colliei* Gurjanova, 1948, 1951 [279]; *M. cristata* Gurjanova, 1955b (Shoemaker, 1964) [280B]; *M. dawsoni* J.L. Barnard, 1962c, 1964b [370]; *M. derjugini* Gurjanova, 1948, 1951 [278]; [*M. gigas* Stuxberg, 1880 (Della Valle, 1893), *nomen* *nudum* [?291]]; *M. glacialis* (Krøyer, 1842, 1845, 1846a) (Just, 1980) (Vader & Beehler, 1983) (= *M. cariana* Gurjanova, 1929b, 1951) [220 + I]; *M. groenlandica* Hansen, 1888 (Stephensen, 1936) (Stephensen & Thorson, 1936) (= *M. hirsutimana* Blake, 1929) [250I + B]; *M. hearni* Dunbar, 1954 [258]; *M. invalida* Sars, 1895 (Gurjanova, 1951) (Dunbar, 1954) [238 + 258]; *M. japonica* Gurjanova, 1952b [285]; *M. kobjakovae* Gurjanova, 1955b [286]; *M. koreana* Gurjanova, 1952b [?391]; *M. latimana* Hansen, 1888 (Lincoln, 1979a) (= *M. abscisa* Norman, 1900b) [216]; *M. layi* Gurjanova, 1948, 1951 [279]; *M. leptocarpa* Sars, 1883, 1895 (Gurjanova, 1951) [216 + B]; *M. longicornis* Boeck, 1871b (Sars, 1895) (Just, 1980) [220]; *M. longirama* Dunbar, 1942, 1954 [258]; *M. majuscula* Gurjanova, 1948, 1951 [280]; *M. mirifica* Gurjanova, 1952b [231A]; *M. normani* Hoek, 1889 (Tesch, 1916a) (Stephensen, 1929) [237]; *M. norvegica* (Liljeborg, 1851a,b) (Lincoln, 1979a) (= *M. pollexiana* Bate, 1857d, Sars, 1895) [216 + B]; *M. palmata* Sars, 1895 (Gurjanova, 1951) [216]; *M. propinqua* Sars, 1895 (Lincoln, 1979a) [200]; *M. pusilla* Sars, 1895 (Lincoln, 1979a) (Just, 1980) [216]; *M. quadrangula* Reibisch, 1905 (Stephensen, 1926, 1929b) [236]; *M. robusta* Sars, 1895 (Stephensen, 1938b) (Shoemaker, 1955a) [216 + BA]; *M. samsiluna* J.L. Barnard, 1966a, ?1967a [370B]; *M. sinuata* Sars, 1895 (Gurjanova, 1951) [216 + B]; *M. solsbergi* Schneider, 1884 (Sars, 1895) (Lincoln, 1979a) (Vader, 1983b) [216I]; *M. spinicoxa* Shoemaker, 1955a [267]; *M. spitzbergensis* Bruggen, 1907a (Stephensen, 1938b) (Gurjanova, 1951) [220]; *M. stelleri* Shoemaker, 1964 [231B]; *M. submajuscula* Gurjanova, 1948, 1951 [290]; *M. tenuimana* Sars, 1895 (Lincoln, 1979a) (Just, 1980) [220]; *M. timonovi* Gurjanova, 1955b [286]; [*M. tuberculata* (Schellenberg, 1926a) see *Prometopa*]; *M. uschakovi* Gurjanova, 1948, 1951 [279]; *M. wiesei* Gurjanova, 1933b, 1951 (Bushueva, 1977) [220].

Habitat and distribution. Marine, mostly cold water Arctic-boreal, descending to bathyal in more southerly latitudes, 0-2300 m, 50 species.

Metopella Sars, revised

Fig.126A

Metopella Sars, 1895: 274.–Stebbing, 1906: 182.–Lincoln, 1979a: 204.

Type species. *Metopa longimana* Boeck, 1871b, selected by Gurjanova, 1938b.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum present. Palp of mandible 2 to 3-articulate; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 different from each other in size and shape, gnathopod 1 small, simple, article 4 incipiently chelate; article 5 elongate, unlobed; article 6 linear. Gnathopod 2 slightly enlarged, palm weakly oblique, articles 4-5 short, 5 lobed. Pereopods 5-7 with rectolinear article 2 but article 2 on pereopod 7 broader than on pereopods 5-6 (variable). Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Inner plates of maxillipeds mostly fused together (e.g. *M. angusta*); article 2 of pereopods 5-7 all rectolinear (*M. angusta*).

Relationship. Differing from *Metopelloides* in the presence of a 2 to 3-articulate (versus 1-articulate) mandibular palp; from *Probolisca* and *Parametopella* in the 1-articulate palp of maxilla 1; from *Mesometopa* in the unexpanded base of article 2 on pereopod 7.

A polyglot genus needing more division; see *Hardametopa*.

Removals. See *Hardametopa*.

Species. See Chevreux & Fage (1925), Gurjanova (1951), Schellenberg (1942), Stephensen (1931a, 1938b, 1940b, 1944a), Shoemaker (1930a, 1955a); *M. angusta* Shoemaker, 1949b (Bousfield, 1973) [254]; *M. aporpis* J.L. Barnard, 1962c, 1964b, 1966b [370]; *M. buynitzkii* Gurjanova, 1946, 1951 [291]; *M. longimana* (Boeck, 1871b) (Sars, 1895) (Just, 1980) [220]; *M. macrochira* Gurjanova, 1948, 1951 [391].

Habitat and distribution. Marine, Arctic-boreal, south to western Mexico, 0-226 m, 7 species.

Metopelloides Gurjanova, revised

Metopelloides Gurjanova, 1938b: 281.

Type species. *Metopella micropalpa* Shoemaker, 1930a, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum absent. Palp of mandible 1-articulate; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds partially fused together. Gnathopods 1-2 subchelate, different from each other in size and shape, gnathopod 1 small, subchelate, palm oblique and as long as posterior margin of propodus; article 4 incipiently chelate; article 5 slightly elongate, not lobed; article 6 short, weakly expanded. Gnathopod 2 enlarged, palm strongly oblique, article 4 short, lobed. Pereopods 5-7 with rectolinear article 2 but pereopod 7 with slightly widened article 2; pereopods 6-7 with barely distinct posteroventral lobe on article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Relationship. Differing from *Metopella* in the reduction of the mandibular palp to 1 article; from

Probolisca in the 1-articulate palp of maxilla 1; from *Stenothoides* in the narrower article 2 of pereopod 7.
See *Vonimetopa* and *Zaikometopa*.

Removals. See *Vonimetopa* and *Zaikometopa*.

Species. See same references as *Metopa*; *M. micropalpa* (Shoemaker, 1930a) (Gurjanova, 1951) [256 + I]; *M. stephenseni* Gurjanova, 1938b, 1951 (Shoemaker, 1955a) [280 to 267]; *M. tattersalli* Gurjanova, 1938b, 1951 (Shoemaker, 1955a) [280 to 267].

Habitat and distribution. Marine, Arctic-boreal, 1-104 m, 3 species.

Metopoides Della Valle, revised

Metopoides Della Valle, 1893: 907.–Stebbing, 1906: 185.

Type species. *Metopa magellanica* Stebbing, 1888, selected by Gurjanova, 1938b.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum 2-articulate. Palp of mandible 2 to 3-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, different from each other in size and shape, gnathopod 1 small, subchelate, palm oblique and not shorter than posterior margin of propodus; article 4 incipiently chelate; article 5 slightly elongate, unlobed; article 6 short, expanded. Gnathopod 2 enlarged, palm strongly oblique, articles 4-5 short, lobed. Pereopod 5 with rectolinear article 2, pereopods 6-7 with expanded and lobate article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Relationship. Differing from *Proboloides* in the presence of a 2-articulate accessory flagellum.

Removals. Following species to *Aurometopa*: *M. aurorae* Nicholls, 1938; following species to *Torometopa*: *M. aequalis* J.L. Barnard, 1962d; *M. compacta* Stebbing, 1888; *M. crassicornis* Schellenberg, 1931; *M. parallelocheir* (Stebbing, 1888).

Species. *Metopoides clavata* Schellenberg, 1931 [833 + s]; *M. crassa* Schellenberg, 1931 [831]; *M. curvipes* Schellenberg, 1926a [881]; *M. elliptica* Schellenberg, 1931 [833]; *M. heterostylis* Schellenberg, 1926a (Nicholls, 1938) (Bellan-Santini, 1972b) [870e]; *M. longicornis* Schellenberg, 1931 [831]; *M. macrocheir* Schellenberg, 1926a [881]; *M. magellanica* (Stebbing, 1888) (Schellenberg, 1931) [867]; *M. sarsi* (Pfeffer, 1888) (Schellenberg, 1931) (Bellan-Santini & Ledoyer, 1974) (= *M. walkeri* Chevreux, 1906a,c) [880].

Habitat and distribution. Marine, Antarctic-austral, 0-385 m, 9 species.

Parametopa Chevreux, revised

Parametopa Chevreux, 1901b: 233.–Gurjanova, 1938b: 280.–Lincoln, 1979a: 206.

Type species. *Parametopa kervillei* Chevreux, 1901b, original designation.

Diagnosis. Antenna 1 bearing nasiform process on articles 1-2. Accessory flagellum absent. Palp of mandible absent; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, scarcely different from each other in size and shape, gnathopod 1 small, weakly subchelate, palm oblique and shorter than posterior margin of propodus; article 4 incipiently chelate; article 5 short, lobed; article 6 almost linear. Gnathopod 2 slightly enlarged, palm almost transverse, articles 4-5 short, lobed. Pereopod 5 with rectolinear article 2, pereopods 6-7 with expanded and lobate article 2. Pereonite 4 short. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Antenna 1 lacking nasiform lobe, article 5 of gnathopod 1 as long as article 6, not lobed, and male gnathopod 2 very enlarged (*P. alaskensis*); article 4 of gnathopod 2 not chelate (*P. crassicornis*).

Relationship. Differing from *Metopa, Prometopa* and *Stenula* by the absence of the mandibular palp. From *Stenothoe* in the 1-articulate palp of maxilla 1.
See *Wallametopa*.

Species. ?*Parametopa alaskensis* (Holmes, 1904) (Gurjanova, 1951) [277]; *P. crassicornis* Just, 1980 [253]; *P. kervillei* Chevreux, 1901b (Chevreux & Fage, 1925) (Lincoln, 1979a) (= *P. sarniensis* Norman, 1907) [239 + 242].

Habitat and distribution. Marine, Arctic-boreal south to Guernsey, 0-66 m, 3 species.

Parametopella Gurjanova

Parametopella Gurjanova, 1938b: 281.–McKinney *et al.*, 1978: 144 (key).

Type species. *Stenothoe cypris* Holmes, 1905, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1 (variable). Accessory flagellum absent. Palp of mandible absent; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds partially fused together. Gnathopods 1-2 different from each other in size and shape, gnathopod 1 small, simple, article 4 incipiently chelate; article 5 short, lobed; article 6 expanded. Gnathopod 2 enlarged, palm strongly oblique, article 5 short, lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Article 1 of antenna 1 with nasiform lobe (*P. stelleri*); accessory flagellum present (*P. inquilina*); urosomites 2-3 fused together (*P. texensis*).

Relationship. Differing from *Metopella* and *Metopelloides* in the lack of a mandibular palp; from *Probolisca* in the 1-articulate palp of maxilla 1.

Species. *Parametopella cypris* (Holmes, 1905) (Bousfield, 1973) [361]; *P. inquilina* Watling, 1976 [363I]; *P. ninis* J.L. Barnard, 1962c [373]; *P. stelleri* Gurjanova, 1948, 1951 [279]; *P. texensis* McKinney *et al.*, 1978 [474].

Habitat and distribution. Marine, Pan-American warm temperate, Cape Cod to Gulf of Mexico and southern California to Bering Sea, 8-79 m, 5 species.

Parathaumatelson Gurjanova

Figs 124E, 125D

Parathaumatelson Gurjanova, 1938b: 277, 387.–J.L. Barnard, 1972b: 158.–J.L. Barnard, 1974b: 108.

Type species. *Metopella nasica* Stephensen, 1927a, original designation.

Diagnosis. Antenna 1 bearing nasiform process on article 1. Accessory flagellum absent. Palp of mandible absent; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 barely produced. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, scarcely different from each other in size and shape, palm scarcely oblique and shorter than posterior margin of propodus; article 4 incipiently chelate only on gnathopod 1, article 5 short, lobed; article 6 expanded, elongate. Pereopods 5-7 with rectolinear article 2. Pereonite 4 elongate. Pleonites 5-6 coalesced; pleonite 3 lacking dorsal process; pleonite 4 weakly extended posterodorsally. Telson fleshy but small.

Relationship. Differing from *Pseudothaumatelson* in the lack of mandibular palp and accessory flagellum and in the similarity of gnathopods 1 and 2. From *Raumahara* in the non-chelate gnathopods and presence of nasiform hump on antenna 1.

Species. *Parathaumatelson nasicum* (Stephensen, 1927a) (J.L. Barnard, 1972b) [850].

Habitat and distribution. Marine, Auckland Islands and south New Zealand, intertidal, 1 species.

Probolisca Gurjanova

Probolisca Gurjanova, 1938b: 279.

Type species. *Metopa ovata* Stebbing, 1888, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1 (variable). Accessory flagellum 1-articulate. Palp of mandible 2-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, scarcely different from each other in size and shape; gnathopod 1 small, subchelate, palm scarcely oblique and shorter than posterior margin of propodus; article 4 incipiently chelate; article 5 short, lobed; article 6 weakly expanded. Gnathopod 2 slightly enlarged, palm almost transverse; article 5 short, lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Article 1 of antenna 1 with nasiform lobe (*P. nasutigenes*); mandibular palp 3-articulate (*P. elliptica, P. nasutigenes*); gnathopod 1 weaker than in type, carpus not lobate, propodus less robust (*P. elliptica, P. nasutigenes*).

Relationship. Differing from *Metopella, Metopelloides* and *Parametopella* in the 2-articulate palp of maxilla 1. Species other than the type may require generic separation.

Species. *Probolisca elliptica* (Schellenberg, 1931) [867]; *P. nasutigenes* (Stebbing, 1888) (Bellan-Santini & Ledoyer, 1974) [851]; *P. ovata* (Stebbing, 1888) (J.L. Barnard, 1972b) (Thurston, 1974b) (Bellan-Santini & Ledoyer, 1974) (Griffiths, 1976) [880].

Habitat and distribution. Marine, Antarctic, austral, 0-235 m, 3 species.

Proboloides Della Valle, revised

Figs 124D, 126F

Proboloides Della Valle, 1893: 907.
Proboliella Walker, 1906c: 113 (*Proboliella typica* Walker, 1906c, monotypy).

Type species. *Metopa gregaria* Sars, 1882, selected by Gurjanova, 1938b.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum 0 to 1-articulate. Palp of mandible 2 to 3-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopod 1 small, almost simple, barely subchelate, palm oblique and shorter than posterior margin of propodus; article 4 chelate; article 5 elongate, unlobed; article 6 short, barely expanded. Gnathopod 2 enlarged, palm strongly oblique, article 4 elongate, lobed, article 5 short, lobed. Pereopod 5 with non-lobate rectolinear article 2, pereopods 6-7 with expanded and lobate article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Eyes absent (*P. tunda*); mandibular palp 2-articulate (*Proboliella typica*); gnathopod 1 simple (*P. holmesi*), propodus expanded and palm well developed (*P. grandimana*), carpus very stout (*P. clypeata*); article 4 of gnathopod 2 not elongate (*P. calcaratum*); article 2 of pereopod 5 almost of lobate form (*P. grandimana*).

Relationship. Differing from *Stenothoe* in the presence of a mandibular palp; from *Metopa* in the 2-articulate palp of maxilla 1 and the separate inner lobes of the maxilliped.

See *Aurometopa*, *Metopoides*, *Prostenothoe* and *Torometopa*.

Removals. Following species to *Torometopa*: *P. antarcticus* Walker, 1906c, 1907; *P. carinata* Schellenberg, 1931; *P. crenatipalmatus* Stebbing, 1888; *P. dentimanus* Nicholls, 1938; *P. palmatus* Ruffo, 1949; *P. perlatus* K.H. Barnard, 1930; *P. porcellanus* K.H. Barnard, 1932; *P. stephenseni* Ruffo, 1949.

Species. See Stephensen (1938b), Gurjanova (1951); *P. anophthalma* Ledoyer, 1986a [618B]; *P. armata* Ledoyer, 1986 [618A]; *P. calcarata* Sars, (1883, 1895) (Gurjanova, 1951) (Vader, 1969a) [238 + B]; *P. clypeata* (Stimpson, 1853) (Stephensen, 1931a) [260 + 253 + 251]; *P. grandimanum* (Bonnier, 1896) (Stebbing, 1906) [303B]; *P. gregaria* (Sars, 1883, 1895) (Chevreux & Fage, 1925) [216 + B]; *P. holmesi* Bousfield, 1973 [254]; *P. pacifica* (Holmes, 1908) (Shoemaker, 1964) [310B]; *P. rotunda* (Stebbing, 1917b) (K.H. Barnard, 1940) (Griffiths, 1975) [743]; *P. schokalskii* Gurjanova, 1946, 1951 [220B]; *P. schuleikini* Gurjanova, 1946, 1951 [207 + B]; *P. tunda* J.L. Barnard, 1962c, 1966a [310B]; *P. typica* (Walker, 1906c, 1907) (Schellenberg, 1926a) (K.H. Barnard, 1932) [870 + 833]; *P. zubovi* Gurjanova, 1951 [220 + B].

Habitat and distribution. Marine, mostly cold water Atlantic boreal, tropical submergent, also Antarctica, S. Africa, 5-3716 m, 14 species.

Prometopa Schellenberg

Prometopa Schellenberg, 1926a: 310.

Type species. *Prometopa tuberculata* Schellenberg, 1926a, monotypy.

Diagnosis. Antenna 1 bearing nasiform process on article 1. Accessory flagellum vestigial. Palp of mandible 3-articulate; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 different from each other in size and shape, gnathopod 1 small, simple, article 4 not incipiently chelate; article 5 elongate, linear, unlobed; article 6 shorter, sublinear. Gnathopod 2 enlarged, palm weakly oblique, article 4 short, lobed. Pereopod 5 with rectolinear article 2, pereopods 6-7 with expanded and lobate article 2. Pereonite 4 slightly elongate and tumid. Pleonites 4-6 free; pleonites 2-3 with erect dorsal process; pleonite 4 weakly extended posterodorsally. Telson ordinary, flat.

Relationship. Differing from *Metopa* in the well-separated inner plates of the maxillipeds, well-developed article 3 of the mandibular palp (versus vestigial), and the presence of an accessory flagellum.

Species. *Prometopa tuberculata* Schellenberg, 1926a [881].

Habitat and distribution. Marine, Antarctica, Gauss Station, 385 m, 1 species.

Prostenothoe Gurjanova

Prostenothoe Gurjanova, 1938b: 278.

Type species. *Prostenothoe sextonae* Gurjanova, 1938b, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum absent. Palp of mandible 1-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 [?ordinary]. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, scarcely different from each other in shape, gnathopod 1 small, palm oblique and shorter than posterior margin of propodus; article 4 incipiently chelate; article 5 short, lobed; article 6 weakly expanded, linear. Gnathopod 2 enlarged, palm strongly oblique, article 4 short, unlobed. Pereopod 5 with rectolinear article 2, pereopods 6-7 with expanded and lobate article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking erect dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Relationship. Differing from *Metopa, Metopoides* and *Proboloides* in the 1-articulate (versus 2 to 3-articulate) mandibular palp; from *Stenula* in the 2-articulate palp of maxilla 1.

Species. *Prostenothoe sextonae* Gurjanova, 1938b, 1951 [280].

Habitat and distribution. Marine, Japan and Okhotsk Seas, shallow water, 1 species.

Prothaumatelson Schellenberg

Figs 124H, 126D

Prothaumatelson Schellenberg, 1931: 113.

Type species. *Thaumatelson nasutum* Chevreux, 1912a,d, monotypy.

Diagnosis. Antenna 1 bearing nasiform process on article 1. Accessory flagellum absent. Palp of mandible 1-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 grossly different from each other in size and shape, gnathopod 1 small, subchelate, palm transverse, as long as posterior margin of propodus; article 4 incipiently chelate; article 5 short, lobed; article 6 short, expanded. Gnathopod 2 enlarged, grossly chelate in form of pincers; article 5 short, lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 elongate and tumid. Pleonites 5-6 coalesced; pleonite 3 lacking dorsal process; pleonite 4 weakly extended posterodorsally. Telson huge, vertically elevated and laterally compressed, fleshy, lateral surface area equal to lateral area of urosome.

Relationship. Differing from *Antatelson* and *Ausatelson* in the chelate gnathopod 2. From *Goratelson* and *Thaumatelson* in the presence of a nasiform process on article 1 of antenna 1. From *Parathaumatelson* and *Raumahara* in the huge telson.

Species. *Prothaumatelson nasutum* (Chevreux, 1912a,d) (Schellenberg, 1931) (K.H. Barnard, 1932) (Thurston, 1974a) (= *P. inermis* Chilton, 1912d) [880].

Habitat and distribution. Marine, Antarctica and nearby islands, 0-40 m, 1 species.

Pseudothaumatelson Schellenberg

Pseudothaumatelson Schellenberg, 1931: 110.

Type species. *Pseudothaumatelson patagonicum* Schellenberg, 1931, selected by J.L. Barnard, 1969c.

Diagnosis. Antenna 1 bearing nasiform process on article 1. Accessory flagellum rudimentary. Palp of mandible 1-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, in male different from each other in size and shape, gnathopod 1 smaller, palm oblique and as long as posterior margin of propodus; article 4 incipiently chelate; article 5 short, weakly lobed; article 6 expanded. Gnathopod 2 enlarged, palm strongly oblique, articles 4-5 short, lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 slightly elongate and tumid. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 strongly extended posterodorsally. Telson flat but fleshy, lateral surface area smaller than lateral area of urosomites 2-3 together.

Relationship. Differing from *Parathaumatelson* in the presence of a mandibular palp and accessory flagellum and in the strong dissimilarity between gnathopods 1 and 2; from *Raumahara* in the non-chelate gnathopod 2 and presence of nasiform process on antenna 1.

Species. *Pseudothaumatelson cyproides* Nicholls, 1938 [878]; *P. patagonicum* Schellenberg, 1931 [831].

Habitat and distribution. Marine, Antarctica and Patagonia, 46-197 m, 2 species.

Raumahara J.L. Barnard

Figs 124I,J, 125C, 126I

Raumahara J.L. Barnard, 1972a: 318.–J.L. Barnard, 1972b: 160.–J.L. Barnard, 1974b: 112.–Moore, 1981b: 962 (key).

Type species. *Raumahara dertoo* J.L. Barnard, 1972a, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum absent. Palp of mandible absent; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 chelate, scarcely different from each other in size and shape, gnathopod 1 shorter, article 4 incipiently chelate; article 5 elongate short, barely lobed; article 6 expanded but sublinear. Gnathopod 2 longer, articles 4-5 short, 5 lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 slightly elongate. Pleonites 4-6 free; pleonite 3 ordinary, pleonite 4 strongly extended posterodorsally. Telson ordinary, flat, fleshy.

Variables. Ocular lobe enlarged (*R. noko*); epistomal keel with deep notch (*R. rongo*); mandible with vestigial palp (*R. noko*); gnathopod 1 not chelate (*R. carinatum, R. rongo*), palm oblique (*R. carinatum*), transverse (*R. rongo*); pleonite 4 not extended

(*R. rongo*); article 2 on ramus of uropod 3 thick (*R. rongo*), seta-like (type).

Relationship. Differing from *Parathaumatelson* and *Pseudothaumatelson* in the chelate gnathopod 2 and simple antenna 1.

Species. *Raumahara carinatum* (Shoemaker, 1955a) [267]; *R. dertoo* J.L. Barnard, 1972a, 1974b [788]; *R. judithae* Moore, 1981b [783]; *R. noko* J.L. Barnard, 1974b [785]; *R. rongo* J.L. Barnard, 1972b [774].

Habitat and distribution. Marine, Beaufort Arctic, cold water Australia and New Zealand, 0-66 m, 5 species.

Stenothoe Dana

Figs 124A, 126G

Stenothoe Dana, 1852b: 311.–Dana, 1853: 923.–Stebbing, 1906: 192.–J.L. Barnard, 1974b: 117.–Lincoln, 1979a: 194.
Probolium Costa, 1853: 170.–Costa, 1857: 199 (*Probolium polyprion* Costa, 1853, 1857, = *Stenothoe valida* Dana, 1853).
Montagua Bate, 1857d: 137 [homonym, Decapoda] (*Cancer* (*Gammarus*) *monoculoides* Montagu, 1813, here selected).
Montaguana Chilton, 1883: 78 (new name for *Montagua*, same type species, here selected).
Microstenothoe Pirlot, 1933b: 2 (*Microstenothoe ascidiae* Pirlot, 1933b, original designation).

Type species. *Stenothoe valida* Dana, 1853, monotypy.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum absent or 1-articulate. Palp of mandible absent; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 unproduced. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, very different from each other in size and shape, gnathopod 1 small, subchelate, palm oblique and as long as posterior margin of propodus; article 4 incipiently chelate; article 5 shorter than 6, lobed; article 6 expanded. Gnathopod 2 enlarged, palm strongly oblique, article 4 elongate, lobed, article 5 short, lobed. Pereopod 5 with rectolinear article 2, pereopods 6-7 with expanded and lobate article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Accessory flagellum 1-articulate (e.g. *Microstenothoe ascidiae*); inner plate of maxilla 2 frequently produced but not in type; inner plates of maxillipeds partly fused and very small (?*S. miersi*); article 5 of gnathopod 1 not lobed *S. antennulariae*); gnathopod 1 almost as large as and like gnathopod 2 (*S. woka*, but various species intermediate this extreme), but differing from gnathopod 2 (*S. kaia*); article 5 of gnathopod 1 often shorter than 6, often very short or as long as 6; gnathopods 1-2 often almost identical in shape but gnathopod 1 small (e.g. *S. monoculoides*); gnathopod 2 small like gnathopod 1 (*S. tergestina*); article 2 of pereopod 6 narrower than article 2 of pereopod 7 (e.g. *S. elachista*, *S. woka*); pereopods prehensile (*S. symbiotica*); body carinate and toothed (*S. richardi*); uropod 1 with peduncular spur (?*S. miersi*).

Relationship. Differing from *Metopoides*, *Proboloides*, *Prostenothoe* and *Stenula* in the loss of the mandibular palp. From *Metopa* and *Stenula* in the 2-articulate palp of maxilla 1.

Species. See Chevreux & Fage (1925), Gurjanova (1951), Nayar (1959, 1967), Schellenberg (1942), Sivaprakasam (1969a), Stephensen (1938b); *S. adhaerens* Stebbing, 1888 (Griffiths, 1975) (Ledoyer, 1986) [743 + B]; ?*S. aequicornis* Stephensen, 1931a (gnathopod 1 wrong, mouthparts unknown) [209B]; *S. allinga* J.L. Barnard, 1974b [787]; *S. antennulariae* Della Valle, 1893 (Krapp-Schickel, 1976a) [348 + I + ?674]; *S. ascidiae* (Pirlot, 1933b) (Toulmand & Truchot, 1964) [242I]; *S. aucklandicus* Stephensen, 1927a [843]; *S. barrowensis* Shoemaker, 1955a (Vader, 1983b) [267]; *S. bosphorana* Sowinsky, 1897, 1898 (Krapp-Schickel, 1976a) (= *S. dactylipotens* Chevreux, 1908g, Ledoyer, 1977) (= *S. dentimana* Chevreux, 1911d) [330 + 339]; *S. brevicornis* Sars, 1883, 1895 (Vader, 1983b), *S. b. canadensis* Dunbar, 1954 [238 + I]; *S. cattai* Stebbing, 1906 (Lincoln, 1979a) [352]; *S. cavimana* Chevreux, 1908 (Krapp-Schickel, 1976a) [352]; *S. coutieri* Chevreux, 1908g, 1935 [304B]; *S. crassicornis* Walker, 1897 (Lincoln, 1979a) [239]; ?*S. dolichopous* K.H. Barnard, 1916 (linear gnathopod 1) (Griffiths, 1974c) [743]; *S. dollfusi* Chevreux, 1887b, 1891a, 1900a (Krapp-Schickel, 1976a) [330 + B]; *S. eduardi* Krapp-Schickel, 1976a (= *S. cattai* identification of Chevreux & Fage, 1925, Ledoyer, 1973c) (= *S. gallensis* identification of Reid, 1951) [348]; *S. elachistoides* Myers & McGrath, 1980 [239]; *S. elachista* Krapp-Schickel, 1976a [348]; *S. estacola* J.L. Barnard, 1962c, 1969a [373]; *S. falklandica* Schellenberg, 1931 [831]; *S. frecanda* J.L. Barnard, 1962c, 1966b [370]; *S. gallensis* Walker, 1904 (J.L. Barnard, 1955a) (Ledoyer, 1972c) (Krapp-Schickel, 1976a) (Ledoyer, 1979a, 1986) (= *S. crenulata* Chevreux, 1907a, 1908c) [423T]; *S. georgiana* Bynum & Fox, 1977 [362+]; [*S. guerinii* Bate 1862 (Stebbing, 1906) [660]]; *S. haleloke* J.L. Barnard, 1970a [381]; *S. inermis* Ledoyer, 1979a, 1986 [698]; *S. irakiensis* Salman, 1985 [673]; *S. kaia* Myers, 1985c [576]; [*S. longimana* (Bate, 1862) (Stebbing, 1906) [348]]; ?*S. macrophthalma* Stephensen, 1931a (gnathopod 1 wrong, mouthparts unknown) [209B]; *S. marina* Bate, 1857d (Sars, 1895) (J.L. Barnard, 1979a) (Krapp-Schickel, 1976a) (Ledoyer, 1977) (Vader, 1984b) (= *S. danai* Boeck, 1861), *S. m. mediterranea* Ledoyer, 1973c [350 + 370 + 660 + 367 + I]; *S. megacheir* (Boeck, 1871b, 1876) (Sars, 1895) (Stephensen, 1938b) [238 + B]; *S. microps* Sars, 1895 (Stephensen, 1929b) [240]; ?*S. miersi* (Haswell, 1879b) (?J.L. Barnard, 1974b) (= *S. longicornis* Haswell, 1879b) [781 + ?788]; *S. minuta* Holmes, 1905 (Bousfield, 1973) [361]; *S. moe* J.L. Barnard, 1972b [775];

S. monoculoides (Montagu, 1813) (Sars, 1895) (Krapp-Schickel, 1976a) (Lincoln, 1979a) [352 + 339]; *S. nonedia* J.L. Barnard, 1974b [788]; [*S. ponticum* (Czerniavsky, 1868) (Sowinsky, 1894a) [339]]; *S. quabara* J.L. Barnard, 1974b [780]; *S. richardi* Chevreux, 1895 (Sexton, 1911) (Chevreux, 1935) [221B]; *S. setosa* Norman, 1900d (Lincoln, 1979a) [242]; *S. sinhalensis* Walker, 1904 [665] (probably = *S. marina*); *S. sivertseni* Stephensen, 1949 (Macnae, 1953) (K.H. Barnard, 1965) [731, 733]; *S. stephenseni* Reid, 1951 [444]; *S. symbiotica* Shoemaker, 1956 (Thomas & Cairns, 1984) [362I]; *S. tenella* Sars, 1883, 1895 (Stephensen, 1938b) [238 + B]; *S. tergestinum* (Nebeski, 1881) (Krapp-Schickel, 1976a) (Lincoln, 1979a) (= *S. spinimana* Chevreux, 1911d) [330 + 340]; *S. uncinifera* Mateus & Mateus, 1966 [446]; *S. valida* Dana, 1853 (J.L. Barnard, 1953, 1970a) (Krapp-Schickel, 1976a) (Lincoln, 1979a) (Ledoyer, 1986) (= *S. polyprion* Costa, 1853, 1857) (= *S. megacheles* Heller, 1867) (= *S. assimilis* Chevreux, 1908f) (= *S. ornata* K.H. Barnard, 1930) [423TP + I]; *S. woka* J.L. Barnard, 1974b [780]; species a, J.L. Barnard, 1970a [381]; species b, J.L. Barnard, 1970a [381]; species, Vader, 1983b [478 + I].

Habitat and distribution. Marine, cosmopolitan, 0-1262 m, occasionally on spider crabs, 51 species.

Stenothoides Chevreux

Stenothoides Chevreux, 1900a: 55.–Gurjanova, 1938b: 279.–J.L. Barnard, 1962c: 135.
Mesostenothoides Gurjanova, 1938b: 280 (*Mesostenothoides pirloti* Gurjanova, 1938b, original designation).

Type species. *Stenothoides perrieri* Chevreux, 1900a, monotypy.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum absent or 1-articulate. Palp of mandible absent or 1-articulate; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, different from each other in size and shape, gnathopod 1 small, subchelate, palm oblique and as long as posterior margin of propodus; article 4 incipiently chelate; article 5 as long as 6, barely lobed; article 6 expanded. Gnathopod 2 enlarged, palm almost transverse, almost chelate; article 5 short, lobed. Pereopods 5-6 with rectolinear article 2, pereopod 7 with slightly expanded and lobate article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Article 5 of gnathopod 1 elongate (*S. bicoma*); gnathopod 1 almost simple (e.g. *S. pirloti*), simple (*S. uenoi*); article 2 of pereopod 7 fully expanded (e.g. *S. burbanki*).

Relationship. Differing from *Mesometopa* and *Metopella* in the reduction of the mandibular palp to 1 article. From *Mesoproboloides* in the 1-articulate palp of maxilla 1.

Species. See J.L. Barnard (1962c); ?*S. bicoma* J.L. Barnard, 1962c, 1964b, 1966a [370]; *S. burbanki* J.L. Barnard, 1969a [372]; *S. perrieri* Chevreux, 1900a (Vader, 1978) [255]; *S. pirloti* (Gurjanova, 1938b, 1951) [280]; *S. slastnikovi* (Gurjanova, 1948, 1951) [279]; *S. smirnovi* (Gurjanova, 1948, 1951) [279]; *S. uenoi* (Gurjanova, 1938b, 1951) [280].

Habitat and distribution. Marine, cold North Pacific, Bering Sea, and cold north-western Atlantic, 0-218 m, 7 species.

Stenula J.L. Barnard

Stenula J.L. Barnard, 1962c: 137.–Lincoln, 1979a: 192.

Type species. *Stenothoides latipes* Chevreux & Fage, 1925, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum absent. Palp of mandible 1-articulate; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopod 1 small, almost simple, article 4 incipiently chelate; article 5 elongate, unlobed; article 6 almost linear. Gnathopod 2 slightly enlarged, palm weakly oblique, article 5 short, lobed. Pereopod 5 with rectolinear article 2, pereopods 6-7 with expanded and article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson ordinary, flat.

Variables. Eyes large (e.g. *S. modosa*); gnathopod 1 distinctly subchelate (e.g. *S. carinatus*); back carinate (*S. carinatus*).

Relationship. Differing from *Parametopa* in the presence of a mandibular palp. From *Stenothoides* in the expanded article 2 of pereopod 6. From *Metopa* in the reduction of the mandibular palp to 1 article. From *Prostenothoe* in the 1-articulate palp of maxilla 1.

Species. *Stenula angusta* (Shoemaker, 1955a) [267]; *S. arctica* (Gurjanova, 1951) [292]; *S. bassarginensis* (Gurjanova, 1951) [391 + 285]; *S. beringiensis* (Gurjanova, 1948, 1951) [281]; *S. carinatus* (Gurjanova, 1953) [231B]; *S. incola* J.L. Barnard, 1969a [372]; *S. modosa* J.L. Barnard, 1962c [372]; *S. nordmanni* (Stephensen, 1931a) (Shoemaker, 1955a) (Just, 1980) [220]; *S. peltata* S.I. Smith, 1874 (Della Valle, 1893) (Rathbun, 1905) (Stebbing, 1906) (Bousfield, 1973, list only) [254]; *S. ratmanovi* (Gurjanova, 1948, 1951) [279]; *S. rubrovittata* (Sars, 1883, 1895) (Chevreux & Fage, 1925) (Schellenberg, 1927)

(Lincoln, 1979a) (= *S. latipes* Chevreux & Fage, 1925) [216 + I + B]; *S. serripes* Gurjanova, 1955b [286]; *S. ussuriensis* Gurjanova, 1951 [391].

Habitat and distribution. Marine, Arctic-boreal south to California and France, 0-1000 m, 11 species.

Thaumatelson Walker

Figs 124C, 125A, 126E

Thaumatelson Walker 1906c: 16.–Walker, 1907: 21.

Type species. *Thaumatelson herdmani* Walker, 1906c, 1907, monotypy.

Diagnosis. Antenna 1 lacking nasiform process on article 1, bearing one on article 2. Accessory flagellum absent. Palp of mandible 3-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 subchelate, different from each other in size and shape, gnathopod 1 smaller, palm scarcely oblique and longer than posterior margin of propodus; article 4 incipiently chelate; article 5 short, barely lobed; article 6 expanded. Gnathopod 2 enlarged, palm almost transverse, article 5 short, lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 slightly elongate and tumid. Pleonites 4-6 coalesced; pleonite 3 lacking dorsal process; pleonite 4 not extended posterodorsally. Telson huge, vertically elevated and laterally compressed, fleshy, lateral surface area equal to lateral area of urosome.

Relationship. Differing from *Goratelson* in the subtransverse (versus fully oblique) palm of gnathopod 2, presence of mandibular palp, produced inner plate of maxilla 2 and presence of small nasiform lobe on article 2 of antenna 1. From *Antatelson* in the diversity of gnathopods 1-2, lack of process on pleonite 3, and distinct pleonite 4 with overhanging tooth (versus fused pleonite 4).

Species. *Thaumatelson herdmani* Walker, 1906c, 1907 (Schellenberg, 1931) (Bellan-Santini, 1972b) (Thurston, 1974b) [880 + B].

Habitat and distribution. Marine, Antarctica and nearby islands, 12-385 m, 1 species.

Torometopa Barnard & Karaman

Torometopa Barnard & Karaman, 1987: 870.

Type species. *Metopa crenatipalmata* Stebbing, 1888, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum 0 to 2-articulate. Palp of mandible 3-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopods 1-2 different from each other in size and shape, gnathopod 1 small, almost simple or weakly subchelate, palm oblique and shorter than posterior margin of propodus; article 4 incipiently chelate; article 5 elongate, unlobed; article 6 long, weakly expanded. Gnathopod 2 enlarged, palm strongly oblique, article 5 short, lobed. Pereopod 5 with rectolinear article 2 bearing posteroventral lobe, pereopods 6-7 with expanded and lobate article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not weakly extended posterodorsally. Telson ordinary, flat.

Variables. Palp of mandible 1-articulate (*T. armata*); inner plate of maxilliped adze-shaped (*T. perlata*); gnathopod 1 elongate, sublinear (*T. aequalis, carinata, T. dentimana, T. perlata*); pleonite 3 with dorsal tooth (*T. carinata*).

Relationship. Differing from *Metopoides* and *Proboloides* in the lobation on article 2 of pereopod 5.

Species. *Torometopa aequalis* (J.L. Barnard, 1962d) [416A]; *T. antarctica* (Walker, 1906c, 1907) (K.H. Barnard, 1932) [871B]; ?*T. armata* (Ledoyer, 1986) [618A]; *T. carinata* (Schellenberg, 1931) (K.H. Barnard, 1932) [833 + B]; *T. compacta* (Stebbing, 1888) (Schellenberg, 1931) [867 + B]; *T. crassicornis* (Schellenberg, 1931) [831]; *T. crenatipalmata* (Stebbing, 1888) (K.H. Barnard, 1932) (Bellan-Santini, 1972b) [867 + 731 + B]; *T. dentimana* (Nicholls, 1938) (Bellan-Santini, 1972a,b) [870 + B]; *T. palmata* (Ruffo, 1949) [802B]; *T. parallelocheir* (Stebbing, 1888) (Schellenberg, 1931) (K.H. Barnard, 1932) [867]; *T. perlata* (K.H. Barnard, 1930) [893]; *T. porcellana* (K.H. Barnard, 1932) [831]; *T. stephenseni* (Ruffo, 1949) [802B].

Habitat and distribution. Marine, Antarctica and austral, north to Tristan da Cunha and Magellan area, into deep southern basins, 10-4986 m, 12 species.

Vonimetopa Barnard & Karaman

Vonimetopa Barnard & Karaman, 1987: 871.

Type species. *Metopella dubia* Shoemaker, 1964, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum absent. Palp of mandible 1-articulate; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds well separated. Gnathopod 1 small, simple, article 4 incipiently chelate; article 5 short, unlobed; article 6 elongate, linear. Gnathopod 2 weakly enlarged, palm strongly oblique, article 5 short, lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 not weakly extended posterodorsally. Telson ordinary, flat.

Relationship. Differing from *Metopelloides* in the elongate simple propodus and short lobed carpus of gnathopod 1, and the fully separated inner plates of the maxillipeds.

See *Zaikometopa.*

Species. *Vonimetopa barnardi* (Gurjanova, 1938b, 1951) [280]; *V. brazhnikovi* (Gurjanova, 1948, 1951) (Kudrjaschov & Zejagintsev, 1975) [280]; *V. dubia* (Shoemaker, 1964) [277]; *V. schellenbergi* (Gurjanova, 1938b, 1951) [391]; *V. shoemakeri* (Gurjanova, 1938b, 1951) (Kudrjaschov, 1979a) [280]; *V. zernovi* (Gurjanova, 1948, 1951) [391].

Habitat and distribution. Marine, Bering Sea, Okhotsk Sea, Japan Sea, shallow to 5 m, 6 species.

Wallametopa J.L. Barnard

Wallametopa J.L. Barnard, 1974b: 132.

Type species. *Wallametopa cabon* J.L. Barnard, 1974b, original designation.

Diagnosis. Antenna 1 lacking nasiform process on article 1. Accessory flagellum 1-articulate, scale-like. Palp of mandible absent; palp of maxilla 1 1-articulate. Inner plate of maxilla 2 produced. Inner plates of maxillipeds well separated. Gnathopod 1 small, simple, dactyl short and stubby, article 4 incipiently chelate; article 5 elongate, unlobed; article 6 short, linear. Gnathopod 2 enlarged, palm strongly oblique; articles 4-5 short, lobed. Pereopod 5 with rectolinear article 2, pereopods 6-7 with expanded and lobate article 2. Pereonite 4 ordinary. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 weakly extended posterodorsally. Telson ordinary, flat.

Relationship. Differing from *Parametopa* in the elongate article 5 of gnathopod 1 and enlarged gnathopod 2.

See *Knysmetopa.*

Species. *Wallametopa cabon* J.L. Barnard, 1974b (Ledoyer, 1979a, 1986) [782 + 698].

Habitat and distribution. Marine, south-eastern Australia to Madagascar, 15-49 m, 1 species.

Zaikometopa Barnard & Karaman

Zaikometopa Barnard & Karaman, 1987: 871.

Type species. *Metopelloides erythrophthalmus* Coyle & Mueller, 1981, original designation.

Diagnosis. Antenna 1 bearing nasiform process on article 1. Accessory flagellum absent. Palp of mandible 1-articulate; palp of maxilla 1 2-articulate. Inner plate of maxilla 2 ordinary. Inner plates of maxillipeds mostly fused together. *Coxa 2 small and hidden by coxa 3.* Gnathopod 1 small, simple, article 4 incipiently chelate; article 5 short, unlobed; article 6 elongate, linear. Gnathopod 2 enlarged, palm parachelate, article 5 short, lobed. Pereopods 5-7 with rectolinear article 2. Pereonite 4 highly elongate. Pleonites 4-6 free; pleonite 3 lacking dorsal process; pleonite 4 strongly carinate posterodorsally. Telson ordinary, flat.

Relationship. Differing from *Metopelloides* and *Vonimetopa* in the nasiform lobe on article 1 of antenna 1, the mostly fused inner plates of the maxillipeds and the carinate urosomite 1. From *Metopelloides* also in the short lobed carpus and elongate simple propodus of gnathopod 1; and the unusually small coxa 2 hidden by coxa 3.

Species. *Zaikometopa erythrophthalmus* (Coyle & Mueller, 1981) [272].

Habitat and distribution. Marine, Gulf of Alaska westward along Alaskan Peninsula, 0 m, 1 species.

STILIPEDIDAE Holmes, 1908

Astyridae Pirlot, 1934: 175.

Diagnosis. Antenna 1 shorter than antenna 2. Accessory flagellum 0 to 2-articulate. Mandible flat, molar simple or absent, mandibular palp present. Coxa 1 broader than 2 or 3, expanded distally, occasionally coxae tending to acumination but never sharply, coxa 4 excavate posteriorly. Gnathopods feeble, simple, carpus dominant. Article 2 of pereopod 7 distinct from article 2 of pereopods 5-6. Uropod 3 with short peduncle, very long rami (often one or both lost). Urosomite 1 with carina. Telson short, cleft or entire.

See Eusiridae (Calliopiidae, Pontogeneiidae), Haustorioidea, Hyperiopsidae, Iphimediidae, Laphystiopsidae, Liljeborgiidae, Oedicerotidae, Pardaliscidae, Pleustidae, Synopiidae and Vitjazianidae.

Description. Body compressed laterally, stout anteriorly, often carinate posterodorsally, urosomites free, rostrum small, head large, ordinary or weakly galeate or tiburonid (shark-nosed); lateral cephalic lobes flush or weakly protruding, lacking deep insertion declivity for antenna 2, antennal corner often produced to form cavity around base of antenna 2; eyes absent or present (rare). Antennae long to medium but peduncles very short, articles 2-3 of peduncle on antenna 1 very short, primary flagellum stout, articles short (proliferate, very strongly setulose, aesthetised or pubescent), those of antenna 2 less strongly setulose. Labrum variable, often deeply incised. Mandibular palp slender, article 3 much shorter than 2. Lower lip variable, inner lobes weak or absent, medial gape absent or strong, mandibular lobes extended, often pointed. Maxillae variable but medial margins of inner plates on both pairs moderately to strongly setose, no major facial setae (rarely *Bathypanoploea*). Maxilliped well developed, inner plate moderate to strong but outer plate very large, medially armed, palp variable but 4-articulate, dactyl often feeble.

Coxa 1 often very broadly adze-shaped, coxae 2-3 usually tapering and narrow, coxa 4 subacuminate, thus ventral margin oblique, poorly to strongly excavate posteriorly, coxae 5-7 short. Carpus of gnathopods as long as but broader than propodus, lobate or not, gnathopods stout or slender but palms absent. Pereopods 3-7 of ordinary elongation. Epimera large, stable, poorly sculptured. Pleopods well developed. Urosomite 1 with dorsal notch or carina. Uropods 1-2 long, spinose, outer ramus of uropod 2 usually shortened. Uropod 3 scarcely exceeding other uropods, peduncle short, rami long, lanceolate. Telson poorly ornamented.

Relationship. Very close to Iphimediidae, especially intergrading to, by and through *Epimeriella-Eclysis* which share similar maxillae, maxillipeds and gnathopods or article 2 of pereopods 5-7 (diverse). The subacuminate coxae of several stilipedids also come close to iphimediid conditions. Probably the broader coxa 1, being much broader than coxae 2 or 3, is the best distinction. Most stilipedids can be recognised by the strange lower lips and by the identical gnathopods with broad dominant carpus and thinner, feeble, simple propodus.

Somewhat to the ancestral side of Stegocephalidae in bearing mandibular palp; otherwise most characters of Stegocephalidae are present.

Stilipedids differ from most Eusiridae in the feeble or absent molars, in the simple gnathopods with dominant carpus and the broadened coxa 1. See the Key to the Genera of Eusiridae for the place where Stilipedidae emerge.

Differing from Pardaliscidae in the longer coxae; from all but the exceptional member of Oedicerotidae in the short peduncle of uropod 3; from Synopiidae in the feeble to absent molar and very short peduncle of antenna 1; from Hyperiopsidae in the broadened coxa 1 and ordinary pereopods 3-4 with non elongate article 4; from Vitjazianidae in the long coxae, broadened coxa 1, evanescent molar, short accessory flagellum and short basal article of primary flagellum on antenna 1; from most Pleustidae in the simple gnathopods combined with enlarged outer plate of the maxilliped; from Liljeborgiidae in the simple gnathopods (note how Liljeborgiidae have the similar broadened coxa 1 and enlarged plates of the maxillipeds); from Laphystiopsidae in the long coxae and strongly setose inner plate of maxilla 1; and from Haustorioids in the non fossorial pereopods and antennae and generally aequiramous uropod 3 with long rami.

The Stilipedidae are unified by the broad coxa 1, narrower coxae 2-3, the feeble gnathopods with the dominant carpus, the propodus dependent and simple (few iphimediids have both gnathopods identical and simple) and the diversity of article 2 on pereopod 7 versus pereopods 5-6.

This family is divided into groups by Holman & Watling (1983a) as follows: Astyrinae, Alexandrellinae and Stilipedinae, with *Alexandrella* and *Bathypanoploea* placed in the Alexandrellinae.

Key to Genera of Stilipedidae

1. Coxa 1 subacuminate, blunt or not significantly broader than coxa 2 .... (Iphimediidae) *Epimeriella*

—— Coxa 1 rounded-truncate, broader than coxa 2 2

2. Antenna 1 and body with large sharp teeth 3

—— Antenna 1 and body with small or no teeth 4

3. Palp of maxilla 1 1-articulate .... *Astyroides*

—— Palp of maxilla 1 2-articulate .... *Bathypanoploea*

4. Mandible and maxillae 1-2 of ordinary dimensions, incisor narrow, molar present, [article 2 of pereopods 5-6 setose posteroventrally] 5

—— Mandible and maxillae 1-2 immensely broadened, incisor broad, molar absent, [article 2 of pereopods 5-6 naked posteroventrally] 6

5. Lacinia mobilis absent, outer lobes of lower lip weakly separated, dactyl of maxillipedal palp not serrate .... *Eclysis*

—— Lacinia mobilis present, outer lobes of lower lip strongly separated, dactyl of maxillipedal palp serrated .... *Astyra* (= *Chagosia*, *Parastyra*)

6. Palp of maxilliped greatly exceeding outer plate, labrum weakly emarginate, incisor smooth, right lacinia mobilis absent .... *Stilipes* (= *Cacao*)

—— Palp of maxilliped not reaching apex of outer plate, labrum deeply incised, right lacinia mobilis present .... *Alexandrella* (= *Pseudandaniexis*)

Alexandrella Chevreux

Fig.127C

Alexandrella Chevreux, 1912a: 7.–Chevreux, 1912d: 134.–Holman & Watling, 1983a: 32.
Parandaniexis Nicholls, 1938: 42 (*Parandaniexis mixtus* Nicholls, 1938, original designation) [homonym, Amphipoda].
Pseudandaniexis Nicholls, 1938: corrigendum (new name, same type species).
Iphimediopsis Schellenberg, 1931: 126 (*Acanthonotozoma australis* Chilton, 1912d, monotypy, but misidentified, see *Bathypanoploea*) [homonym, not Della Valle, 1893].
Bathypanoploea Schellenberg, 1939: 137 (new name for *Iphimediopsis* Schellenberg, same type species).
Pseudiphimediopsis Ruffo, 1949: 18 (new name for *Iphimediopsis* Schellenberg, same type species).

Type species. *Alexandrella dentata* Chevreux, 1912a, original designation.

Diagnosis. Labrum deeply incised, lobes asymmetrical. Mandibles very broad, very flat, incisor broad, minutely crenulate to strongly toothed, left lacinia mobilis present, right present or absent (type), raker row absent, molar absent. Maxillae 1-2 broadly expanded, palp of maxilla 1 2-articulate and often bent (type). Basal setae of inner plate on maxilla 2 elongate. Palp of maxilliped not reaching apex of outer plate. Carpus of gnathopods not lobate. Article 2 of pereopods 5-6 laterally smooth, narrow, mostly asetose, of pereopod 7 much broader, more deeply lobate, posterior margin excavate.

Description. Sides of pereonites each with small cusp well above top edges of coxae (type). Eyes absent (or poorly apparent). Outer lobes of lower lip large, appressed, inner lobes weak, split, or absent, mandibular lobes well developed. Inner plate of maxilla 1 subquadrate, fully setose medially, outer plate with 11 spines, palp stout. Inner plate of maxilla 2 broad, short, often adze-shaped (type), fully setose medially, outer plate broad basally, then tapering distally, setose medially and apically. Article 2 of pereopods 5-6 moderately expanded, ovatorectangular, lobate posteroventrally, of pereopod 7 broadly expanded, lobate or not, posterior edge angularly sculptured. Telson with weak, complex apical excavation. Gills simple, on coxae 2-?, ovate to pyriform; oostegites expanded, tear drop shaped, well setose.

Sexual dimorphism. Unknown; antennae of both sexes with tufts of armaments somewhat as in *Astyra* but bundles on flagellum of antenna 1 often widely dispersed and antenna 2 with facial bundles mainly on articles 2-3 of peduncle, rarely article 4.

Variables. Antenna 1 with or without tooth; incisor toothed or smooth; inner lobes of labium present or absent; posteroventral corner of coxa 5 blunt or acute; posteroventral corner of article 2 on pereopod 7 blunt or acute.

Relationship. Differing from *Astyra* in the flabellate mandible and maxillae, and the absent molar.
See *Stilipes* and *Bathypanoploea*.

Species. *Alexandrella australis* (Chilton, 1912d) (not Schellenberg, 1931) (Holman & Watling, 1983a) [880BA]; *A. dentata* Chevreux, 1912a,d (J.L. Barnard, 1961a) (Holman & Watling, 1983a) [800B]; *A. inermis* Bellan-Santini & Ledoyer, 1986 [799]; *A. mixta* (Nicholls, 1938) (Bellan-Santini, 1972) (Holman & Watling, 1983a)[878 + 714A]; *A. subchelata* Holman & Watling, 1983a [717B].

Habitat and distribution. Marine, cosmopolitan (probably), cold water, 60-7210 m, 4 species.

Astyra Boeck, new synonymy

Figs 128A,B,C,D

Astyra Boeck, 1871b: 133.
Chagosia Walker, 1909b: 332 (*Chagosia gardineri* Walker, 1909b, monotypy).
Parastyra Pirlot, 1934: 176 (*Parastyra longidactyla* Pirlot, 1934, original designation).

Type species. *Astyra abyssi* Boeck, 1871b, monotypy.

Diagnosis. Labrum scarcely incised. Mandibles narrow, very flat, twisted, incisor narrow, toothed, right lacinia mobilis absent, left present, raker row well developed, molar long, conical, simple, setose. Maxillae 1-2 almost ordinary, not immensely broadened though inner plate of maxilla 2 broader than ordinary (see Fig.128A), palp of maxilla 1 2-articulate. Palp of maxilliped exceeding apex of outer plate. Carpus of gnathopods weakly lobate or moderately carpochelate. Article 2 of pereopods 5-6 with setose lateral ridge

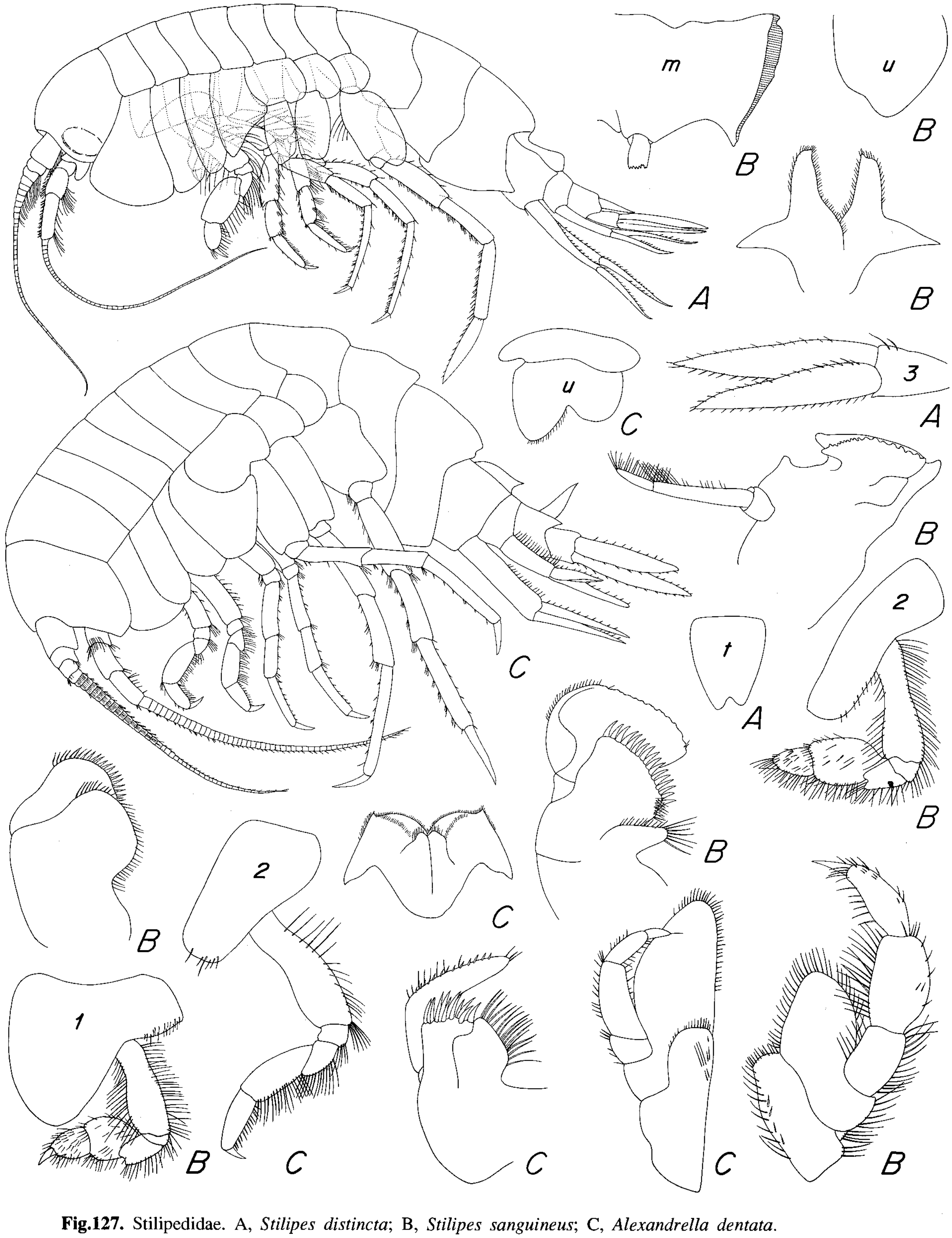


Fig.127. Stilipedidae. A, *Stilipes distincta*; B, *Stilipes sanguineus*; C, *Alexandrella dentata*.

extending ventrally to form weak posteroventral lobe; article 2 of pereopod 7 simple, lobate, lacking setose ridge, posterior margin straight.

Description. Eyes present or absent. Accessory flagellum present or absent. Outer lobes of lower lip large, widely separated by gape, space empty or filled with weak but split inner lobes, mandibular lobes well developed. Inner plate of maxilla 1 thickly triangular, with about 7 medial setae towards apex; outer plate with 9 spines, palp slender. Inner plate of maxilla 2 broad, short, apically setose, outer plate narrow, elongate, apically setose. Dactyls of gnathopods serrate. Article 2 of pereopods 5-6 moderately expanded and ovatorectangular, posteroventrally lobate, of pereopod 7 broadly expanded, lobate, with angular sculpture on posterior edge. Telson cleft halfway (type). Gills simple, on coxae 2-7, ovate to pyriform; oostegites weakly expanded, tear drop shaped, well setose.

Sexual dimorphism. Weak; both sexes of *A. abyssi* with *Ampelisca*-like setular bundles on anterior margins of articles 4-5 on antenna 2 and medium to long bundles on articles of flagellum on antenna 1.

Variables. Inner ramus of uropod 3 frequently broken off, thereby leaving uropod 3 apparently uniramous or showing from dorsal view peduncular process that looks like scaliform inner ramus.

Dactyls of pereopods 3-7 elongate (*A. longidactyla-longipes*) or short (*A. carinatus*); gnathopods carpochelate (*A. gardineri*) or not (*A. carinata*); corner of head produced (*A. abyssi*) or head plough-shaped (*A. gardineri*, *A. longidactyla*); inner plate of maxilla 1 very setose (*A. zenkevitchi*); telson cleft (type), barely incised (*A. zenkevitchi*); pleonites 2-3 carinate (*A. longipes*).

Astyra longidactyla appearing distinct from *A. gardineri* on (1) shape of gnathopod 1; (2) shape of article 2 on pereopod 6 (?2 interpretations); (3) shape of coxa 4; (4) slope of palms on gnathopods 1-2; (5) head, telson cleft (type), barely incised (*A. zenkevitchi*); pleonites 2-3 carinate (*A. longipes*).

Relationship. Differing from *Stilipes* and *Alexandrella* in the narrower mandible and incisor and unexpanded maxillae.

Astyra vaguely looks like *Cleippides* in the Iphimediidae but *Astyra* is characterised by toothed incisor, small simple molar (contrast large ringed incisor and molar), short inner plate of maxilla 2 lacking facial setae, large outer plate of maxilliped with medial spination (*Cleippides* is short and medially naked), short

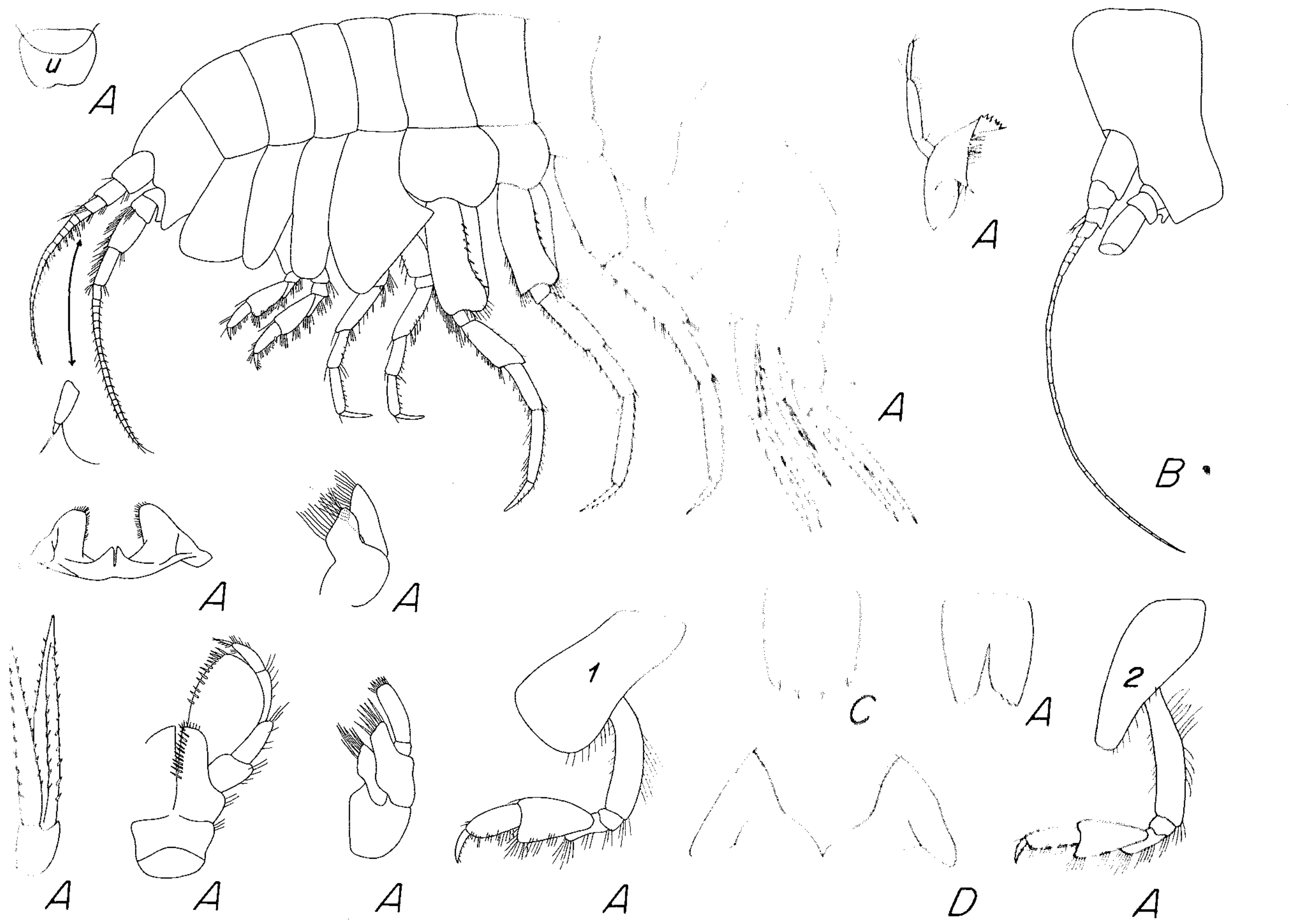


Fig.128. Stilipedidae. A, *Astyra abyssi*; B, *Astyra gardineri*; C, *Astyra zenkevitchi*; D, *Astyra bogorovi*.

articles 1-2 of antenna 1, and gaping lower lip.

Species. See Gurjanova (1951); Stephensen (1931a, 1938b, 1940b); *A. abyssi* Boeck, 1871b (Sars, 1895) [216 + B]; *A. bogorovi* Birstein & Vinogradov, 1955, 1958 [230A]; *A. gardineri* (Walker, 1909b) (?= *A. longidactyla* Pirlot, 1934) (Birstein & Vinogradov, 1964) [660B]; *A. longidactyla* (Pirlot, 1934) [?600]; *A. longipes* Stephensen, 1933b [212B]; *A. similis* (K. H. Barnard, 1932)[833]; *A. zenkevitchi* Birstein & Vinogradov, 1955, 1958, 1964 [280A + 660A].

Habitat and distribution. Marine, cosmopolitan, cold water pelagic or demersal, 100-2350 m, 7 species.

Astyroides Birstein & Vinogradova

Astyroides Birstein & Vinogradova, 1960: 152.

Type species. *Astyroides carinatus* Birstein & Vinogradova, 1960, original designation.

Diagnosis. Like *Bathypanoploea* but palp of maxilla 1 1-articulate.

Species. *Astyroides carinata* Birstein & Vinogradova, 1960 [231A].

Habitat and distribution. Marine, Kurile-Kamchatka Trench, 7210-7230 m, 1 species.

Bathypanoploea Schellenberg [also in Iphimediidae]

Bathypanoploea Holman & Watling, 1983: 47 (requesting type be changed to *Bathypanoploea schellenbergi* Holman & Watling, 1983 to overcome erroneous original identification by Schellenberg, 1931).
Epimeriopsis K.H. Barnard, 1931a: 428 [void ab initio].
not *Iphimediopsis* Schellenberg, 1931: 126 (*Acanthonotozoma australis* Chilton, 1912d, monotypy, but misidentified) [homonym, not Della Valle, 1893] (= *Alexandrella*).
not *Bathypanoploea* Schellenberg, 1939: 137 (new name for *Iphimediopsis* Schellenberg, same type species) (= *Alexandrella*).
not *Pseudiphimediopsis* Ruffo, 1949: 18 (new name for *Iphimediopsis* Schellenberg, same type species) (= *Alexandrella*).

Type species. *Bathypanoploea schellenbergi* Holman & Watling, 1983.

Diagnosis. *Antenna 1 and body toothed.* Labrum deeply incised, lobes asymmetrical. Mandibles ordinary, flat, incisor broad, toothed, right and left laciniae mobiles present, raker row moderately developed, molar absent. Maxillae 1-2 moderately broadened, palp of maxilla 1 2-articulate. Basal setae on inner plate of maxilla 2 not elongate. Palp of maxilliped much shorter than outer plate. Carpus of gnathopods not lobate. Article 2 of pereopods 5-6 lacking ridge and lobe; article 2 of pereopod 7 excavate, lobate above and below, lacking setose ridge.

Description. Eyes absent. Accessory flagellum 1-articulate. Outer lobes of lower lip large, separated by gape, space filled with shallow inner lobes, mandibular lobes well developed. Inner plate of maxilla 1 thickly triangular, medially setose, with several scattered facial setules; outer plate with 9 spines; palp slender, medially spinose. Plates of maxilla 2 broad, apically setose. Dactyls of gnathopods pectinate. Article 2 of pereopods 5-6 moderately expanded and ovatorectangular, scarcely lobate. Telson cleft one fourth to one third. Gills [unknown]; oostegites [unknown].

Relationship. In the Iphimediidae this genus would differ from *Acanthonotozoma* in the similarity of gnathopods 1-2 to each other, the nonparasitic mouthparts and the short strong incisor. Differing from *Epimeria* and allies in the absence of the molar; from *Epimeriella* in the blunt coxae 1-3 and noncrescentic form of coxae 3-4.

Differing from other stilipedids in the teeth on pereon, pleon and antenna 1. From *Alexandrella* especially in the presence of rakers, and the 2-articulate palp of maxilla 1. *Alexandrella* has elongate basomedial setae on the inner plate of maxilla 2.

Removal. *Bathypanoploea australis* Chilton, 1912d, to *Alexandrella*.

Species. *Bathypanoploea schellenbergi* Holman & Watling, 1983a (= *B. australis* identification of Schellenberg, 1931) [880 + B].

Habitat and distribution. Marine, South Georgia to Ross Sea area, 468-2675 m, 1 species.

Eclysis K.H. Barnard

Figs 76O, 78F, 79H

Eclysis K.H. Barnard, 1932: 181.

Type species. *Eclysis similis* K.H. Barnard, 1932, monotypy.

Diagnosis. Labrum scarcely incised. Mandibles narrow, not very flat, [?twisted], incisor narrow, toothed, right lacinia mobilis absent, left absent, raker row present, molar long, conical, simple, setose. Maxillae 1-2 almost ordinary, not immensely broadened though palp of maxilla 1 slightly expanded, palp of maxilla 1 2-articulate. Palp of maxilliped exceeding apex of outer plate. Carpus of gnathopods moderately lobate. Article 2 of pereopods 5-6 with [?non-setose] lateral ridge extending ventrally to form moderate posteroventral lobe; article 2 of pereopod 7 simple, lobate, posterior margin weakly concave.

Description. Eyes absent. Accessory flagellum present. Outer lobes of lower lip large, weakly separated by gape, space empty, mandibular lobes well developed. Inner plate of maxilla 1 thickly triangular, with about 7 medial setae towards apex; outer plate with 9 spines. Plates of maxilla 2 short, apically setose. Dactyls of gnathopods [?serrate]. Article 2 of pereopods 5-7 moderately expanded and ovatorectangular, posteroventrally lobate. Telson cleft halfway. Pereonite 7, pleonites 1-4 dorsally toothed. Gills [?simple, on coxae 2-7, ?ovate to pyriform; oostegites ?weakly expanded, ?teardrop shaped, ?well setose].

Sexual dimorphism. [?Weak].

Relationship. Differing from *Astyra* in the lack of lacinia mobilis, the poorly spaced outer lobes of the lower lip, unserrate article 4 of the maxillipedal palp and pereopod 7 longer than pereopod 6.

Species. *Eclysis similis* K.H. Barnard, 1932 (Andres & Lott, 1986) [833].

Habitat and distribution. Marine, South Georgia, 230-250 m, 1 species.

Epimeriella

See Iphimediidae

Stilipes Holmes

Figs 127A,B

Stilipes Holmes, 1908: 536.–Holman & Watling, 1983a: 28.
Cacao K.H. Barnard, 1931a: 427 (*Cacao lacteus* K.H. Barnard, 1931a, 1932, original designation).

Type species. *Stilipes distincta* Holmes, 1908, original designation.

Diagnosis. Labrum weakly incised, lobes asymmetrical. Mandibles very broad, very flat, incisor broad, smooth (scarcely notched), left lacinia mobilis present, right absent, raker row absent, molar absent. Maxillae 1-2 broadly expanded, palp of maxilla 1 2-articulate. Palp of maxilliped strongly exceeding apex of outer plate. Carpus of gnathopods not lobate, gnathopods especially stout. Article 2 of pereopods 5-6 laterally smooth, narrow, mostly asetose, of pereopod 7 much broader, more deeply lobate, posterior margin excavate.

Description. Eyes present, below oval bulge on side of head. Accessory flagellum absent. Rostrum grotesque. Outer lobes of lower lip thin vertically (proximal to distal), with moderately medial gape, mandibular lobes well developed, sharp. Inner plate of maxilla 1 thin, apically setose, outer plate very broad, with about 17+ spines, palp flabellate. Inner plate of maxilla 2 broad, circular, short, outer plate similar, both setose medially. Coxa 4 especially small, smaller than coxa 1. Article 2 of pereopods 5-6 slender, weakly expanded, scarcely lobate, of pereopod 7 slightly more expanded, lobate posteroventrally, posterior edge regular; dactyl of pereopod 7 enlarged, oar-shaped. Telson narrowly incised. Gills folded and lobed (crumpled) on coxae 2-7; oostegites [unknown].

Sexual dimorphism. Antennae somewhat tufted as in *Astyra* in male only, female with ungrouped setae.

Relationship. Differing from *Alexandrella* in the long maxillipedal palp, the poorly emarginate labrum and the absent right lacinia mobilis.

Species. *Stilipes distincta* Holmes, 1908 (Gurjanova, 1952b) (Shoemaker, 1964) (Birstein & Vinogradov, 1970) [510B]; *S. lacteus* (K.H. Barnard, 1931a, 1932) [447B]; *S. sanguineus* (Hurley, 1954f) [715B].

Habitat and distribution. Marine, probably cosmopolitan, 230-620 m, 3 species.

SYNOPIIDAE Dana, 1855

Syrrhoinae Boeck, 1871b: 146.
Tironidae Stebbing, 1906: 273.

Diagnosis. Gammaridean with galeate head or with plough-shaped protuberance on forehead; accessory flagellum of antenna 1 large, multiarticulate; upper lip fleshy, ventrally truncate, rounded or weakly incised, usually with small marginal hairs; mandibles with 3-articulate palp (3 exceptions), molar present and never amalgamated with spine row, latter often vestigial; lower lip with well-developed mandibular lobes, inner lobes present and separate from each other, no extraordinarily wide space occurring between outer lobes; maxillae 1-2 well developed but setation variable, palp of maxilla 1 2-articulate; inner and outer plates and palp of maxilliped well developed, palp usually 4-articulate, rarely 3; coxae 1 and 2 large and unhidden by posterior coxae, except coxa 1 rarely narrowed; gnathopod 1 present, 7-articulate; gnathopods not sexually dimorphic, gnathopod 2 not enlarged; pereopods 3-5 basic, pereopod 7 not grossly longer than 6 in contrast to Oedicerotidae; uropods 1-3 present, all strongly biramous; telson present.

See Cardenioidae and Platyischnopidae.

Sexual dimorphism. Males often with enlarged eyes (when present), elongate, more brushy antennae and enlarged posterior body teeth.

Morphology. 'Pelagont coxae' refers to an enlarged coxa 3 and reduced coxa 4, latter often comma-shaped.

Relationship. The galeate head, in combination with the presence of a macroscopic accessory flagellum, nonfleshy telson, reasonably proportional articles 5-6 of pereopods 3-4, well-developed molar, elongate telson (with one generic exception), unbroadened mandibular incisors, reasonably short article 3 of gnathopod 2, and slender peduncle of antenna 1 with articles 2 and 3 not strongly shortened or telescoped into article 1, distinguish synopiids from similar members of Haustorioidea, Oedicerotidae, Phoxocephalidae, Argissidae, Eusiridae, (?Vitjazianidae), Stilipedidae, Iphimediidae, Stegocephalidae and Lysianassidae.

Synopiidae and Oedicerotidae are very similar morphologically. Synopiids differ from most Oedicerotidae in the short peduncle of uropod 3 (but one genus of Oedicerotidae has vestigial uropod 3). Synopiidae differ from Oedicerotidae in the presence of a conspicuous accessory flagellum.

The Stilipedidae differ from synopiids in the mandible, which bears a heavily and sharply serrate, subflabellate incisor, a swept, conical molar bearing setae and in the lower lip, which has a wide channel between the outer lobes. The excessively large number of raking spines on the mandible suggests a feeding behaviour distinct from the synopiids and more intensely adapted for raking than in most oedicerotids.

Synopiids are close to the basic gammaroidean but each genus of synopiid taken by itself differs from marine gammaroideans (including section Gammarida) in bearing one or more of the following characters: huge mandibular molar, pelagont coxae, galeate head, elongate telson, gnathopodal shape, and shortened outer ramus of uropod 1 or 2.

Key to Genera of Synopiidae

1. Both telson and peduncle of uropod 3 very short and subequal in length, mandibular palp extremely stout .... *Synopia*

—— Telson elongate, exceeding peduncle of uropod 3 even when peduncle elongate, mandibular palp not extremely stout or absent 2

2. Gnathopods simple 3

—— One or both gnathopods subchelate, with definite corner or defining spine 6

3. Rostrum with blunt apex, eyes absent, uropod 1 failing to reach apex of uropod 2 .... *Pseudotiron*

—— Rostrum with sharp apex, eyes absent, uropod 1 reaching apex of uropod 2 4

—— Rostrum with sharp apex, eyes present, uropod 1 reaching apex of uropod 2 5

4. Mandibular palp present, coxa 3 not distinctly pelagont, coxa 4 of medium size .... *Syrrhoites*

—— Mandibular palp absent, coxa 3 very pelagont, coxa 4 small .... *Jeddo*

5. Mandibular palp present, pleonites 1-3 multicrenulate dorsally .... *Tiron*

—— Mandibular palp absent, pleonites 1-3 each with 1 dorsal tooth .... *Metatiron*

6. Gnathopodal palms transverse or nearly so, defined by enlarged spine(s) 7

—— Gnathopodal palms oblique and defined by enlarged spine(s) 8

7. Coxae 3-4 pelagont .... *Syrrhoe*

—— Coxae 3-4 not pelagont .... *Garosyrrhoe*

8. Mandibular molar of medium size, occasionally smooth and minutely fuzzy but usually triturative and generally columnar or subcolumnar, body of mandible stout but not extraordinarily bulky or subglobular, palp relatively strong 9

—— Mandibular molar very large and smooth, minutely setulose or fuzzy, molar completely dominating mandible, body of mandible bulky, subglobular, together with molar often dwarfing palp (exceptions in *Ileraustroe* and *Jeddo*) 10

9. Telson very long and narrow, entire .... *Priscosyrrhoe*

—— Telson of medium length, broad, cleft about halfway .... *Austrosyrrhoe*

10. Coxae 3-4 strongly pelagont 11

—— Coxae 3-4 not or weakly pelagont 13

11. Telson cleft three eighths or more, mandibular palp absent .... *Jeddo*

—— Telson cleft one fourth or less, mandibular palp present 12

12. Antenna 1 with apicodorsal tooth on article 1, telson entire or apical cleft vestigial .... *Bruzeliopsis*

—— Antenna 1 lacking apicodorsal tooth on article 1, telson cleft about one fifth .... *Ileraustroe*

13. Telson cleft one third or more 14

—— Telson entire 15

14. Palms of gnathopods bearing 1-2 serrate spines, coxa 1 narrow and tapering distally .... *Latacunga*

—— Palms of gnathopods bearing 1-2 simple spines, coxa 1 not tapering .... *Syrrhoites*

15. Palms of gnathopods bearing 1-2 serrate spines .... *Bruzelia*

—— Palms of gnathopods bearing about 4 simple spines .... *Stephobruzelia*

Austrosyrroe K.H. Barnard

Austrosyrrhoe K.H. Barnard, 1925: 354.–Lincoln, 1979a: 396.

Type species. *Austrosyrrhoe crassipes* K.H. Barnard, 1926, monotypy.

Diagnosis. Forehead not protuberant, lateral cephalic lobe not sharp; eyes absent; mandible with palp, molar of medium size and not dominating mandible, weakly to strongly triturative; articles 1-2 of antenna 1 either basic or article 2 elongate and bearing apical tooth; coxa 1 ordinary; coxae 3-4 not pelagont or weakly so; gnathopods typically subchelate, palms oblique and bearing at least 1 serrate spine, occasionally gnathopod 2 with obsolescent transverse palm; dactyl of gnathopod 2 usually normal; pereopods 3-5 elongate, dactyls elongate, article 2 of pereopod 7 weakly or strongly expanded, rounded or truncate ventrally; pleonites 1-3 not denticulate; uropod 3 not grossly exceeding uropods 1-2, peduncle elongate; telson of medium length and cleft halfway.

Variables. Article 2 of antenna 1 with apical tooth (type) or not (others), gnathopods with 1 palmar spine (type), or 2 (others); article 2 of pereopod 7 well expanded (*A. septentrionalis*) or poorly (type); and see subgeneric groups in 'Relationships'.

Taxonomy. Possibly species other than the type are not congeneric (see J.L. Barnard, 1972c).

Relationship. This genus remains confounded because of uncertainties in the type species (see J.L. Barnard, 1972c). *Austrosyrrhoe* remains a catchall of species with presumed unenlarged molar distinct from that of *Ileraustroe* and *Bruzelia*, bears a deeply cleft telson and oblique gnathopodal palms with one enlarged serrate spine. Species of *Austrosyrrhoe* and *Priscosyrrhoe* are of vital interest in attempting to determine whether the small mandibular molar is an evolutionary apex with origins in the *Bruzelia* group or whether the *Austrosyrrhoe* molar represents the condition primordial to the later evolution of the *Syrrhoites-Bruzelia* complex. The members of *Austrosyrrhoe* are the only species in Synopiidae with distinctly oblique palms that lie outside the *Bruzelia* complex; the *Tiron* group has simple gnathopods; the *Syrrhoe* group has transverse palms and *Synopia* is problematical.

Two groups of species occur in *Austrosyrrhoe* as diagrammed below. Some of the species now placed in *Austrosyrrhoe* were formerly in *Syrrhoites*. Because the precise shape of coxa 3 and armaments on uropods 1-2 are unknown in the type species, it seems unwise to divide the two groups generically; many more species of deep-sea synopiids undoubtedly remain to be described.

Diagnoses of Subgeneric Groups in *Austrosyrrhoe*. 1. Article 2 of antenna 1 bearing apical tooth; coxa 3 not adequately known; coxa 4 apparently large and adze-shaped; gnathopods with 1 palmar spine; outer rami of uropods 1-2 not definitely known though presumed from the description to have simple outer rami but much room for doubt is possible in light of other similarities to group 2 .... *A. crassipes*

2. Article 2 of antenna 1 simple; coxa 3 subquadrate and scarcely excavate posteriorly, coxa 4 medium and strongly adze-shaped; gnathopods with 2 palmar spines (male of *A. fimbriatus* aberrant and female not definitely known in this regard); outer rami of uropods 1-2 apically spinose ....
..........................*A. rinconis*, *septentrionalis*, ?*fimbriatus*

Species. *Austrosyrroe crassipes* K.H. Barnard, 1926 (J.L. Barnard, 1972c) [701B]; *A. fimbriatus* (Stebbing & Robertson, 1891) (Schellenberg, 1925b) (Stephensen, 1938b) (Gurjanova, 1951) (Lincoln, 1979a) [239 + 202B]; *A. rinconis* J.L. Barnard, 1967a, 1972a [309B]; *A. septentrionalis* Stephensen, 1931a (Gurjanova, 1951) (J.L. Barnard, 1972c [216BA].

Habitat and distribution. Marine, probably cosmopolitan, mostly in deep water, 34-60 m in Irish Sea and Firth of Clyde, otherwise 885-2702 m, 4 species.

Bruzelia Boeck

Fig.129E

Bruzelia Boeck, 1871b: 149.–Stebbing, 1906: 274.–J.L. Barnard, 1972c: 17.

Type species. *Bruzelia typica* Boeck, 1871b, monotypy.

Diagnosis. Forehead weakly protuberant in type but not in others, lateral cephalic lobe not sharp; eyes absent; mandible with palp, molar greatly enlarged, not triturative, fuzzy; mouthparts basic; articles 1-2 of antenna 1 basic; coxa 1 ordinary; coxae 3-4 not pelagont, coxa 3 not strongly expanded distally except for acute anteroventral cusp and not posteriorly excavate, coxa 4 variable, excavate posteriorly (rarely weak), and slightly smaller or slightly larger than coxa 3; gnathopods typically subchelate, palms oblique, defined by 1-2 serrate spines, second spine if present occasionally simple; dactyl of gnathopod 2 normal; pereopods 5-7 weakly to strongly elongate, dactyls weakly elongate, article 2 of pereopod 7 typically rounded posteroventrally but truncate in *B. tuberculata* and *B. popolocan*; pleonites 1-3 not denticulate; uropod 3 not exceeding uropods 1- 2, peduncle typically short but elongate in *B. tuberculata* and *B. popolocan*; pleonites 1-3 not denticulate; uropod 3 not exceeding uropods 1-2, peduncle typically short but elongate in *B. tuberculata* and *B. popolocan*; telson elongate, entire.

Variables. Dorsal body teeth present or absent; antenna 1 with or without cusp; coxa 4 comma or adze-shaped; palm of gnathopods with 1 or 2 spines.

Relationship. Differing from *Stephobruzelia* in the 1-2 serrate spines of the gnathopodal palms (versus 4 simple spines). From *Syrrhoites* and *Latacunga* in the uncleft telson.

Species. See J.L. Barnard (1972c); *B. ascua* J.L. Barnard, 1966a, 1967a [310A]; *B. australis* Stebbing, 1910a (J.L. Barnard, 1972c) [781]; *B. diodon* K.H. Barnard, 1916 (J.L. Barnard, 1962d) (Ledoyer, 1986) [740BA]; *B. guayacura* J.L. Barnard, 1972c [503A]; *B. inlex* J.L. Barnard, 1967a [309BA]; *B. pericu* J.L. Barnard, 1972c [406B]; ?*B. popolocan* J.L. Barnard, 1972c [501A]; *B. poton* J.L. Barnard, 1972c [801A]; *B. tuberculata* Sars, 1883, 1895 (Stephensen, 1931a, 1938b) (Ledoyer, 1977) [200 + B]; *B. typica* Boeck, 1871b (Sars, 1895) (Stephensen, 1928, 1929) (Gurjanova, 1951) (Ledoyer, 1977) [355 + BA].

Habitat and distribution. Marine, cosmopolitan deep or cold water, except 100 m in warm eastern Australia, otherwise cold 121-3716 m, 10 species.

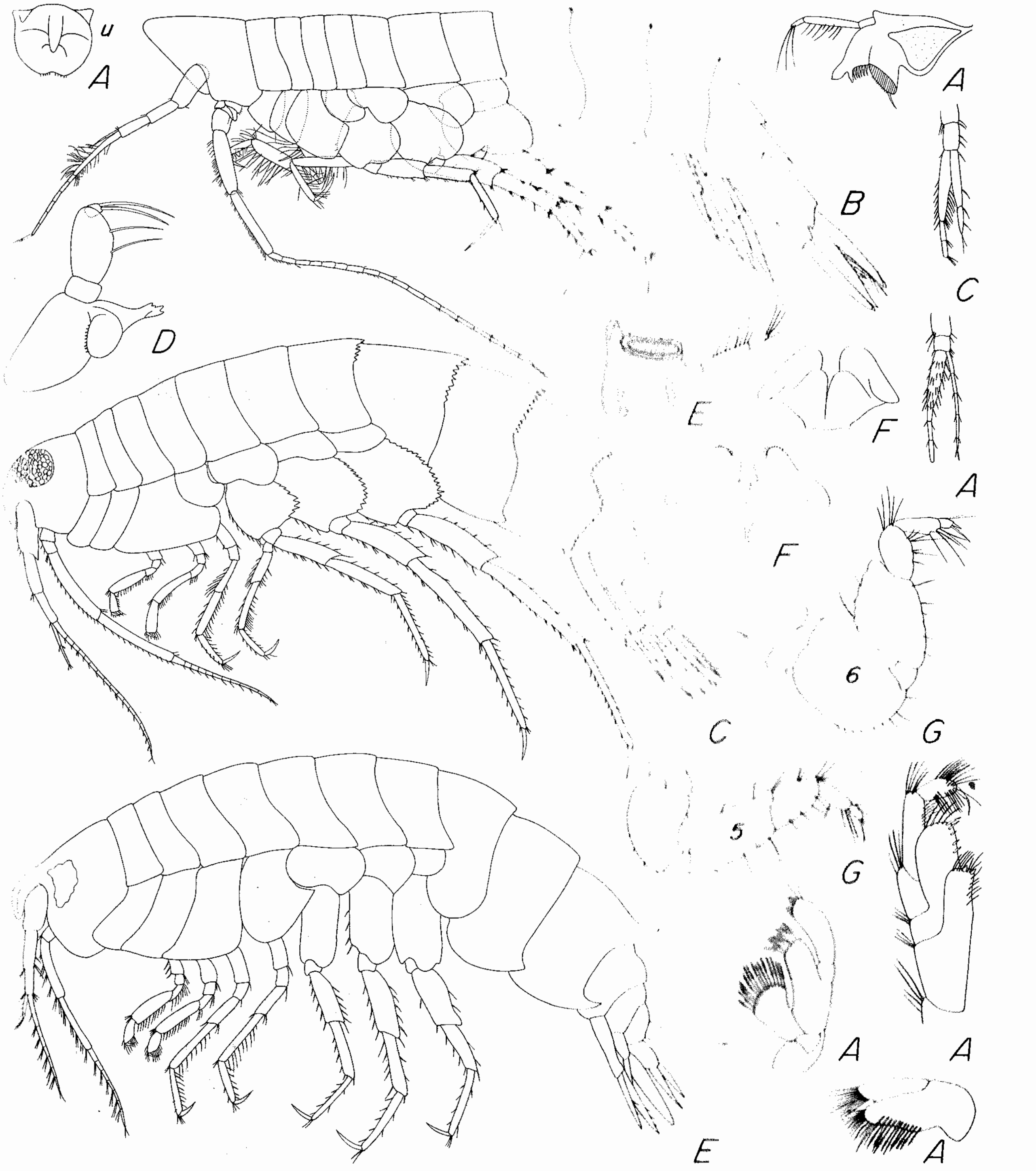


Fig.129. Synopiidae and Cardenioidae. A, *Tiron spiniferum*; B, *Pseudotiron longicaudatum*; C, *Syrrhoe crenulata*; D, *Synopia variablis*; E, *Bruzelia typica*; F, *Syrrhoites serratus*; G, *Cardenio paurodactylus*.

Bruzeliopsis Chevreux

Fig.130F

Bruzeliopsis Chevreux, 1911a: 3.–J.L. Barnard, 1972c: 32.

Type species. *Bruzeliopsis alberti* Chevreux, 1911a, original designation.

Diagnosis. Forehead not protuberant, lateral cephalic lobe not sharp; eyes absent; mandible with weak palp, molar greatly enlarged, not triturative, fuzzy; mouthparts basic; article 1 of antenna 1 elongate and bearing dorso (antero) distal tooth, article 2 lacking tooth; coxa 1 ordinary; coxae 3-4 pelagont; gnathopods weakly subchelate, palms oblique, with 1-2 nonserrate defining spines; dactyl of gnathopod 2 normal; pereopods 5-7 elongate, dactyls elongate, article 2 of

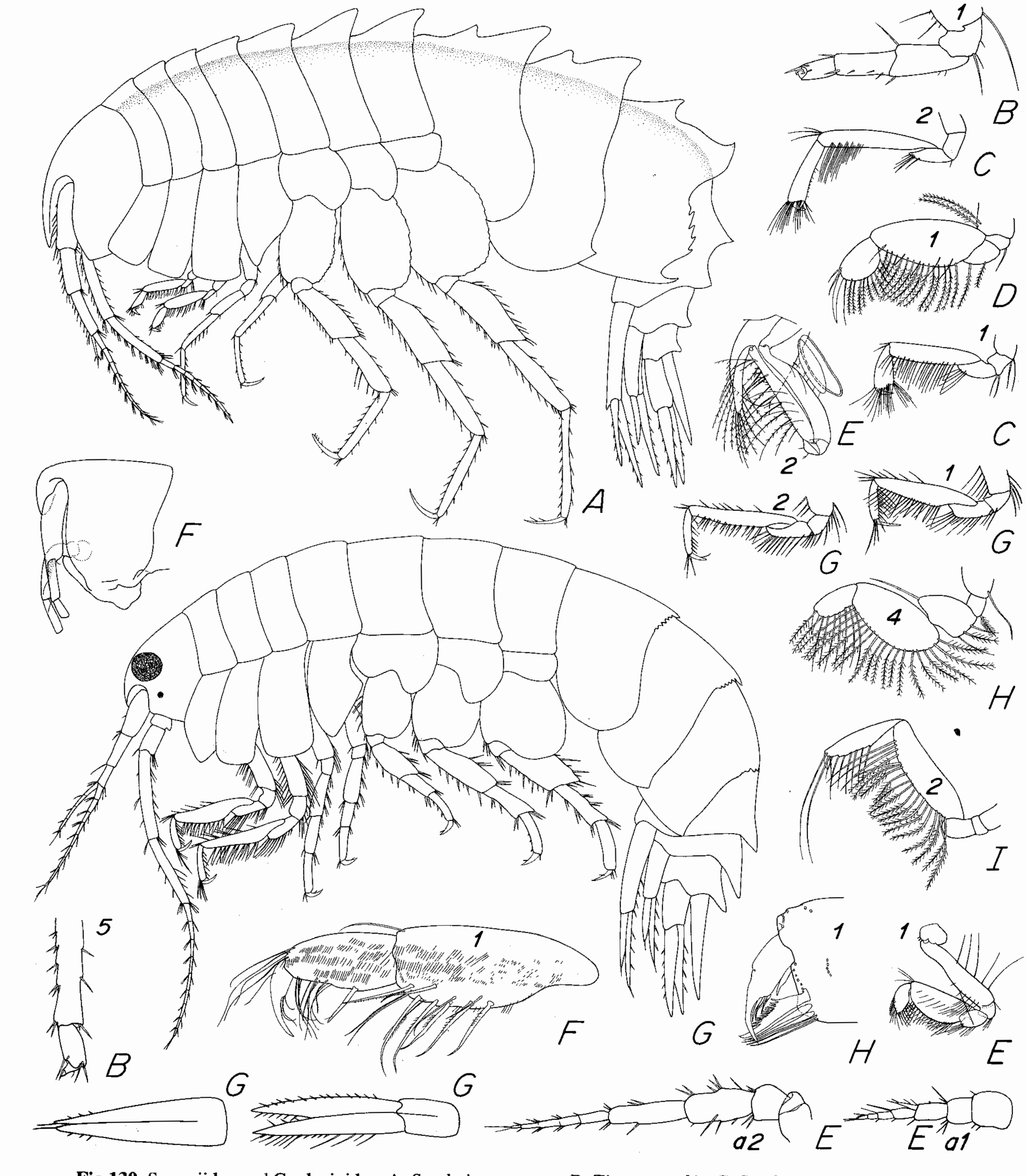


Fig.130. Synopiidae and Cardenioidae. A, *Syrrhoites serratus*; B, *Tiron tropakis*; C, *Syrrhoe crenulata*; D, *Synopia scheeleana*; E, *Cardenio paurodactylus*; F, *Bruzeliopsis turba*; G, *Tiron spiniferum*.

pereopod 7 posteroventrally truncate, weakly so in *B. cuspidata*; pleonites 1-3 not denticulate; uropod 3 not exceeding uropods 1-2, peduncle typically long but short in *B. turba*; telson elongate, entire, or very weakly cleft.

Variables. Minor.

Relationship. Close to *Ileraustroe* (see key couplet 11). Differing from the *Bruzelia* group in the pelagont coxae.

Remarks. See *Bruzelia popolocan* for remarks on similarities of that species to *Bruzeliopsis*.

Species. See J.L. Barnard (1972c); *B. alberti* Chevreux, 1911a (Chevreux, 1935) [221A]; *B. cuspidata* (J.L. Barnard, 1962d) [416A]; *B. turba* J.L. Barnard, 1964a [406B].

Habitat and distribution. Marine, north-eastern Atlantic, Caribbean Sea, south-eastern Atlantic, 825-4380 m, 3 species.

Garosyrrhoe J.L. Barnard

Garosyrrhoe J.L. Barnard, 1964a: 29.–J.L. Barnard, 1972c: 33.

Type species. *Syrrhoites bigarra* J.L. Barnard, 1962b, original designation.

Diagnosis. Forehead not protuberant; lateral cephalic lobe not sharp; mandible with palp, molar of medium size, weakly triturative or fuzzy; mouthparts basic; articles 1-2 of antenna 1 basic; coxa 1 ordinary; coxae 3-4 not pelagont, coxa 3 softly rectangular, posterior margin nearly parallel with anterior, and nonexcavate, coxa 4 expanded midposteriorly, posterodorsal margin sloping, not concave but appearing excavate, coxa 4 larger than 3; gnathopods subchelate, palms nearly transverse, defined by large serrate spine giving propodus chelate appearance; dactyl of gnathopod 2 normal; pereopods 5-7 elongate, dactyls elongate, article 2 of pereopod 7 rounded posteroventrally; pleonites 1-3 not denticulate or very weakly so; uropod 3 not exceeding uropods 1-2, peduncle elongate; telson elongate, deeply cleft.

Relationship. The gnathopods relate this genus to *Syrrhoe* but coxae 3 and 4 are distinct. In *Syrrhoe* coxa 3 is very large and posterodorsally excavate while coxa 4 is much shorter and narrower. *Syrrhoites* has oblique palms on the gnathopods and the palmar spines are relatively simple. *Syrrhoites* has the enlarged form of mandibular molar. *Austrosyrrhoe* has oblique palms on the gnathopods, coxa 4 is slightly smaller than coxa 3 and is distally adze-shaped, and the telson is never deeply cleft.

Species. See J.L. Barnard (1972c); *G. bigarra* (J.L. Barnard, 1962b, 1966a) [369]; *G. disjuncta* J.L. Barnard, 1969b [377]; species, Ortiz, 1978 [478].

Habitat and distribution. Marine, tropical pan-America, 0-89 m, 2 species.

Ileraustroe J.L. Barnard

Ileraustroe J.L. Barnard, 1972c: 34.–J.L. Barnard, 1972c: 34.

Type species. *Austrosyrrhoe ilergetes* J.L. Barnard, 1964, original designation.

Diagnosis. Forehead not protuberant, lateral cephalic lobe not sharp; eyes absent; mandible with palp, molar classified as enlarged but not strongly so, not triturative or weakly so, fuzzy; mouthparts basic; articles 1-2 of antenna 1 basic; coxa 1 ordinary; coxae 3-4 pelagont or tending to be so, coxa 3 expanded distally and posterodorsal margin excavate, coxa 4 small and intermediate between adze- and comma-shaped; gnathopods typically subchelate, palms oblique, defined by 1 serrate and 1 simple spine; dactyl of gnathopod 2 normal; pereopods 5-7 elongate, dactyls elongate, article 2 of pereopod 7 subtruncate posteroventrally in type, rounded in second species but generally expanded; pleonites 1-3 not denticulate; uropod 3 not exceeding uropods 1-2, peduncle elongate; telson highly elongate, cleft about one fifth its length.

Relationship. *Ileraustroe* differs from *Bruzelia* in the telsonic elongation, the slight cleft in the telson and the subpelagont coxae.

The affinities with *Bruzeliopsis* are very strong, especially with *Bruzeliopsis cuspidata* which has a weak apical cleft on the telson. The telson is highly elongate in typical species of *Bruzeliopsis* but not *B. turba*. The type species of *Ileraustroe* and *Bruzeliopsis* have the truncate kind of article 2 on pereopod 7 but the bevelment is oblique in *Bruzeliopsis*. Other members of the two genera do not, however, share precisely similar pereopod 7 so that this characteristic is not highly valuable generically.

Bruzeliopsis has fully pelagont coxae and article 1 of antenna1 is elongate and bears an anterodistal tooth. The gnathopods of *Bruzeliopsis* are nearly simple like those in *Jeddo* but they do bear two simple defining spines whereas the gnathopods of *Ileraustroe* are fully subchelate and bear at least one serrate spine. The molars of *Bruzeliopsis* are also fully enlarged.

Species. See J.L. Barnard (1972c); *I. ilergetes* (J.L. Barnard, 1964a, 1967a) (Ledoyer, 1986) [340B + 535AB + 618B]; *I. i. inconstans* (J.L. Barnard, 1967a) [309B]; *I. torpens* (J.L. Barnard, 1962d, 1964a) [740A].

Habitat and distribution. Marine, Mediterranean, South Atlantic, eastern Pacific, 1363-5690 m, 2 species.

Jeddo J.L. Barnard

Jeddo J.L. Barnard, 1962d: 54.–J.L. Barnard, 1972c: 35.

Type species. *Jeddo simplisyrrhis* J.L. Barnard, 1962d, original designation.

Diagnosis. Forehead not protuberant, lateral cephalic lobe not sharp; eyes absent; mandible lacking palp, molar greatly enlarged, not triturative, fuzzy; mouthparts basic; articles 1-2 of antenna 1 basic; coxa 1 ordinary; coxae 3-4 pelagont; gnathopods simple, lacking distinctive spines; dactyl of gnathopod 2 normal; pereopods 5-7 elongate, dactyls elongate, article 2 of pereopod 7 rounded posteroventrally; pleonites 1-3 not denticulate; uropod 3 not exceeding uropods 1-2, peduncle elongate; telson elongate and cleft.

Relationship. Differing from *Bruzeliopsis* and *Ileraustroe* in the deeply cleft telson and loss of mandibular palp.

Species. *Jeddo simplisyrrhis* J.L. Barnard, 1962d, 1972c [701B].

Habitat and distribution. Marine, Cape Basin, South Africa, 1861 m, 1 species.

Latacunga J.L. Barnard

Latacunga J.L. Barnard, 1972c: 35.

Type species. *Latacunga latacunga* J.L. Barnard, 1972c, original designation.

Diagnosis. Forehead not protuberant, lateral cephalic lobe sharp; eyes absent; mandible with palp, molar greatly enlarged, not triturative, fuzzy; mouthparts basic; articles 1-2 of antenna 1 basic, article 1 with small medioterminal tooth; coxa 1 tapering distally; coxae 3-4 not pelagont, coxa 3 not expanded distally except for anteroventral cusp, posterior margin nearly parallel with anterior margin and not excavate, coxa 4 nearly as long as 3, surface area subequal to 3, adze-shaped; gnathopods ordinarily subchelate, defined by 1-2 serrate spines; dactyl of gnathopod 2 normal; pereopods 5-7 elongate, dactyls elongate, article 2 of pereopod 7 rounded posteroventrally; pleonites 1-3 not denticulate; uropod 3 not exceeding uropods 1-2, peduncle elongate; telson elongate, deeply cleft.

Relationship. Differing from *Syrrhoites* in the serrate condition of the palmar spines on gnathopods 1-2 and the narrowed and tapering coxa 1. From *Bruzelia* in the cleft telson.

Species. *Latacunga comanita* J.L. Barnard, 1972c [406A]; *L. latacunga* J.L. Barnard, 1972c [502B].

Habitat and distribution. Marine, Caribbean and eastern Pacific, 1363-2944 m, 2 species.

Metatiron Rabindranath

Metatiron Rabindranath, 1972e: 84.

Type species. *Pseudotiron brevidactylus* Pillai, 1957, monotypy.

Diagnosis. Forehead [?not protuberant, lateral cephalic lobe ?not sharp, 'moderately produced']; eyes well developed, or absent, often with pair of segregated lateral corneal lenses on each side of head; mandible without palp, molar large, columnar, triturative; mouthparts basic; articles 1-2 of antenna 1 basic; coxa 1 ordinary, coxae 3-4 pelagont, coxa 3 oblong, weakly expanded apically, poorly excavate, coxa 4 small; gnathopods simple, propodus thin, spinose; dactyl of gnathopod 2 normal; pereopods 5-7 short, dactyls short, clawlike, bearing large inner wire-seta; article 2 of pereopod 7 posteroventrally rounded; pleonites 1-3 with mid-dorsal tooth; uropod 2 [?not shortened]; uropod 3 [?exceeding uropods 1-2, peduncle short]; telson elongate, deeply cleft.

Relationship. Differing from *Tiron* in the presence of single dorsal teeth on pleonites 1-3, the absence of the mandibular palp, and the heavy spines on the propodus of the gnathopods. From *Pseudotiron* in the slightly sharper rostrum and unshortened uropod 1, unserrate (only one tooth) pleonites 1-3, less strongly curved coxa 4, and spinose propodus of the gnathopods.

Species. *Metatiron brevidactylus* (Pillai, 1957) (Rabindranath, 1972e) (Ledoyer, 1979a, 1986) [690]; *M. caecus* Ledoyer, 1979a, 1986 [698].

Habitat and distribution. Marine, India to Madagascar, 9-27 m, 2 species.

Priscosyrrhoe J.L. Barnard

Priscosyrrhoe J.L. Barnard, 1972c: 44.

Type species. *Austrosyrrhoe priscis* J.L. Barnard, 1967a, original designation.

Diagnosis. Forehead weakly protuberant, lateral cephalic lobe not sharp; eyes absent; mandible with palp, molar small and not dominating mandible, triturative surface obsolescent; article 2 of antenna 1 elongate and bearing apicodorsal tooth; coxa 1 ordinary; coxae 3-4 weakly pelagont; gnathopods typically subchelate, palms oblique and bearing one large serrate spine; dactyl of gnathopod 2 normal; pereopods 5-7 elongate, article 2 of pereopod 7 weakly expanded and ventrally rounded; pleonites 1-3 not denticulate; uropod 3 not exceeding uropods 1-2, peduncle elongate; telson highly elongate, entire.

Relationship. Differing from *Austrosyrrhoe* in the very long, narrow and uncleft telson. From the *Jeddo-Bruzeliopsis-Bruzelia* group of genera in the ordinary triturative molar and non-bulky size of mandible.

Species. *Priscosyrrhoe priscis* J.L. Barnard, 1972c [309B].

Habitat and distribution. Marine, Baja California, Cedros Trench, 842-1720 m, 1 species.

Pseudotiron Chevreux

Fig.129B

Pseudotiron Chevreux, 1895b: 166.–Stebbing, 1906: 284.–J.L. Barnard, 1972c: 44.

Type species. *Pseudotiron bouvieri* Chevreux, 1895b, original designation.

Diagnosis. Forehead protuberant, lateral cephalic lobe not sharp; eyes absent; mandible with palp, molar of medium size, columnar and triturative; mouthparts basic; articles 1-2 of antenna 1 basic; coxa 1 ordinary; coxae 3-4 pelagont or weakly so or not pelagont in *P. coas*; gnathopods simple, lacking distinctive spines; dactyl of gnathopod 2 normal; pereopods 5-7 typically elongate but short in *P. coas*, article 2 of pereopod 7 typically rounded posteroventrally but truncate in *P. longicaudatus*; pleonites 1-3 typically denticulate dorsally but apparently smooth in *P. golens*; uropod 3 greatly exceeding apices of uropods 1-2, peduncle short; telson elongate, deeply cleft. Pleonite 6 elongate.

Variables. Coxa 3 small, rectangular, poorly excavate (*P. coas*), large, trapezoidal, well excavate (*P. bouvieri*, etc.); dactyls of pereopods 6-7 elongate (*P. longicaudatus*), short (others); uropod 1 shortened (*P. golens*).

Relationship. Differing from *Tiron* in the shortened uropod 1, lack of eyes and blunter rostrum. From *Synopia* in the elongate telson and longer peduncle of uropod 3, other than *Metatiron* (see) and *Tiron* by the simple gnathopods.
See *Metatiron*.

Removal. *Pseudotiron brevidactylus* Pillai, 1957, to *Metatiron*.

Species. See J.L. Barnard (1972c); *P. bouvieri* Chevreux, 1895b, 1911b (J.L. Barnard, 1964a) (Ledoyer, 1977) (Bellan-Santini, 1984) [340 + BA]; *P. coas* J.L. Barnard, 1967a [309A]; *P. golens* J.L. Barnard, 1962d [740A]; *P. longicaudatus* Pirlot, 1934 (J.L. Barnard, 1967a [600BA]; *P. pervicax* J.L. Barnard, 1967a [309B].

Habitat and distribution. Marine, cosmopolitan below 40° latitudes, cold deep water except Mediterranean 170 m, otherwise 835-4050 m, 5 species.

Stephobruzelia J.L. Barnard

Stephobruzelia J.L. Barnard, 1969: 461.–J.L. Barnard, 1972c: 50.

Type species. *Bruzelia dentata* Stephensen, 1931a, original designation.

Diagnosis. Forehead not protuberant, lateral cephalic lobe sharp or weakly so; eyes absent; mandible with palp, molar greatly enlarged, not triturative, fuzzy; mouthparts basic, articles 1-2 of antenna 1 basic; coxa 1 ordinary; coxae 3-4 not pelagont, coxa 3 rectangular, not distally expanded except for anteroventral cusp, posterior margin parallel with anterior and not excavate, coxa 4 as long as and as large as coxa 3, subrectangular, posteroventrally excavate but ventral margin truncate, with midposterior tooth; gnathopods typically subchelate, palms oblique, defined by about 4 simple spines; dactyl of gnathopod 2 normal; pereopods 5-7 elongate, dactyls elongate, article 2 of pereopod 7 rounded posteroventrally; pleonites 1-3 not denticulate; uropod 3 not exceeding uropods 1-2, peduncle elongate; telson elongate, entire.

Relationship. See *Bruzelia*.

Species. *Stephobruzelia dentata* (Stephensen, 1931a) (Gurjanova, 1951) (J.L. Barnard, 1972c) [209B].

Habitat and distribution. Marine, Norwegian Basin, 1096-1996 m, 1 species.

Synopia Dana

Figs 129D, 130D

Synopia Dana, 1852b: 315.–Dana, 1853: 994.–Bovallius, 1886: 4.-Stebbing, 1906: 271.–J.L. Barnard, 1972c: 50.

Type species. *Synopia ultramarina* Dana, 1853, selected by J.L. Barnard, 1969.

Diagnosis. Forehead protuberant, lateral cephalic lobe not sharp; eyes present, accessory eyes present; articles 1-2 of antenna 1 basic; mandible with palp, molar large, columnar, triturative (type) or swollen and pillowlike and poorly triturative (*S. variabilis*); mouthparts, especially maxillipeds, subfoliaceous; inner plate of maxilliped lacking large smooth spine, outer plate only with medial setae; coxa 1 ordinary (if small, not tapering), coxae 3-4 pelagont; gnathopods simple, propodus slender or tumid, often heavily setose but lacking defining spines, tumid propodus appearing subchelate; dactyl of gnathopod 2 vestigial or very small; pereopods 5-7 elongate, dactyls elongate, article 2 of pereopod 7 weakly basic or tending towards truncation or gross lobation; pleonites 1-3 not denticulate; uropod 3 greatly exceeding apices of uropods 1-2, peduncle short; telson short, cleft, or entire and trifoliate.

Variables. Forehead protuberant or not; article 2 of pereopod 7 narrow or broad, rectangular or ovate; telson elongate or short, entire or cleft.

Taxonomy. Very poorly described genus; several species to be clarified; distributions poorly specified.

Relationship. Distinguished by the short telson, short peduncle of uropod 3 and extremely stout mandibular palp.

Species. See J.L. Barnard (1972c); *S. angustifrons* Dana, 1853 (Bovallius, 1886) (Stebbing, 1906) [530N]; *S. caraibica* Bovallius, 1886 (Stebbing, 1906) [460N]; *S. gracilis* Dana, 1853 (Bovallius, 1886) [400]; *S. orientalis* Kossmann, 1880 (Bovallius, 1886) (Stebbing, 1906) [677]; *S. rotunda* Andres, 1984b [401N]; *S. scheeleana* Bovallius, 1886 (Stebbing, 1888) (Chilton, 1912d) (Ledoyer, 1979a) [400 + 530]; *S. triangula* Andres, 1984b [408N]; *S. ultramarina* Dana, 1853 (Bovallius, 1886) (Spandl, 1924a) (Schellenberg, 1926a) (Shoemaker, 1945a) (Ortiz, 1978) (Ledoyer, 1986) [400 + 500 + 600 + N]; *S. variabilis* Spandl, 1923f (Spandl, 1924a) (J.L. Barnard, 1965a) (Ledoyer, 1979a, 1984, 1986) [600N].

Habitat and distribution. Marine, cosmopolitan, mostly epipelagic, neritic, poorly reported, 9 species.

Syrrhoe Goes

Figs 129C, 130C

Syrrhoe Goes, 1866: 527.–Stebbing, 1906: 281.–J.L. Barnard, 1972c: 52.

Type species. *Syrrhoe crenulata* Goes, 1866, selected by Boeck, 1876.

Diagnosis. Forehead in type species not protuberant but strongly so in 3 other species, lateral cephalic lobe sharp in type but rounded in species with protuberant forehead and others; eyes typically present but occasionally absent, accessory eyes absent; mandible with palp, molar small, weakly triturative; mouthparts basic; articles 1-2 of antenna 1 usually basic but in type article 1 bearing large posteroterminal tooth and article 2 in *S. papyracea* with weak tooth, peduncle slightly elongate (female); coxa 1 ordinary; coxae 3-4 pelagont; gnathopods with transverse or subtransverse palms bearing enlarged serrate defining spine giving chelate appearance to propodus, spine possibly unserrate in *S. affinis*; dactyl of gnathopod 2 normal; pereopods 5-7 elongate, dactyls elongate, second articles heavily serrate or not, article 2 of pereopod 7 typically rounded posteroventrally but in few other species becoming truncate; pleonites 1-3 typically denticulate dorsally but often smooth or bearing single dorsal tooth, uropod 3 not exceeding apices of uropods 1-2 (possible exception in *S. longifrons* group), peduncle short (except *S. nodulosa*); telson elongate, deeply cleft.

Variables. Forehead protruding or not; coxa 1 expanded or not, coxa 2 narrowed or not; pleonal teeth and serrations distinctive; telsonic length and cleft variable.

Relationship. Differing from *Garosyrrhoe* in the pelagont coxae.

Otherwise distinguished from other genera by combination of elongate telson, and subchelate gnathopods with transverse palms.

Species. See J.L. Barnard (1972c); *S. affinis* Chevreux, 1908 (?J.L. Barnard, 1961a) (Ledoyer, 1977) [352B + ?715B]; *S. angulipes* Ledoyer, 1977 [348 + B]; *S. crenulata* Goes, 1866 (Sars, 1895) (Stephensen, 1931a) (Gurjanova, 1951) (Dickinson *et al.*, 1980) [210]; *S. longifrons* Shoemaker, 1964 (J.L. Barnard, 1971b) [271]; *S. nodulosa* K.H. Barnard, 1932 (Ruffo, 1949) [870B]; *S. oluta* J.L. Barnard, 1972c [535A]; *S. papyracea* Stebbing, 1888, 1906 (Shoemaker, 1935a) [404B]; *S. psychrophila* Monod, 1926 (Schellenberg, 1931) (K.H. Barnard, 1932) (Ruffo, 1949) [870 + B]; *S. semiserrata* Stebbing, 1888 (Della Valle, 1893) (Stebbing, 1910a) (Schellenberg, 1938a) [782 + 592]; *S. serrima* J.L. Barnard, 1972c [706B]; *S. tuberculata* J.L. Barnard, 1972c [876B]; species, Pirlot, 1934 [603B].

Habitat and distribution. Marine, cosmopolitan, cool to cold water, probably somewhat demersal, 40-3251 m, 11 species.

Syrrhoites Sars

Figs 129F, 130A

Syrrhoites Sars, 1895: 391.–Stebbing, 1906: 279.–J.L. Barnard, 1972c: 64.

Kindia J.L. Barnard, 1962d: 57 (*Kindia sorpresa* J.L. Barnard, 1962d, original designation).

Type species. *Bruzelia serrata* Sars, 1879, original designation.

Diagnosis. Forehead not protuberant, lateral cephalic lobe not sharp; eyes absent; mandible with palp, molar greatly enlarged, not triturative, fuzzy; articles 1-2 of antenna 1 basic, article 1 with small medioterminal tooth; coxa 1 ordinary; coxa 3 rectangular, not distally expanded, posterior margin parallel, with anterior margin and not excavate, coxa 4 nearly as long as 3, with subequal surface area, adze-shaped, thus coxae 3-4 occasionally weakly pelagont; gnathopods typically subchelate, but palms very oblique, however defined by 1-2 unserrate spines but majority of species with palms obsolescent though distinguished by spine(s); dactyl of gnathopod 2 normal; pereopods 5-7 elongate, dactyls elongate, article 2 of pereopod 7 typically basic but posteroventrally truncate in *S. cohasseta-redox* group; pleonites 1-3 not denticulate; uropod 3 not exceeding other uropods (or rarely in slight degree), peduncle elongate; telson elongate and deeply cleft.

Variables. Rostrum long to medium, deflexed or nearly horizontal; dorsal teeth and epimeral shapes variable; coxa 4 shortened (*S. capricornia*); uropod 1 short (*S. pusillus*); uropods 1-2 with or without distolateral tooth on peduncle; cleft of telson variable.

Relationship. Differing from *Bruzelia* and *Austrosyrrhoe* in the uncleft telson. From *Bruzeliopsis* in the nonpelagont coxae.
See *Latacunga*.

Species. See J.L. Barnard (1972c); *S. anaticauda* K.H. Barnard, 1930, 1932 [870B]; *S. capricornia* Bellan-Santini, 1984 [302A]; *S. cohasseta* J.L. Barnard, 1967a [309B]; *S. columbiae* J.L. Barnard, 1972c [310B]; Bellan-Santini, 1984 [302A]; *S. cu* J.L. Barnard, 1972c [501A]; *S. dulcis* J.L. Barnard, 1967a [309B]; *S. levis* (Boeck, 1871b, 1876) (Stebbing, 1906) [238]; *S. lorida* J.L. Barnard, 1962d [702A]; *S. pacifica* Nagata, 1965b [395]; *S. pantasma* J.L. Barnard, 1972c [501BA]; *S. pusilla* Enequist, 1950 (Ledoyer, 1977) [350 + B]; *S. redox* J.L. Barnard, 1967a [309B]; *S. serrata* (Sars, 1879, 1885, 1895) (Stephensen, 1931a) (Gurjanova, 1951) [240B]; *S. silex* J.L. Barnard, 1967a [309B]; *S. sorpresa* J.L. Barnard, 1962d [425BA]; *S. tenella* K.H. Barnard, 1926 [701B]; *S. terceris* J.L. Barnard, 1964a [540B]; *S. trux* J.L. Barnard, 1967a [309B]; *S. walkeri* Bonnier, 1896 (Sexton, 1911c) [303B + 221B]; species A, J.L. Barnard, 1972c [707A].

Habitat and distribution. Marine, cosmopolitan, deep and coldwater, 70-4086 m, 20 species.

Tiron Liljeborg

Figs 129A, 130B,G

Tiron Liljeborg, 1865a: 10.–Stebbing, 1906: 275.–J.L. Barnard, 1972c: 83.–Lincoln, 1979a: 400.
Tessarops Norman, 1868: 412 (*Tessarops hastata* Norman, 1868, original designation).

Type species. *Lysianassa spinifera* Stimpson, 1853, monotypy.

Diagnosis. Forehead protuberant or not (type species), lateral cephalic lobe sharp; eyes present and accessory eyes usually present; mandible with palp, molar of medium size, strongly projecting, columnar and triturative; mouthparts basic; articles 1-2 of antenna 1 basic; coxa 1 ordinary, coxae 3-4 not pelagont or weakly so, coxa 3 softly rectangular, posterior margin almost parallel, with anterior margin adze-shaped and almost as long as coxa 3, surface area of latter nearly equal to coxa 4, rarely coxa 4 distinctly shorter and smaller than 3 and weakly comma-shaped; gnathopods simple, propodus elongate, linear, lacking distinct spines; dactyl of gnathopod 2 normal; pereopods 5-7 very short, dactyls typically very short, clawlike and bearing large inner wire-seta, but occasionally dactyls slightly elongate and poorly armed; article 2 of pereopod 7 posteroventrally rounded; pleonites 1-3 typically denticulate dorsally but apparently smooth in 3 species; uropod 3 greatly exceeding apices of uropods 1-2, (except in *T. brevidactylus*), peduncle short; telson elongate, deeply cleft.

Variables. Outer plate of maxilliped aberrant, apically incised and guarded on each side by hooked wing, large spines absent (*T. thompsoni*); dactyls of pereopods stubby or elongate; each lobe of telson with or without medial row of spines(s).

Relationship. Differing from all other synopiids except *Metatiron* and *Pseudotiron* (see) in the combination of simple gnathopods and elongate telson.
See *Metatiron* and *Pseudotiron*.

Species. See J.L. Barnard (1972c); *T. altifrons* Reid, 1951 [444]; *T. antarcticus* K.H. Barnard, 1932 [890]; *T. australis* Stebbing, 1908b, 1910b (Schellenberg, 1926c) (Griffiths, 1974b,d, 1975) [743]; *T. bellairsi* Just, 1981 [491]; *T. biocellata* J.L. Barnard, 1962b, 1964b, 1966b, 1969a) (Ortiz, 1978) [370]; [*T. bombayensis* Tembe & Deshpande, 1961 (*nomen nudum*)]; *T. intermedius* Reid, 1951 [444]; *T. spiniferus* (Stimpson, 1853) (= *T. acanthurus* Liljeborg, 1865a) (= *T. biscuspis* Goes, 1866) (= *T. hastata* Norman, 1868) (Sars, 1895 as *T. acanthurus*) (Stephensen, 1931a) (Gurjanova, 1951) (Shoemaker, 1955a) (Tzvetkova, 1968) (Lincoln, 1979a) [210+ B]; *T. thompsoni* Walker, 1904 (Nayar, 1967) [665]; *T. triocellatus* Goeke, 1982 [362]; *T. tropakis* J.L. Barnard, 1972c (Fox & Bynum, 1975) (Dickinson *et al.*, 1980) [490]; species, Camp, Whiting &

Martin, 1977 [478].

Habitat and distribution. Marine, cosmopolitan, generally warm to cold shallow water, species mostly oculate, 3-682 m, 10 species.

TALITRIDAE Rafinesque, 1815

Not Treated Herein

Figs 70C, 71B,C,D

Beach and forest hoppers, not considered herein but see Talitroidea for endpoint in the key. A few figures are included for comparisons with hyalids and najnids.

TALITROIDEA

Diagnosis. Accessory flagellum absent; mandible lacking palp; coxa 1 ordinary; uropod 3 essentially uniramous but 1 genus (*Parhyale*) with tiny scale-like inner ramus.

See Colomastigidae, Corophioidea and Tulearidae.

Relationship. Differing from Corophioidea in the absence of spinning glands in the pereopods and from those with poorly developed uropod 3 in the well-developed coxae. From Tulearidae in the lack of a huge lobe on coxa 4. From Colomastigidae in the strong inner plates of the maxillipeds, well-developed flagella of the antennae and the non-probe-like gnathopod 1.

Key to Families of Talitroidea

1. Mandibular molar fully triturative 2

—— Mandibular molar not fully triturative 7

2. Peduncle of antenna 2 heavily setose, pereopods 5-7 subfossorial, heavily setose and spinose .... Dogielinotidae

—— Peduncle of antenna 2 not heavily setose, pereopods 5-7 not heavily setose and spinose 3

3. Urosomites coalesced .... Kuriidae

—— Urosomites separate 4

4. Uropod 3 lacking ramus .... Ceinidae (including Chiltoniinae)

—— Uropod 3 with ramus 5

5. Antenna 1 much shorter than peduncle of antenna 2, dactyl of maxillipedal palp vestigial or absent, area of coxa 1 much smaller than coxa 2, gnathopod 2 in female and juveniles with mitten-shaped and minutely chelate propodus .... Talitridae

—— Antenna 1 as long as or longer than peduncle of antenna 2, dactyl of maxillipedal palp unguiform, area of coxa 1 subequal to that of coxa 2, gnathopod 2 in female and juveniles regularly subchelate 6

6. Telson cleft .... Hyalidae

—— Telson entire .... Hyalellidae

7. Mandibular molar represented by articulate spine(s) .... Najnidae

—— Mandibular molar represented by fixed process or absent 8

8. Body strongly cylindroid, coxae small, subovate, not splayed; telson cleft; abdomen unflexed; uropod 3 very small, hidden from lateral view, tucked mostly below telson .... Eophliantidae

—— Body strongly compressed laterally, coxae medium to large, not splayed, telson weakly cleft in marine species, entire in freshwater species, abdomen unflexed, uropod 3 small but visible from lateral view 9

—— Body strongly depressed, coxae variable, splayed, telson entire, abdomen strongly flexed beneath thorax, uropod 3 very small, hidden from lateral view, tucked beneath telson (all marine) 10

9. Pereon with pleurae .... Temnophliantidae

—— Pereon lacking pleurae .... Phliantidae

10. Head depressed, cuspidate, body with strong anterodorsal cuspidation, coxae excavate, cuspidate, antennae cuspidate, gnathopods lacking large thick setae .... Plioplateidae

—— Head not depressed, not cuspidate, body with weak or no anterodorsal cuspidation, coxae neither excavate not cuspidate, antennae not cuspidate, gnathopods with large thick setae .... Ceinidae

TEMNOPHLIANTIDAE Griffiths, 1975

Temnophliidae [sic] Griffiths, 1975: 171.

See page 280 for note on proper spelling of family name.

Diagnosis. Head slightly reduced in size; basal fusion of antenna 2 [unknown (but probably fused)]; urosomal fusion probable (pleonites 4-5 'not distinctly separate' for *Hystriphlias*), pleon small and flexed below body; thorax depressed, very broad and flat or triquetral, segments laterally discontiguous and produced into pleurae, coxae, though small, therefore splayed. Eyes small, ommatidial. Antennae short. Accessory flagellum absent. Mandible lacking palp, molar degraded, styliform; maxillae feeble. Gnathopods simple. Peduncles of pleopods expanded. Uropods 1-2 with 1 ramus, uropod 3 without ramus. Telson entire, laminar or appearing weakly fleshy, pyriform.

See Phliantidae, Eophliantidae, Plioplateidae, and key to Talitroidea.

Description. Head with thorn-like rostrum. Antennal flagella 1-2 articulate. Right lacinia mobilis absent; rakers sparse. Inner lobes of lower lip absent. Inner plate and palp of maxilla 1 absent, outer plate with 4-5 spines. Maxilla 2 poorly setose. Maxillipeds short, stout, plates ordinary, palp 2-articulate. Coxae rectangular, bifid, or trifid. Gnathopods and pereopods either or prehensile. Article 2 of pereopods 5-7 unexpanded. Body smooth dorsally or elevated in triquetral fashion with processes on head, pereon and pleonites 1-2. Rami of pleopods well developed. Ramus of uropods 1-2 very short. Oostegite form and count and gill formulas [unknown]; gills slender; setae of oostegites curl-tipped.

Relationship. Differing from Phliantidae, Eophliantidae, and Plioplateidae in the presence of pereonal pleurae. Similarity in body form between *Hystriphlias* and Plioplateidae suggesting descent through common ancestor.

Key to Genera of Temnophliantidae

1. Body flat, lacking dorsal processes, coxae simple, all thoracic legs simple .... *Temnophlias*

—— Body triquetral, with dorsal processes, coxae bifid or trifid, all thoracic legs prehensile .... *Hystriphlias*

Hystriphlias Barnard & Karaman

Fig.131B

Hystriphlias Barnard & Karaman, 1987: 872.

Type species. *Temnophlias hystrix* K.H. Barnard, 1954, original designation.

Diagnosis. Body triquetral, with dorsal processes, coxae bifid or trifid, all thoracic legs prehensile.

Species. *Hystriphlias hystrix* (K.H. Barnard, 1954) (Griffiths, 1975) [743]..

Habitat and distribution. Marine, South Africa, littoral, 1 species.

Temnophlias K.H. Barnard

Fig.131A

Temnophlias K.H. Barnard, 1916: 158.–Griffiths, 1975: 172.

Type species. *Temnophlias capensis* K.H. Barnard, 1916, monotypy.

Diagnosis. Body flat, lacking dorsal processes, coxae simple, all thoracic legs simple.

Species. *Temnophlias capensis* K.H. Barnard, 1916, 1954 (Griffiths, 1975) [743].

Habitat and distribution. Marine, South Africa, littoral, 1 species.

TULEARIDAE Ledoyer, 1979a

Diagnosis. Body compressed, with appearance of stenothoid or cyproidinid. Head more or less ordinary but hooded, eyes ordinary. Accessory flagellum absent. Mandibular shape not styliform, molar and palp absent; outer plates of maxillipeds large (versus Stenothoidae). Coxae 1-3 large, ordinary (versus Stenothoidae, Nihotungidae); coxa 4 shield-like but posterodorsally excavate, as wide as length of 4 pereonites; coxae 5-7 small. Gnathopods feeble, weakly subchelate. Urosomites separate. Uropod 3 uniramous, ramus 1-articulate. Telson of ordinary length, weakly cleft.

See Stenothoidae, Cressidae, Nihotungidae, Pagetinidae, Sebidae, Amphilochidae and Anamixidae.

Description. Body compressed, smooth. Head large, strongly rostrate or hooded; eyes ordinary. Antennae short, feeble, antenna 1 stouter than 2, peduncle short, accessory flagellum absent, primary flagellum not longer than peduncle; flagellum of antenna 2 about 2 to 3-articulate, very short.

Labrum weakly excavate below. Incisor broad,

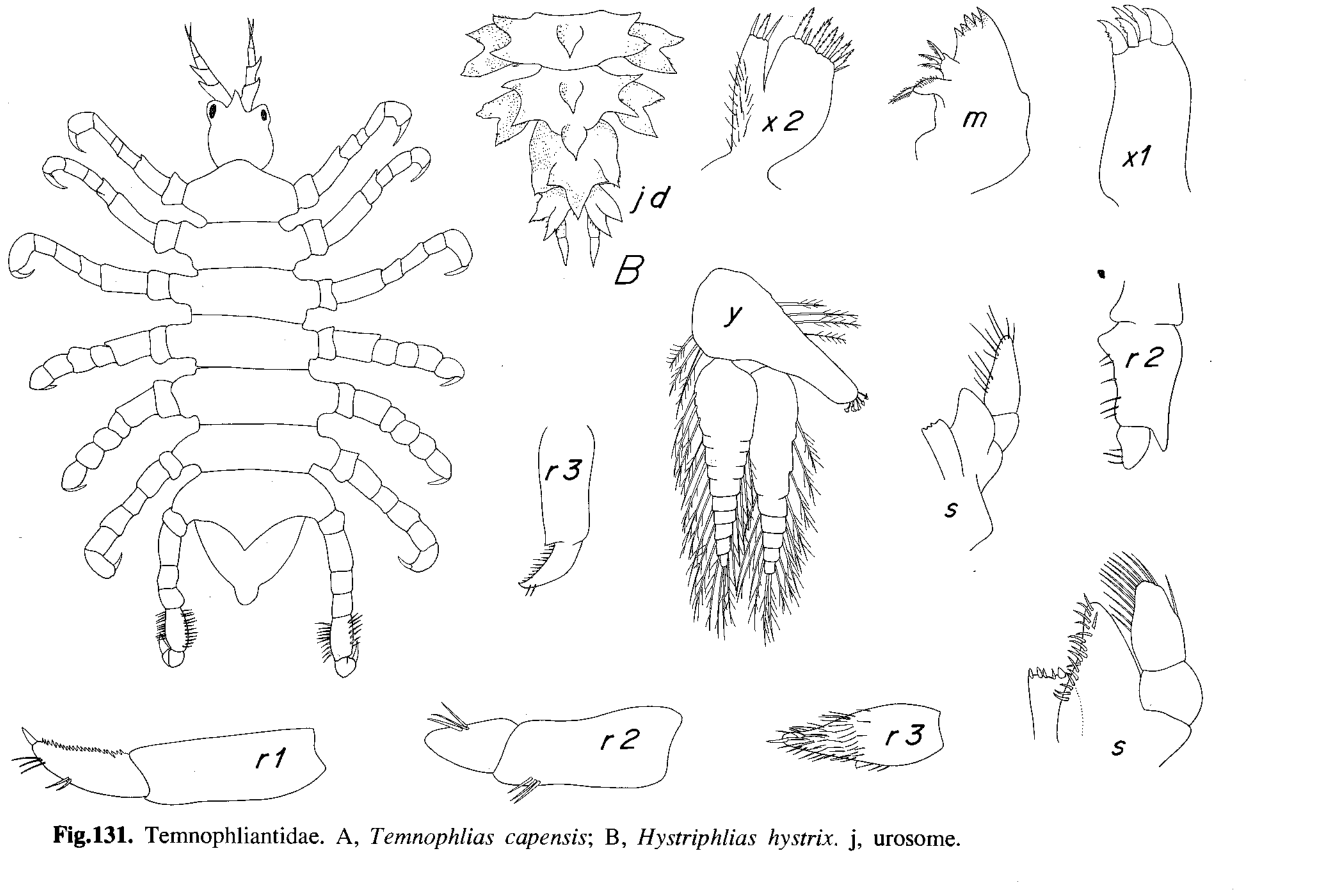


Fig.131. Temnophliantidae. A, *Temnophlias capensis*; B, *Hystriphlias hystrix*. j, urosome.

toothed, lacinia mobilis present, 1 raker present, molar and palp absent. Labium with appressed major lobes and well-developed rounded mandibular lobes, inner lobes plastered to outer lobes. Inner plate of maxilla 1 [unknown], outer plate with 6 spines, palp vestigial. Lobes of maxilla 2 fused together to make vermiform appendage. Maxillipeds large, inner plates, ordinary, outer plates very large, medially excavate and weakly spinose, palp stout, dactyl unguiform, very large and thick.

Coxae 1-3 large, longer than broad, rounded or truncate apically. Gnathopods feeble, alike, gnathopod 2 slightly longer than 1, carpi of medium length or weakly elongate, unlobate, propodi thin, rectangular, palms short, oblique, dactyls ordinary. Article 2 of pereopods 5-6 unexpanded, of pereopod 7 broadly expanded and lobate. Uropods 1-2 weakly spinose, outer rami slightly shortened. Peduncle of uropod 3 of medium length, ramus slightly longer than peduncle, with weak apical spine. Telson of ordinary length, cleft about one third its length.

Relationship. Superficially similar to Stenothoidae and Cressidae but coxa 1 large, outer plates of maxillipeds large, ramus of uropod 3 1-articulate.

Differing from Nihotungidae in the large coxae 2-3, large rostrum, undivided eyes, loss of mandibular palp and uncomplicated maxilla 1. From Pagetinidae in the loss of mandibular palp, large outer plates of the maxillipeds and large coxae. From Sebidae in the nonchelate gnathopods, huge coxa 4 and very large outer plate of the maxilliped. From Dexaminidae, Amphilochidae, Anamixidae, Leucothoidae, and Stilipedidae in the uniramous uropod 3. From Ceinidae in the huge coxa 4, rectolinear article 2 of pereopods 5-6 and the presence of a ramus on uropod 3.

Tulearus Ledoyer

Fig.132

Tulearus Ledoyer, 1979a: 139.

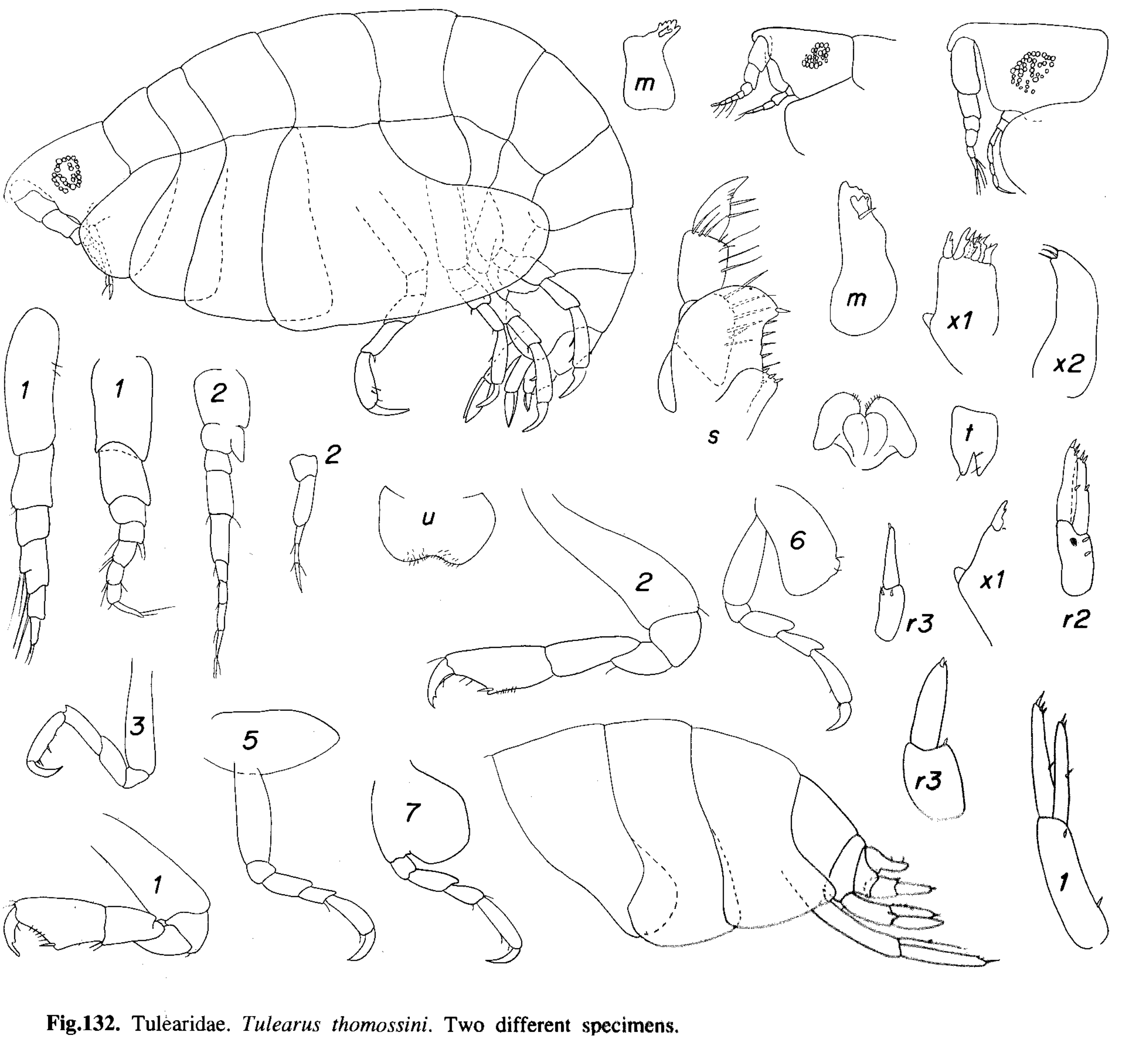


Fig.132. Tulearidae. *Tulearus thomossini.* Two different specimens.

Type species. *Tulearus thomassini* Ledoyer, 1979a, original designation.

Diagnosis. With the characters of the family.

Species. *Tulearus thomassini* Ledoyer, 1979a, 1986 [698].

Habitat and distribution. Marine, Madagascar, 12-31 m, 1 species.

TYPHLOGAMMARIDAE Bousfield, 1977

[see Barnard & Barnard, 1983]

UROHAUSTORIIDAE Barnard & Drummond, 1982c

Diagnosis. Rostrum weak, head short, cheek poorly developed. Antenna 1 of haustorius form, article 1 short, articles 2-3 progressively shorter, weakly geniculate or not, flagella elongate, usually subequal to peduncle. Antenna 2 of haustorius form, article 4 expanded, with facial spines near base, article 5 shorter and narrower than article 4, these articles furnished with 1 or more longitudinal rows of facial armaments, ventral margin of article 4 with at least 3 kinds of setae: (1) elongate plumes, (2) shorter and stiffer glassy spines set in clusters or ranks, and (3) usually bulbar-based penicillate setules; flagellum subequal to or longer than article 4 of peduncle. Prebuccal complex massive, upper lip usually dominant and epistome scarcely distinct. Mandibles bearing elongate, poorly toothed incisors; laciniae mobiles present on each side, diverse; rakers distinct, usually serrate, but few in number; molar large and weakly triturative, usually furnished with accessory chopper; palp 3-articulate, article 3 with numerous outer and inner setae forming apical fan, apex not bevelled, most setae awned. Lower lip with discrete inner lobes, mandibular extensions of outer lobes well developed. Maxilla 1 with 1-articulate palp (except *Huarpe*), inner plate with fewer than 5 setae. Maxilla 2 ordinary, inner plate with oblique but poorly developed facial row of setae. Maxillipeds with unexpanded bases, normally enlarged plates, outer spinose; palp 4-articulate, article 2 expanded, article 4 clavate, multisetose. Maxillae and maxillipeds lacking baler lobes.

Coxa 2 very small, not forming stepped intergrade between coxae 1 and 3; coxa 3 dominant or not dominated by coxa 4, broadly extended posteroventrally. Coxal gills on segments 2-5. Brood plates slender. Gnathopods feeble, grossly alike in proportions, carpi elongate, but gnathopod 1 simple, gnathopod 2 subchelate or minutely parachelate; article 3 short. Article 5 of pereopods 3-4 broad, slightly expanded, not deeply lobate, with thick posterior spines; dactyls of pereopods 3-5 well developed, those of pereopods 6-7 variable; pereopod 5 of haustorius form, articles 2, 4, and 5 expanded, articles 5 and 6 with extensive facial rows of spines; pereopods 6-7 alike, articles 5-6 weakly expanded; no pereopod with underslung articulation.

Pleopod 2 usually inferior in size, number of articles or setation; peduncles of pleopods not longer than wide, coupling hooks paired; inner rami inferior, each usually bearing 1 clothespin spine. Epimeron 1 scarcely developed; epimeron 2 dominant in setation, often dominant in size. Urosomites ordinary, though often furnished with lateral teeth. Rami of uropods 1-2 linguiform, setose (not spinose); uropod 3 of ordinary haustorioid-phoxocephalid kind, outer ramus dominant, 2-articulate, peduncle short, flat, expanded, rami poorly setose apically. Telson variable.

See key to Haustorioidea.

Sexual dimorphism. Weak.

Relationship. This family differs from the Urothoidae in the poor development of the ventral cephalic cheek, the full development of the haustorius antenna 2, and in the dominance of epimeron 2. All taxa have linguiform and setose rami on uropods 1-2 whereas urothoids have styliform and spinose rami. The urothoid *Cunicus* upsets easy recognition and clear distinction between the two groups because the rami of uropods 1-2 are absent and the peduncles are linguiform and setose.

Distinguishing characters of Haustoriidae are listed with the diagnosis of that family.

Phoxocephalopsidae bear styliform or rod-shaped spinose rami on uropods 1-2.

Urohaustoriidae differ from Zobrachoidae exclusively in the almost full loss of epimeron 1; in the simple gnathopod 1; the great reduction in size of coxa 2 (and, in all but one case, of coxa 1); enlargement and posteroventral extension of coxa 3; to a lesser degree the uniformly small rostrum or simple outline dorsally of the head; the small number of setae on the palp of maxilla 1; reduction in the extension and cuspidation of the mandibular molar; and generally the reduction in size of article 2 on the outer ramus of uropod 3.

Prantinus of the Zobrachoidae intergrades some of these characters slightly. Epimeron 1, for example, is not as well developed as in other zobrachoids; article 2 on the outer ramus of uropod 3 is not as greatly elongate; but on the other hand the mandibular molar is extremely cuspidate and the head is strongly rostrate or, at least, extended forward dorsally.

Ecology. Urohaustoriids live as fossorials in shallow water on sandy to muddy benthos and often in the surf zone. See Dexter (1983a, 1983b, 1985a) for life histories.

Key to Genera of Urohaustoriidae

1. Dactyl of pereopod 5 spinose 2

—— Dactyl of pereopod 5 not spinose 4

2. Antennae bearing supernumerary oar-shaped setae, article 2 of pereopods 6-7 narrow or strongly tapering distally .... *Narunius*

—— Antennae lacking supernumerary oar-shaped setae, article 2 of pereopods 6-7 fully expanded, not tapering distally 3

3. Coxa 3 large, coxa 4 small .... *Urohaustorius*

—— Coxa 3 small, coxa 4 large .... *Gheegerus*

4. Posterior margin of coxa 3 not excavate, (right and left laciniae mobiles subequal), coxa 2 larger than coxa 1, mandibular lobes of lower lip blunt .... *Huarpe*

—— Posterior margin of coxa 3 excavate, (right and left laciniae mobiles various), coxa 2 not larger than coxa 1, mandibular lobes of lower lip not blunt 5

5. Epimera 2-3 lacking setae (and identical) 6

—— One or the other of epimera 2-3 setose, not identical 7

6. Coxae 1 and 2 of equal size, right and left laciniae mobiles of subequal size, thin .... *Dirimus*

—— Coxa 1 larger than coxa 2, left lacinia mobilis much broader than right .... *Warragaia*

7. Gnathopod 2 subchelate, dactyls of pereopods 5-7 setose in female .... *Tottungus*

—— Gnathopod 2 parachelate, dactyls of pereopods 5-7 not setose in female .... *Tuldarus*

Dirimus Barnard & Drummond

Dirimus Barnard & Drummond, 1982c: 132.

Type species. *Dirimus tarlitus* Barnard & Drummond, 1982c, original designation.

Diagnosis. Antennae lacking oar-shaped setae. Laciniae mobiles symmetrical. Coxae 1-2 small, subequal; coxa 3 huge, adze-shaped, posterior margin excavate, coxa 4 smaller than 3, posterior margin weakly excavate and with weak lobe posterodorsally. Gnathopod 2 weakly chelate. Dactyl of pereopod 5 not spinose but weakly setose. Article 2 of pereopods 6-7 moderately expanded. Epimera 2-3 alike, setae absent.

Additional characters. Head cowl-like; combs of gnathopod 2 absent; inner rami of uropods 1-2 reduced.

Relationship. Differing from *Tottungus* in size equality of epimera 2-3, shape and lack of setation (thus unlike all other urohaustoriids), ordinary palp setation of maxilla 1 and uropod 3 (see *Tottungus* 'Additional characters'), chelate gnathopod 2 and equality of coxae 1-2.

Dirimus thus with many plesiomorphic characters (see Barnard & Drummond, 1982c) but apomorphically with reduced rakers and reduced inner rami of uropods 1-2.

See *Warragaia*.

Species. *Dirimus tarlitus* Barnard & Drummond, 1982c [631].

Habitat and distribution. Marine, Queensland, Moreton Bay, 2-12 m, 1 species.

Gheegerus Barnard & Drummond

Gheegerus Barnard & Drummond, 1982c: 106.

Type species. *Gheegerus garbaius* Barnard & Drummond, 1982c, original designation.

Diagnosis. Antennae lacking oar-shaped setae. Lacinia mobiles strongly asymmetrical. Coxae 1-2 small, subequal; coxa 3 much larger than coxae 1-2 but smaller than coxa 4, adze-shaped, posterior margin oblique but scarcely excavate; coxa 4 large, shield-shaped. Gnathopod 2 parachelate. Dactyl of pereopod 5 spinose. Article 2 of pereopods 6-7 expanded. Epimeron 3 dominant; epimeron 2 setose.

Additional characters. Palpar setae of maxilla 1 in 2 sets; basoventral setae on outer rami of uropods 1-2 absent (versus *Bumeralius*).

Relationship. Differing from *Urohaustorius* in the small coxa 3 and large coxa 4. From *Bumeralius* in the spinose dactyl of pereopod 5 and lack of basoventral setae on the outer rami of uropods 1-2. From *Narunius* in lack of oar-shaped setae on antennae 1-2 and narrow article 2 of pereopods 6-7.

Species. *Gheegerus garbaius* Barnard & Drummond, 1982c [631].

Habitat and distribution. Marine, Queensland, Moreton Bay, 6.7 m, 1 species.

Huarpe Barnard & Clark

Huarpe Barnard & Clark, 1982a: 282.

Type species. *Huarpe escofeti* Barnard & Clark, 1982a, original designation.

Diagnosis. Antennae lacking oar-shaped setae. Laciniae mobiles strongly asymmetrical. *Palp of maxilla 1 2-articulate*. Coxae 1,2,3,4 progressively larger, posterior margin of coxa 3 not excavate. Gnathopod 2 parachelate. Dactyl of pereopod 5 not spinose. Article 2 of pereopods 6-7 expanded broadly. Epimeron 3 dominant in size; epimeron 2 strongly setose.

Additional characters. Mandibular lobes of lower lip abnormally reduced (but larger than in Haustoriidae); article 1 of antenna 1 with large crescent of setae; inner plate of maxilla 2 with facial row of setae; dactyls of pereopods 6-7 especially small (but see *Urohaustorius perkeus*); telson deeply cleft (all characters like Zobrachoidae).

Relationship. Differing from other urohaustoriids in the evenly enlarging coxae 1-4 and the items in 'Additional characters'. From Zobrachoidae in reduced mandibular lobes of lower lip, 2-articulate palp of maxilla 1, weak rostrum, short incisor, sparse rakers, poorly developed laciniae mobiles and poorly developed epimeron 1.

Species. *Huarpe escofeti* Barnard & Clark, 1982a [864].

Habitat and distribution. Marine, Argentina, ?Golfo San Jose to Magellan Straits, Chile, 0-12 m, 1 species.

Narunius Barnard & Drummond

Fig.67C

Narunius Barnard & Drummond, 1982c: 111.

Type species. *Narunius tallerkus* Barnard & Drummond, 1982c, original designation.

Diagnosis. Antennae with oar-shaped setae. Laciniae mobiles strongly asymmetrical. Coxae 1-2 small and subequal, coxa 3 huge, adze-shaped, posteriorly excavate, coxa 4 about same size, subquadrate. Gnathopod 2 parachelate. Dactyl of pereopod 5 spinose. Articles 2 of pereopods 6-7 slender, subrectangular or trapezoidal. Epimeron 3 slightly dominant, epimeron 2 setose.

Additional character. Article 5 of pereopods 3-4 with weak secondary spination (versus *Urohaustorius*).

Relationship. Differing from *Urohaustorius* in subequal coxae 3 and 4, narrow article 2 of pereopods 6-7 and see 'Additional character'.

Species. *Narunius tallerkus* Barnard & Drummond, 1982c [784+].

Habitat and distribution. Marine, Victoria to Queensland, 3-22 m, 1 species.

Tottungus Barnard & Drummond

Tottungus Barnard & Drummond, 1982c: 126.

Type species. *Tottungus tungus* Barnard & Drummond 1982c, original designation.

Diagnosis. Antennae lacking oar-shaped setae. Laciniae mobiles strongly asymmetrical. Coxae 1-2 small but coxa 1 larger than coxa 2; coxae 3-4 huge, subequal, weakly sickle-shaped but thick, posterior margins excavate. Gnathopod 2 subchelate. Dactyl of pereopod 5 lacking spines, but weakly setose. Article 2 of pereopods 6-7 expanded moderately. Epimeron 2 slightly dominant and setose.

Additional characters. Head cowl-like; setae of coxae 3-4 especially small; article 5 of pereopods 3-4 with extra set of facial setae; inner rami of uropods 1-2 absent (fused as processes to peduncles); outer ramus of uropod 3 with 3 apical setae (versus 2 in *Tuldarus*).

Relationship. Differing from *Tuldarus* in loss of chela on gnathopod 2 and see 'Additional characters'.

Species. *Tottungus tungus* Barnard & Drummond, 1982c [782].

Habitat and distribution. Marine, Victoria, 2-23 m, 1 species.

Tuldarus Barnard & Drummond

Figs 66K, 68E

Tuldarus Barnard & Drummond, 1982c: 118.

Type species. *Tuldarus cangellus* Barnard & Drummond, 1982c, original designation.

Diagnosis. Antennae lacking oar-shaped setae. Laciniae mobiles strongly asymmetrical. Coxae 1-2 small but coxa 1 larger than 2, coxae 3-4 both large, similar, sharply sickle-shaped, posterior margins excavate. Gnathopod 2 parachelate. Dactyl of pereopod 5 not spinose. Article 2 of pereopods 6-7 narrow or expanded. Epimeron 3 scarcely larger than 2; epimeron 2 setose. All setae on palp of maxilla 1 fully apical (versus *Urohaustorius*).

Variables. Article 2 of pereopods 6-7 narrow (type) or expanded; inner ramus of uropods 1-2 present (type) or absent.

Relationship. Differing from *Urohaustorius* in lack of spines on dactyl of pereopod 5, loss in dominance of coxa 3 and see 'Additional characters'. From *Narunius* in lack of oar-shaped setae on antennae 1-2 and simple dactyl of pereopod 5.

Species. *Tuldarus barinius* Barnard & Drummond, 1982c [782]; *T. cangellus* Barnard & Drummond, 1982c [784].

Habitat and distribution. Marine, Victoria and New South Wales, 9-28 m, 2 species.

Urohaustorius Sheard

Figs 65E,I, 66L,M, 67E, 68I, 69I

Urohaustorius Sheard, 1936: 445.

Type species. *Urohaustorius halei* Sheard, 1936, original designation.

Diagnosis. Antennae lacking oar-shaped setae. Laciniae mobiles strongly asymmetrical. Coxae 1-2 small and subequal (or moderately diverse), coxa 3 huge and posteriorly excavate, coxa 4 smaller and of medium size. Gnathopod 2 parachelate. Dactyl of pereopod 5 spinose. Article 2 of pereopods 6-7 expanded broadly. Epimeron 3 weakly dominant or not; epimeron 2 setose.

Variables. Coxa 1 much larger than coxa 2 and forming hook (*U. gunni*); dactyls of pereopods 6-7 vestigial (*U. perkeus*); inner rami of uropods 1-2 long or short (never vestigial); telson weakly cleft or entire.

Relationship. The typical genus to which other genera are compared.

Species. See Barnard & Drummond (1982c); *U. gunni* Barnard & Drummond, 1982c [781]; *U. halei* Sheard, 1936 (Barnard & Drummond, 1982c) [780]; *U. merkanius* Barnard & Drummond, 1982c [784]; *U. metungi* Fearn-Wannan, 1968a (Barnard & Drummond, 1982c) [784 + E]; *U. parnggius* Barnard & Drummond, 1982c [782]; *U. pentinus* Barnard & Drummond, 1982c [782]; *U. perkeus* Barnard & Drummond, 1982c [791]; *U. pulcus* Barnard & Drummond, 1982c (*U. p.* morph 872 Barnard & Drummond, 1982c) [784]; *U. urungari* Barnard & Drummond, 1982c [631]; *U. vercoi* Sheard, 1936 (Barnard & Drummond, 1982c) [unclarified] [785]; *U. wingaro* Barnard & Drummond, 1982c [782]; *U. yurrus* Barnard & Drummond, 1982c [631]; species M, Barnard & Drummond, 1982c [781].

Habitat and distribution. Marine, southern Australia, from South Australia to southern Queensland, often in seaside saline lakes and estuaries, open sea shallows from surf zone to 37 m, 12+ species.

Warragaia Berents

Warragaia Berents, 1985: 253.

Type species. *Warragaia rintouli* Berents, 1985, original designation.

Diagnosis. Antennae lacking oar-shaped setae. Laciniae mobiles asymmetrical. Coxae 1-2 small, but coxa 1 larger than coxa 2; coxae 3-4 both large, dissimilar, coxa 3 adze-shaped, posterior margin weakly excavate, coxa 4 scarcely smaller than 3, posterior margin scarcely excavate and with weak lobe posterodorsally. Gnathopods 1-2 weakly barely subchelate. Dactyl of pereopod 5 neither spinose nor setose. Article 2 of pereopods 6-7 moderately expanded. Epimera 2-3 alike, setae absent.

Additional characters. Head cowl-like; combs of gnathopod 2 absent; coxa 7 with posterodorsal hook; inner rami of uropods 1-2 absent.

Relationship. Differing from *Dirimus* in loss of inner rami on uropods 1- 2, identical and almost simple gnathopods 1-2 with inflated propodi, asymmetrical laciniae mobiles, lack of armaments (other than serrations) on dactyl of pereopod 5, and the presence of a hook on coxa 7. From *Tottungus* and *Tuldarus* in the even, asetose epimera 1-2.

Species. *Warragaia rintouli* Berents, 1985 [781].

Habitat and distribution. Marine, Australia, New South Wales, Jervis Bay, 8 m, 1 species.

UROTHOIDAE Bousfield, 1978

Diagnosis. Rostrum weak, head short, ventral cheek strongly developed and projecting ventrally. Antenna 1 of urothoe form, articles 1-3 elongate, geniculate, flagella short. Antenna 2 of urothoe form, article 4 scarcely expanded, with spines either absent or in seriate ranks, all spines on article 4 apicad, no disjunct spine group basad, ventral margin with 2 kinds of setae, elongate plumes, and smaller penicillates, ventral glassy spines poorly developed or absent, article 5 slightly shorter and narrower than article 4, flagellum variable, usually short in female but in male often greatly elongate as in *Bathyporeia* or phoxocephalids, and flagellum, plus part of peduncle, often furnished with calceoli. Prebuccal complex massive, epistome scarcely distinct, upper lip dominant. Mandibles bearing stubby, poorly toothed incisors; laciniae mobiles, though occasionally vestigial, present on both sides and unlike each other, rakers poorly developed to absent; molar large to medium, minutely fuzzy, almost non-triturative, lacking significant accessory chopper; palp 3-articulate, article 3 rounded apically, setae dominantly apical, with outer setae, setae simple. Lower lip with discrete inner lobes, mandibular extensions of outer lobes well developed. Maxilla 1 with 2-articulate palp, inner plate with fewer than 6 setae. Maxilla 2 ordinary, inner plate with well to poorly developed medial to submarginal row of setae. Maxillipeds with unexpanded bases, normally enlarged plates, outer spinose; palp 4-articulate, article 2 expanded or nasiform, article 4 unguiform to clavate, usually setose, apical nail usually poorly developed. No baler lobes on any maxillae or maxillipeds.

Coxae variable, either of ordinary gammarid form, or coxa 1 very small, or coxa 3 dominant and/or bearing posteroventral lobe, plus other variations. Coxal gills on segments 2-5 or 2-6; brood plates slender. Gnathopods feeble, grossly alike in proportions, carpi elongate, but otherwise highly variable in degrees of palmar development and chelateness, article 3 short. Article 5 of pereopods 3-4 broad, slightly expanded, not deeply lobate, with thick posterior spines; dactyls of pereopods 3-5 well developed, those of pereopods 6-7 variable but usually well developed; pereopod 5 of haustorius form, articles 2, 4, and 5 expanded, articles 4-5 with extensive facial rows of spines in primitive members but declining in derived taxa; pereopods 6-7 alike, or pereopod 7 developed in phoxocephalid fashion, with article 2 broadly expanded and posteroventrally lobate, remainder of articles thin, whole appendage somewhat shortened in comparison to pereopod 6.

Pleopod 2 apparently not inferior; peduncles of pleopods slightly to significantly wider than long, coupling hooks paired on each pleopod; inner rami usually inferior, usually not bearing clothespin hooks (only several species in 2 genera examined). Epimeron 1 strongly developed; epimeron 3 dominant in size and usually in setation. Urosomites ordinary. Rami of uropods 1-2 styliform and spinose or naked or rami absent; peduncles usually only spinose, but 1 genus with linguiform and setose peduncles lacking rami; uropod 3 of ordinary haustorioid-phoxocephalid kind, outer ramus dominant, 2-articulate, peduncle short, flat, expanded; rami poorly setose apically. Telson variable. Antenna 2 with strong sexual dimorphism in several taxa.

See key to Haustorioidea.

Key to Genera of Urothoidae

1. Uropods 1-2 lacking rami .... *Cunicus*

—— Uropods 1-2 with 1 or more rami 2

2. Uropod 2 with 1 ramus .... *Urothopsis*

—— Uropod 2 with 2 rami 3

3. Telson and uropod 3 stubby, very short 4

—— Telson and uropod 3 of normal length 5

4. Antenna 2 small, article 3 small, weakly bulbous, not nasiform, mandibular palp very small, rakers absent, inner ramus of uropod 3 well developed .... *Carangolia*

—— Antenna 2 large, article 3 very large, nasiform, mandibular palp ordinary, rakers present, inner ramus of uropod 3 tiny .... *Pseudurothoe*

5. Pereopod 7 of phoxocephalid form .... *Urothoides*

—— Pereopod 7 not of phoxocephalid form .... *Urothoe*

Carangolia J.L. Barnard

Figs 65G, 66H, 67D, 68D, 69G

Carangolia J.L. Barnard, 1961a: 73.

Type species. *Carangolia mandibularis* J.L. Barnard, 1961a, original designation.

Diagnosis. Pereopod 7 not of phoxocephalid form, thus article 2 not shield-like and rest of leg not short and/or slender, combined. Uropods 1-2 with rami. Uropod 3 short, stubby. Telson short, stubby.

Diagnostic differences from *Pseudurothoe*. Antenna 2 very small, article 3 scarcely swollen; mandibular palp very small, rakers absent, callus large; coxa 4 narrow; inner ramus of uropod 3 almost as long as article 1 of outer ramus.

Relationship. See *Pseudurothoe*.

Species. *Carangolia cornuta* Bellan-Santini & Ledoyer, 1986 [799]; *C. mandibularis* J.L. Barnard, 1961a, 1962d [701B]; *C. puliciformis* J.L. Barnard, 1961a [715B].

Habitat and distribution. Marine, Cape and Tasman Basins or slopes, Marion Island, 110-1861 m, 3 species.

Cunicus Griffiths

Figs 65B, 67F

Cunicus Griffiths, 1974c: 293.

Type species. *Cunicus profundus* Griffiths, 1974c, original designation.

Diagnosis. Pereopod 7 not of phoxocephalid form, thus article 2 not shield-like and rest of leg not slender and short, combined, nor dissimilar from pereopod 6. Uropods 1-2 without rami. Uropod 3 long and slender. Telson ordinary, deeply cleft.

Species. *Cunicus profundus* Griffiths, 1974c, 1975 [743].

Habitat and distribution. Marine, South Africa, 7 m [full depth range unknown], 1 species.

Pseudurothoe Ledoyer

Pseudurothoe Ledoyer, 1986: 605.

Type species. *Pseudurothoe benthedii* Ledoyer, 1986, original designation.

Diagnosis. Pereopod 7 not of phoxocephalid form, thus article 2 not shield-like and rest of leg not short and/or slender, combined. Uropods 1-2 with rami. Uropod 3 short, stubby. Telson short, stubby.

Diagnostic differences from *Carangolia*. Mandibular palp large, callus small, rakers present; article 3 of antenna 2 enlarged, swollen, nasiform, article 4 attached in geniculate fashion.

Relationship. See differences from *Carangolia* above. Differing from *Urothoides* and *Urothoe* in the short and stubby uropod 3 with reduced inner ramus.

Species. *Pseudurothoe benthedii* Ledoyer, 1986 [618B].

Habitat and distribution. Marine, western Bank of Leven, 1100-1150 m, 1 species.

Urothopsis Ledoyer

Urothopsis Ledoyer, 1967b: 26.

Type species. *Urothopsis brevicaudata* Ledoyer, 1967b, original designation.

Diagnosis. Pereopod 7 not of phoxocephalid form, thus article 2 not shield-like and rest of leg not slender and short, combined. Uropod 1 biramous, uropod 2 uniramous, ramus small. Uropod 3 long and slender. Telson ordinary, deeply cleft.

Species. *Urothopsis brevicaudata* Ledoyer, 1967b, 1986 [698].

Habitat and distribution. Marine, Madagascar, shallow water, 1 species.

Urothoe Dana

Figs 65D, 68C, 69J

Urothoe Dana, 1852b: 311.–Dana, 1853: 920.–Stebbing, 1906: 128.–Lincoln, 1979a: 326.
Egidia Costa, 1853: 170 (*Egidia pulchella* Costa, 1853, monotypy).

Type species. *Urothoe irrostrata* Dana, 1853, selected by Stebbing, 1891b.

Taxonomy. Here based on *U. elegans* Bate; type obscure.

Diagnosis. Pereopod 7 not of phoxocephalid form, thus article 2 not shield-like (but often large and ovate) and rest of leg not slender and short combined. Uropods 1-2 with rami. Uropod 3 long and slender. Telson ordinary, deeply cleft.

Sexual dimorphism. Males rarely described, peduncles of antennae 1-2 with short male setular tufts, flagellum of antenna 2 elongate, articles elongate, armaments well developed, calceoli present on peduncle and flagellum.

Variables. Accessory flagellum short, less than half of primary flagellum (*U. elegans*), well developed (*U. brevicornis*, etc.); flagellum of antenna 2 essentially 1-articulate (*U. pulchella*); article 1 of mandibular palp elongate (*U. orientalis*, etc.); maxilla 1 palp shorter than outer plate (*U. carda*, etc.); coxae 1-5 diverse, with sharp corners, coxa 1 reduced, coxa 5 unlobed (*U. orientalis*), other coxal variations from type common; gnathopods 1-2 similar, with article 6 short, stout, expanded into poorly defined palm (*U. elegans* etc.); gnathopods 1-2 similar, article 6 elongate, slender, palmar surface short, blunt (*U. grimaldii*, etc.); gnathopods 1-2 dissimilar, gnathopod 1 simple, article 6 elongate, slender; gnathopod 2 with suboval or expanding propodus, palm distinct, rounded (*U. falcata*, etc.); article 7 of pereopod 5 spinose (*U. spinidigitus*, etc.) or not (type), article 2 of pereopod 5 almost shield-shaped as in *Urothoides* (*U. oniscoides*); epimeron 3 rounded or toothed; uropod rami curved or straight; uropods 1-2 setose (various) or not (type); uropod 3 inner ramus longer or shorter than outer ramus; telson cleft fully or partly.

Removal. *Urothoe simplignathia* J.L. Barnard, 1962d, to *Caleidoscopis* in Pardaliscidae.

Species. See J.L. Barnard (1962d); *U. abbreviata* Sars, 1879, 1885, 1886 (Stebbing, 1906) (Stephensen, 1938b) [218B]; *U. bairdii* Bate, 1862 (= *U. norvegica* identification of Boeck, 1871b) (Walker, 1895a) (Stebbing, 1906) [239]; *U. brevicornis* Bate, 1862 (Chevreux & Fage, 1925) (Lincoln, 1979a) [240]; *U. carda* Imbach, 1969 [655]; *U. corsica* Bellan-Santini, 1965b, 1984 (Ledoyer, 1970, 1977) [348B]; *U. coxalis* Griffiths, 1974b,c, 1975 [743]; *U. cuspis* Imbach, 1969 [655]; *U. dentata* Schellenberg, 1925a [445]; *U. denticulata* Gurjanova, 1951, 1962 [280 + B]; *U. elegans* Bate, 1857d (= *U. norvegica* Bate, 1861; Boeck, 1876; Sars, 1895) (Chevreux & Fage, 1925) (Schellenberg, 1927, 1942) (Ruffo, 1947a) (Gurjanova, 1951, 1962) (Ledoyer, 1979a, 1986) (Lincoln, 1979a) [200 + B, + ?740 + ?680]; *U. elizae* Cooper & Fincham, 1974 [773]; *U. falcata* Schellenberg, 1931 (K.H. Barnard, 1932) [866]; *U. femoralis* K.H. Barnard, 1955 (as a variety) [743]; *U. gelasina* Imbach, 1969 [655]; *U. grimaldii* Chevreux, 1895a, 1935 (Chevreux & Fage, 1925) (K.H. Barnard, 1955) (Rabindranath, 1971d) (Griffiths, 1974c) (Takamaru & Ochiai, 1982) [348 + ?743 + ?664 + ?395]; *U. irrostrata* Dana, 1853 (Bate, 1862) (Stebbing, 1891b, 1906) [641]; *U. leone* Reid, 1951 [444]; *U. marina* (Bate, 1857d) (= *U. pectinatus* Grube, 1868; = *U. pectina* (sic) Grube, 1868) (Chevreux & Fage, 1925) (Schellenberg, 1927) (Lincoln, 1979a) [240]; *U. marionis* Bellan-Santini & Ledoyer, 1986 [799]; *U. oniscoides* (K.H. Barnard, 1932) [801B]; *U. orientalis* Gurjanova, 1938b, 1951, 1962 (Imbach, 1969) [390]; *U. pestai* Spandl, 1923b, 1924a [677]; *U. pinnata* K.H. Barnard, 1955 (Griffiths, 1974b,c, 1975) [743]; *U. platydactyla* Rabindranath, 1971d [664N]; *U. platypoda* Griffiths, 1974c [743]; *U. poseidonis* Reibisch, 1905 (= *U. inermis* Chevreux, 1925a; Ledoyer, 1968) (Fage, 1933) (Schellenberg, 1942) (Movaghar, 1965) (Hamond, 1967) (Lincoln, 1979a) [240]; *U. poucheti* Chevreux, 1888c, 1900a (Stebbing, 1891b, 1906) [359]; *U. pulchella* (Costa, 1853, 1857) (Chevreux & Fage, 1925) (K.H. Barnard, 1955) (Griffiths, 1974c) (Lincoln, 1979a) [352]; *U. rotundifrons* J.L. Barnard, 1962d [735BA]; *U. ruber* Giles, 1888 (?K.H. Barnard, 1951) (?Pillai, 1957) (Rabindranath, 1971d, see *U. serrulidactyla*) [664N]; *U. serrulidactyla* K.H. Barnard, 1955 (Ledoyer, 1969b, 1979a, 1986) (Griffiths 1974b) (?= *U. ruber* per Rabindranath, 1971d) [690]; *U spinidigita* Walker, 1904 (Nayar, 1959, 1967) (Imbach, 1969) [600]; *U. tumorosa* Griffiths, 1974b,c, 1975 [743]; *U. varvarini* Gurjanova, 1953, 1962 (J.L. Barnard,1957b

1966a,b) [510 + 370]; *U. vemae* J.L. Barnard, 1962d [868A]; *U. wellingtonensis* Cooper, 1974 [774].

Habitat and distribution. Marine, cosmopolitan both shallow and deep waters, 0-4893 m, 36 species.

Urothoides Stebbing

Urothoides Stebbing, 1891b: 26.–Stebbing, 1906: 132.–Barnard & Drummond, 1979: 37.

Type species. *Urothoe lachneessa* Stebbing, 1888, monotypy.

Diagnosis. Pereopod 7 of phoxocephalid form, thus article 2 shield-like and rest of leg slender and short. Uropods 1-2 with rami. Uropod 3 long and slender. Telson ordinary.

Variables. Gnathopods 1-2 dissimilar (type); gnathopods 1-2 alike (Australian species).

Species. *Urothoides inops* J.L. Barnard, 1967a (Griffiths, 1977b) [309A]; *U. kurrawa* Barnard & Drummond, 1979 [784]; *U. lachneessa* (Stebbing, 1888, 1891b, 1906) (Chilton, 1920b) (Bellan-Santini & Ledoyer, 1974, 1986) [790]; *U. mabingi* Barnard & Drummond, 1979 [781]; *U. makoo* Barnard & Drummond, 1979 [782]; *U. mammaria* Barnard & Drummond, 1979 [781]; *U. odernae* Barnard & Drummond, 1979 [782]; *U. pseudodernae* Ledoyer, 1984 [586]; *U. tondea* Barnard & Drummond, 1979 [782]; *U. waminoa* Barnard & Drummond, 1979 [782].

Habitat and distribution. Marine, southern Australia to Kerguelen Island, and Cedros Trench, Mexico, 3-2667 m, 10 species.

VITJAZIANIDAE Birstein & Vinogradov, 1955

Diagnosis. Peduncle of antenna 1 short; accessory flagellum long, composed of a few long articles; base of primary flagellum with callynophore. Gnathopod 1 simple, gnathopods feeble. Coxae short.

See Hyperiopsidae, Stilipedidae (= Astyridae), Synopiidae, Eusiridae, Liljeborgiidae, Melphidippidae, Argissidae and Iphimediidae.

Description. Body laterally compressed, long, smooth (or scarcely carinate), pereon thin, pleon dorsoventrally thick, segments free. Head small or medium, ordinary, rostrum weak to medium, lateral cephalic lobes protruding, rounded or angular, no distinct anteroventral excavation for antenna 2; eyes absent. Antenna 1 of medium length, primary flagellar articles 2-n scarcely longer together than article 1 of primary flagellum; antenna 2 as long as 1 or very much longer, article 5 of peduncle as long as 4 or longer (versus Hyperiopsidae).

Labrum minutely incised. Mandibular body stocky, incisor small and scarcely toothed, lacinia mobilis present on both sides, rakers sparse, molar well developed, triturative, palp well developed, article 3 shorter than 2, expanded or linear. Labium ordinary, inner lobes present or absent, papes insignificant. First maxillae symmetrical, inner plate of medium size, partly to fully setose marginally, outer plate and palp ordinary. Plates of maxilla 2 subequal, inner with medium sized facial row of setae. Maxilliped like Hyperiopsidae, plates very broad, with large outer plate, palp slender, 4-articulate, dactyl long, unguiform.

Coxae barely touching, minute or of medium length, diversity weak, coxa 4 not lobate. Carpus of gnathopod 1 shorter or longer than propodus, latter very slender, weakly tapering, simple, dactyl elongate, gnathopod 1 thus appearing like ordinary pereopod 3; carpus of gnathopod 2 as long as or longer than propodus, latter like gnathopod 1 or rectolinear and with distinct short oblique palm. Pereopods 3-4 ordinary or elongate, articles 5-6 ordinary or elongate, dactyls short or long. Pereopods 5-7 short or long, article 2 more or less alike or diverse, short or long, article 5 in *Vitjaziana* immensely elongate [articles 6-7 of these pereopods unknown in *Vitjaziana*].

Epimera large. Pleopods [?ordinary]. Urosome weakly carinate. Uropods 1-3 variable, long or short, apices reaching in 1-2-3 order or 3-2-1 order, rami much longer to much shorter than peduncles; outer ramus of uropod 1 occasionally shorter than inner, rami spinose or not. Telson short, slightly cleft, poorly armed.

Relationship. Very close to the Hyperiopsidae, especially in the general appearance of the mandibles (bulky, incisors short and poorly toothed, rakers few), the maxillipeds (plates very broad, outer large but palp dominant, thin, and elongate), the feeble gnathopods (the first simple), the callynophore on the primary flagellum of antenna 1, and the long accessory flagellum. Differing from Hyperiopsidae in the nondominant article 4 of pereopods 3-4, which however in *Vitjaziana* is admittedly long and thin but not so dominant as in Hyperiopsidae, the regular palps of the first maxillae (not bent and scaly), and the ordinary length of article 5 on antenna 2.

The Stilipedidae (= Astyridae) have reduced accessory flagella, reduced molars, broad dominant carpi on the gnathopods, no callynophore on the primary flagellum of antenna 1 and much larger coxae with coxa 1 broader than coxa 2.

Differing from the Eusiridae in the elongate accessory flagellum; most Eusiridae have subchelate gnathopods or longer coxae or less strongly developed callynophore on the primary flagellum of antenna 1 and long peduncles of the first antennae.

Synopiidae have a very large and strongly rostrate head or the head is tiburonid (shark-nosed or parrotheaded).

Melphidippidae have very elongate antennal peduncles and carinate bodies.

Argissidae have a special configuration of coxae.

Liljeborgiidae have large subchelate gnathopods with dominant propodi.

The Vitjazianidae, especially *Vemana*, have close similarity to *Cleippides* in the Iphimediidae but *Cleippides* has more dominant carpi on the gnathopods, the main flagellum of antenna 1 does not have a strong callynophore, the body is often carinate and the accessory flagellum is vestigial or absent.

Key to Genera of Vitjazianidae

1. Gnathopod 2 simple; coxae minute, broader than long; article 5 of pereopods 5-7 immensely elongate; palp article 3 of mandible and palp article 2 of maxilla 1 linear or slender .... *Vitjaziana*

—— Gnathopod 2 subchelate; coxae 1-4 of ordinary length, almost as long as broad; article 5 of pereopods 5-7 not elongate; palp article 3 of mandible and palp article 2 of maxilla 1 clavate or expanded .... *Vemana*

Vemana J.L. Barnard

Fig.133A

Vemana J.L. Barnard, 1964a: 38.–Birstein & Vinogradov, 1970: 415.

Type species. *Vemana compressa* J.L. Barnard, 1964a, original designation.

Diagnosis. Palp article 3 of mandible expanded, clavate. Palp of maxilla 1 expanded apically. Dactyl of palp on maxilliped bearing nail. Coxae 1-4 of ordinary length, almost as long as broad but coxae 5-7 much shorter. Gnathopod 2 subchelate, article 5 not longer than 6. Pereopods 5-7 short, with short article 5 and elongate article 2. Peduncle of uropod 1 barely reaching base of uropod 2, outer ramus shortened; outer ramus of uropod 3 2-articulate.

Species. *Vemana compressa* J.L. Barnard, 1964a [406B]; *V. geyserensis* Ledoyer, 1986 [618A]; *V. lemuresa* J.L. Barnard, 1967a [309A]; *V. lizata* J.L. Barnard, 1964a [406A].

Habitat and distribution. Marine, middle American seas, western, Indian Ocean, 1826-4077 m, 4 species.

Vitjaziana Birstein & Vinogradov

Fig.133B

Vitjaziana Birstein & Vinogradov, 1955: 247.–Birstein & Vinogradov, 1970: 415.

Type species. *Vitjaziana gurjanovae* Birstein & Vinogradov, 1955, original designation.

Diagnosis. Palp article 3 of mandible slender, linear. Palp of maxilla 1 linear. Dactyl of palp on maxilliped lacking nail. Coxae minute, broader than long. Gnathopod 2 simple, article 5 longer than 6. Pereopods 5-7 very long, with elongate article 5 and short article 2. Peduncle of uropod 1 almost reaching apex of peduncle on uropod 2, outer ramus not shortened; outer ramus of uropod 3 [?1-articulate].

Species. *Vitjaziana gurjanovae* Birstein & Vinogradov, 1955, 1958, 1960 [390A].

Habitat and distribution. Marine, north-west Pacific Ocean, 4200-6500 m (confirmed), 1 species.

ZOBRACHOIDAE Barnard & Drummond, 1982c

Diagnosis. Rostrum well developed (for haustorioids), cheek poorly developed. Antenna 1 variable, article 1 short (typical) or elongate (apomorphic), articles 2-3 progressively shorter (typical) or elongate (apomorphic), flagella elongate (typical) or not (apomorphic), articles of peduncle weakly (typical) to strongly geniculate. Antenna 2 of haustorius form, article 4 expanded (pleisiomorphic) or weakly so (apomorphic), with facial spines near base, article 5 shorter and narrower than article 4, these articles furnished with 1 or more longitudinal rows of facial armaments, ventral margin of article 4 with at least 3 kinds of setae: (1) elongate plumes, (2) shorter and stiffer glassy spines usually set in clusters and, (3) bulbar-based penicillate setules; flagellum longer than article 4 of peduncle. Prebuccal complex massive, upper lip usually dominant. Mandibles bearing elongate strongly toothed incisors, laciniae mobiles present on both sides and unlike each other, rakers almost simple and numerous (4 or more), molar large, strongly extended, weakly triturative but with several strong cusps, usually 1 of these forming accessory chopper; palp 3-articulate, article 3 with numerous outer and inner setae forming fan, setae awned (apomorphic) or not (typical and plesiomorphic). Lower lip with discrete inner lobes, mandibular extensions of outer lobes well developed. Maxilla 1 with 1-articulate palp, inner plate with oblique facial row of setae but poorly developed. Maxillipeds with unexpanded bases, normally enlarged plates, outer spinose; palp 4-articulate, article 2 expanded, article 4 clavate, multisetose. No baler lobes on maxillae or maxillipeds. Coxa 2 small to medium, larger than coxa 1 and forming stepped intergrade between coxa 1 and coxa 3, coxa 4 dominant, coxa 3 lacking deep posteroventral lobe. Coxal gills on segments 2-6 or 2-5. Brood plates slender.

Gnathopods feeble, subchelate, grossly alike in proportions, carpi elongate, article 3 short. Article 5 of pereopods 3-4 broad, slightly expanded, not deeply lobate, with thick posterior spines; dactyls of pereopods 3-5 well developed, those of pereopods 6-7 variable; pereopod 5 of haustorius form, articles 2,4, and 5 expanded, articles 4-5 with extensive facial rows of spines; pereopods 6-7 alike, articles 5-6 weakly expanded; no pereopod with underslung articulation.

Pleopod 2 usually inferior in size, articulation, or setation; peduncles of pleopods not longer than wide,

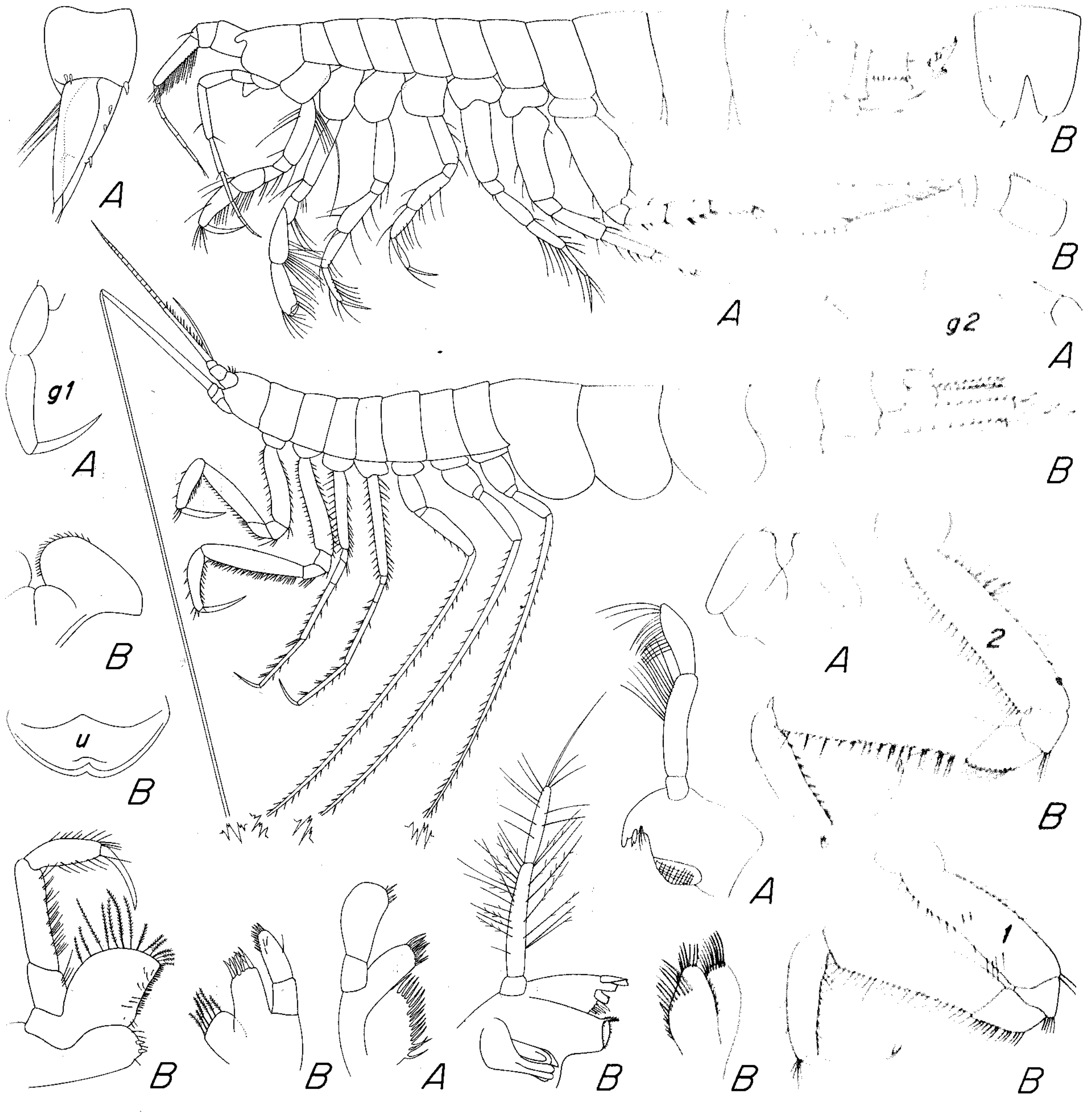


Fig.133. Vitjazianidae. A, *Vemana compressa*; B, *Vitjaziana gurjanovae*.

inner rami inferior; coupling hooks paired on each pleopod, usually inner rami bearing 1 basal clothespin spine. Epimeron 1 moderately to strongly developed; epimeron 2 dominant in setation, often dominant in size. Urosomites ordinary, though often furnished with lateral teeth. Rami of uropods 1-2 linguiform, setose (not spinose); uropod 3 of ordinary haustorioid-phoxocephalid kind, outer ramus dominant, 2-articulate, peduncle short, flat, expanded; rami poorly setose apically. Telson variable in length, deeply cleft.

See key to Haustorioidea.

Sexual dimorphism. Weak.

Relationship. Zobrachoids differ from urothoids in the absence of a ventral cephalic cheek, in the full development of the haustorius antenna 2, especially in the ventral armament, and in the dominance of epimeron 2. Zobrachoids bear linguiform rami of uropods 1-2, in contrast to urothoids (but one genus of urothoid lacks rami). *Prantinus* has epimeron 2 dominant, and is furnished with a urothoid antenna 1, but antenna 2, though not fully expanded, lacks seriate ranks of spines, and bears the ventral spination diversity not typical of urothoids.

Differing from the Urohaustoriidae in the well-developed epimeron 1.

Key to Genera of Zobrachoidae

(see also Clark & Barnard, 1987, for another key)

1. Antenna 1 of urothoe form 2

—— Antenna 1 of haustorius form 3

2. Article 4 of antenna 2 slender, epimeron 2 as large as epimeron 3 .... *Prantinus*

—— Article 4 of antenna 2 broad, epimeron 2 much smaller than epimeron 3 .... *Tonocote*

3. Telson elongate, rami of uropods 1-2 with many medial setae, no baso-ventral setae .... *Zobracho*

—— Telson short, rami of uropods 1-2 lacking medial setae, bearing basoventral setae 4

4. Inner rami of uropods 1-2 present .... *Bumeralius*

—— Inner rami of uropods 1-2 absent .... *Chono*

Bumeralius Barnard & Drummond

Figs 65H, 66I, 67B, 68A, 69E

Bumeralius Barnard & Drummond, 1982c: 27.

Type species. *Bumeralius buchalius* Barnard & Drummond, 1982c, original designation.

Diagnosis. Antenna 1 of haustorius form, thus article 1 stout, article 3 short. Epimeron 3 dominant, epimeron 2 setose, epimeron 1 naked. Rami of uropods 1-2 lacking medial setae, bearing basoventral setae. Telson short.

Additional characters. Rostrum short; inner plate of maxilla 1 narrowed, with 1 basomedial seta and 5 setae enveloping apex.

Relationship. Differing from *Zobracho* in the short telson and sparser and more specialised setation on the rami of uropods 1-2, narrowed inner plate of maxilla 1 with specialised setation pattern and shorter rostrum.

Species. *Bumeralius buchalius* Barnard & Drummond, 1982c [784].

Habitat and distribution. Marine, Victoria and New South Wales, 0 m, 1 species.

Chono Clark & Barnard

Chono Clark & Barnard, 1987: 78.

Type species. *Chono angustiarum* Clark & Barnard, 1987, original designation.

Diagnosis. Antenna 1 of haustorius form, thus article 1 stout, article 3 short. Epimeron 3 dominant, epimeron 2 poorly setose, epimeron 1 naked. Inner rami of uropods 1-2 absent, outer lacking medial setae, occasionally bearing basomedial setae. Telson short.

Additional characters. Rostrum short; inner plate of maxilla 1 narrowed, with 2 apicomedial setae.

Relationship. Differing from its closest counterpart *Bumeralius* and all other zobrachoids in the loss of the inner rami on uropods 1-2.

Species. *Chono angustiarum* Clark & Barnard, 1987 [864].

Habitat and distribution. Marine, Magellan Strait, 4-11 m, 1 species.

Prantinus Barnard & Drummond

Figs 65C, 67A, 68H, 69C

Prantinus Barnard & Drummond, 1982c: 36.

Type species. *Prantinus talanggi* Barnard & Drummond, 1982c, original designation.

Diagnosis. Antenna 1 of urothoe form, thus articles 1-2 slender, article 3 elongate, highly geniculate. Epimeron 2 dominant, grossly setose, epimeron 1 weak and naked. Rami of uropods 1-2 lacking subapical setae. Telson short.

Additional characters. Rostrum broad and medium; inner plate of maxilla 1 medium, with 6 setae enveloping apex.

Relationship. Characterised by the thin urothoid form of antenna 1.

Species. *Prantinus talanggi* Barnard & Drummond, 1982c [784].

Habitat and distribution. Marine, Victoria to New South Wales, 10-28 m, 1 species.

Tonocote Clark & Barnard

Tonocote Clark & Barnard, 1986: 227.

Type species. *Tonocote magellani* Clark & Barnard, 1986, original designation.

Diagnosis. Antenna 1 of urothoe form, thus articles 1-2 slender, article 3 short, weakly geniculate. Epimeron 3 dominant, poorly setose, epimeron 1 weak and naked, epimeron 2 small, with few long setae. Rami of uropods 1-2 lacking subapical setae. Telson short.

Additional characters. Rostrum narrow and medium; inner plate of maxilla 1 medium, with 4 setae enveloping apex.

Relationship. Differing from *Prantinus* in the broad article 4 of antenna 2 and the inferior epimeron 2.

Species. *Tonocote magellani* Clark & Barnard, 1986 [864].

Habitat and distribution. Marine, Magellan Straits, 11-12 m, 1 species.

Zobracho J.L. Barnard

Figs 65F, 66A, 68G, 69I.

Zobracho J.L. Barnard, 1961a: 74.

Type species. *Zobracho canguro* J.L. Barnard, 1961a, original designation.

Diagnosis. Antenna 1 of haustorius form, thus article 1 stout, article 3 short. Epimeron 2 slightly dominant, setose, epimeron 1 strong, setose. Rami of uropods 1-2 with many medial setae, no basoventral setae. Telson elongate.

Additional characters. Rostrum long; inner plate of maxilla 1 broad, evenly setose on both sides and apex.

Relationship. The basic and most primitive genus of the family, because of the large rostrum, and broad, unmodified multisetose inner plate of maxilla 1.

Species. *Zobracho canguro* J.L. Barnard, 1961a (Barnard & Drummond, 1982c) [780 + B].

Habitat and distribution. Marine, Great Australian Bight to New South Wales, 0-875 m, 1 species.

References

(See Barnard & Barnard, 1983, for Gammarida, Melphidippoidea and Pontoporeiidae, except for new additions since 1980)

Abildgaard, P.C., 1789. Zoologia Danica seu animalium Daniae et Norvegiae rariorum ac minus notorum. Descriptiones et Historia, 3: 71 pp, 120 pls. Havniae: N. Molleri et Filii.

Adamstone, F.B., 1928. Relict amphipods of the genus *Pontoporeia*. Transactions of the American Microscopical Society 47: 366-371, pl. 52.

Afonso, O., 1976. Amphipoda des Acores cueillis par scaphandrier autonome (avec la description d'une nouvelle espece). Publicacoes do Instituto de Zoologia "Dr. Augusto Nobre", Faculdade de Ciencias do Porto 130: 9-38, 9 figs.

Afonso, O., 1977. Contribution a l'etude des amphipodes des Acores - Description d'une nouvelle espece. Publicacoes do Instituto de Zoologia "Dr Augusto Nobre", Faculdade de Ciencias do Porto 135: 11-32, 9 figs.

Ahmad, J., 1981. On some amphipods of Karachi Coast. Record Zoological Survey, Pakistan 8: 27-36, 12 figs.

Alcock, A.W., 1894. Natural history notes from H.M. Indian Marine Survey Steamer 'Investigator', Commander R.F. Hoskyn, R.N., late commanding.- Series II., No. 1. On the results of the deep-sea dredging during the season 1890-91 (concluded). Annals and Magazine of Natural History, series 6, 13: 400-411, fig.

Alcock, A.W., 1910. Catalogue of Indian Decapoda Crustacea collections in the Indian Museum. Records of the Indian Museum 1: 9-14 [not seen].

Alderman, A.L., 1936. Some new or little known amphipods of California. University of California Publications in Zoology 41: 53-74, 51 figs.

Aldrich, F.A., 1961. Seasonal variations in the benthic invertebrate fauna of the San Joaquin River Estuary of California with emphasis on the Amphipod, *Corophium spinicorne* Stimpson. Proceedings of the Academy of Natural Sciences Philadelphia 113: 21-28, 2 figs.

Alexander, W.B., B.A. Southgate & R. Bassindale, 1935. Survey of the River Tees Part II. - The estuary - Chemical and biological. Department of Scientific and Industrial Research. Water Pollution Research, Technical Paper 5: xiv + 171 pp, 65 figs, 117 tables, charts.

Allman, G.J., 1847. On *Chelura terebrans*, Philippi, an amphipodous crustacean destructive to submarine timber-works. Annals and Magazine of Natural History, series 1, 19: 361-370, pls 13, 14.

Alonso, G., 1980. Anfipodos de la Ria Deseada (Santa Cruz - Argentina). Centro de Investigacion de Biologia Marina (CIBIMA) del Sistema de Centros del Instituto Nacional de Tecnologia Industrial (INTI), Contribucion Cientifica, 175: 3-15, 8 figs.

Alonso, G., 1981. *Gammaropsis deseadensis* n.sp., a new species of marine amphipod from Puerto Deseado (Santa Cruz, Argentina). Neotropica 27(78): 185-189, 28 figs. [in Spanish]

Alonso, G., 1986. Dos especies nuevas del genero *Gondogeneia* Barnard (Amphipoda, Eusiridae). Physis (Buenos Aires), Seccion A, 44(106): 1-7, 27 figs.

Amphipod Newsletter, 1972-1986. Issues 1-16, 1972-1986. Issued by Dr Wim Vader, Tromso Museum, Norway, or Dr Les Watling, University of Maine, United States of America [mimeographed].

Andersson, A., 1953. Notes on some gammarids of the genus *Microdeutopus* from the west coast of Sweden. Arkiv for Zoologi 6: 247-253, 4 figs.

Andres, H.G., 1975a. *Nicippe buchi* n.sp., ein Pardaliscide aus einem Lavatunnel auf Lanzarote (Amphipoda, Crustacea). Mittheilungen aus den Hamburgischen Zoologischen Museum und Institut 72: 91-95, 2 figs.

Andres, H.G., 1975b. Zur Verbreitung eulitoraler Gammaridea (Amphipoda,... Kusten Sudamerikas und Sudafrikas sowie Angaben uber sublitorale Gammaridea vor der chilenischen Kuste. Dissertation zur Erlangung des Doktorgrades des Fachbereichs Biologie der Universitat Hamburg III, 140 pp, 8 figs, 5 pls, 9 tables.

Andres, H.G., 1977. Gammaridea (Crustacea, Amphipoda) aus dem iberischen Tiefseebecken Auswertung des Materials des Fahrten 3 und 15 von F.S. "Meteor". Meteor Forschungs-Ergebnisse, Reihe D, 25: 54-67, 5 figs, 2 tables.

Andres, H.G., 1978. *Liagoceradocus acutus* sp. nov., ein Gammaride aus der Jameos del Agua auf Lanzarote (Amphipoda, Crustacea). Mittheilungen aus den Hamburgischen Zoologischen Museum und Institut 75: 249-253, 2 figs.

Andres, H.G., 1979a. *Paracorophium hartannorum* sp.n. aus dem Eulitoral der chilenischen Pazifikkuste (Crustacea, Amphipoda). Mitteilungen aus den Hamburgischen Zoolologischen Museum und Institut 76: 381-385, 2 figs.

Andres, H.G., 1979b. Gammaridea (Amphipoda, Crustacea) der Antarktis-Expedition 1975/1976 Auswertung der Dauerstation sudlich von Elephant Island. Meeresforschung 27: 88-102, 3 figs, 3 tables.

Andres, H.G., 1981a. Lysianassidae aus dem Abyssal des Roten Meeres. Bearbeitung der Koderfange von FS <<Sonne>> - MESEDA I (1977) (Crustacea: Amphipoda: Gammaridea) Senckenbergiana Biologia 61: 429-443, 6 figs.

Andres, H.G., 1981b. Die Gammaridea (Crustacea: Amphipoda) derdeutschen Antarktis-Expeditionen 1975/76 und 1977/78 1. Gammaridae, Melphidippidae und Pagetinidae. Mitteilungen aus den Hamburgischen Zoologischen Museum und Institut 78: 179-196, 10 figs.

Andres, H.G., 1982. Die Gammaridea (Crustacea: Amphipoda) der deutschen Antarktis-Expeditionen 1975/76 und 1977/78, 2. Eusiridae. Mittheilungen aus den Hamburgischen Zoologisches Museum und Institut 79: 159-185, 15 figs.

Andres, H.G., 1983. Die Gammaridea (Crustacea: Amphipoda) der deutschen Antarktis-Expeditionen 1975/76 und 1977/78. 3. Lysianassidae. Mitteilungen aus den Hamburgischen Zoologischen Museum und Institut 80: 183-220, 14 figs.

Andres, H.G., 1984a. Neue vertreter der antarktisch verbreiteten gattung *Paraceradocus* Stebbing, 1899 (Crustacea: Amphipoda: Gammaridae). Mitteilungen aus den Hamburgischen Zoologisches Museum und Zoologisches Institut 81: 85-107, 11 figs.

Andres, H.G., 1984b. Zwei neue Synopiiden (Crustacea: Amphipoda: Gammaridea) aus dem warmen zentralen Nordatlantik. Mitteilungen aus de Hamburgischen Zoologisches Museum und Zoologisches Institut 81: 109-116, 3 figs.

Andres, H.G., 1985. Die Gammaridea (Crustacea: Amphipoda) der deutschen Antarktis-Expeditionen 1975/1976 und 1977/1978. 4. Acanthonotozomatidae, Paramphithoidae und Stegocephalidae. Mitteilungen aus den Hamburgischen Zoologischen Museum und Zoologisches Institut 82: 119-153, 7 figs.

Andres, H.G., 1986. *Atylopsis procerus* sp.n. und *Cheirimedon solidus* sp. n. aus der Weddell See sowie Anmerkungen zu *Orchomenella pinguides* Walker, 1903 (Crustacea: Amphipoda: Gammaridea). Mittheilungen aus den Hamburgischen Zoologischen Museum und Institut 83: 117-130, 6 figs.

Andres, H.G. & N. Lott, 1986. Where To place *Eclysis similis* K.H. Barnard, 1932? Hints at its relationships and remarks on the systematics position of the Astyridae (Crustacea: Amphipoda). Mittheilungen aus den Hamburgischen Zoologischen Museum und Institut 83: 131-137, 2 figs.

Andres, H.G. & N. Lott, 1977. Verzeichnis der Typen aus der Sammlung Crustacea des Zoologischen Instituts und Zoologischen Museums der Universitat Hamburg. Mitteilungen aus den Hamburgischen Zoologischen Museum und Zoologisches Institut 74: 53-64.

Andrzeiowski, A., 1839. Catalogue des objets qui se conservent dans le cabinet zoologique de L'Universite Imperiale de de St. Vladimir a Kief, Iere Partie: Mammiferes, Oiseaux, Reptiles, Poissons et Crustacees. Bulletin de la Societe Imperiale des Naturalistes de Moscou 1: 3-24.

Annandale, N., 1908. The habits of the amphipod *Quadrivisio bengalensis*, Stebbing. Records of the Indian Museum 2: 107.

Annandale, N., 1922. The macroscopic fauna of Lake Biwa. Annotationes Zoologicae Japonenses 10: 127-153.

Anonymous (?Halliday), 1857. Description of Crustacea (with a plate). The Natural History. Review 4: 41-44, pl.II.

Anonymous Number 2, 1972. Neue Amphipoden-Art aus dem Pazifik. Review of paper by R.R. Hessler & E.L. Mills, 1972, in Science, 175: 636. Naturwissen-schaftliche Rundschau 25: 402-403.

Arnaud, P., K. Jazdzewski, P. Presler & J. Sicinski, 1986. Preliminary survey of benthic invertebrates collected by Polish Antarctic Expeditions in Admiralty Bay (King George Island, South Shetland Islands, Antarctica). Polish Polar Research 7: 7-24.

Arndt, W., 1933. Die biologischen Beziehungen zwischen Schwammen und Krebsen. Mitteilungen aus den Zoologischen Museum in Berlin 19: 221-305.

Arresti, A., J. C. Iturrondobeitia & A. Rallo, 1986. Contribucion al conocimiento faunistico y ecologico del orden Amphipoda en el Abra de Bilbao (C. Vasca). Cuadernos de Investigacion Biologica, Bilbao 9: 89-125, 7 figs.

Arresti, A. & I. Rallo, 1987. Estudio ecologico de los anfipodos (Amphipoda) del abra de Bilbao. Cuadernos de Investigacion Biologica, Bilbao 10: 51-88, 17 figs.

Asari, K.P., 1983. On two new species of gammarids (Amphipoda, Crustacea) from Andaman and Nicobar Islands, India. Bulletin du Museum National d'Histoire Naturelle, Paris 5: 641-649, 3 figs.

Asari, K.P. & A.A. Myers, 1982. Taxonomic studies on the genus *Grandidierella* Coutiere (Crustacea, Amphipoda). IV. Indian Species. Bulletin du Museum National d'Histoire Naturelle, Paris (4)4: 237-256, 10 figs.

Atkinson, R.J.A., P.G. Moore & P.J. Morgan, 1982. The burrows and burrowing behaviour of *Maera loveni* (Crustacea: Amphipoda). Journal of the Zoological Society of London 198: 399-416, 4 pls.

Atwood, W.G. & A.A. Johnson, 1924. Marine structures their deterioration and preservation. Report of the Committee on Marine Piling Investigations of the Division of Engineering and Industrial Research of the National Research Council, Washinton, D.C. 534 pp, 169 figs, 14 pls.

Audouin, V., 1826. Explication sommaire des planches de crustaces de l'Egypte et de la Syrie, publiees par Jules-Cesar Savigny, membre de l'Institut; offrant un expose des caracteres naturels des genres, avec la distinction des especes. Description de l'Egypte, Histoire Naturelle 1: 77-98.

Aurivillius, C.W.S., 1885. Krustacee hos Arktiska Tunikater. Vega-Expedition Vetenskapakaemien Iakttagelser 4: 223-254, pls 7-9.

Bacescu, M. & R. Mayer, 1960. Nouveaux cas de commensalisme (*Colomastix* et *Tritaeta*) et de parasitisme (*Rhizorhina*) pour la Mer Noire et quelques observations sur l'*Ampelisca* des eaux prebosphoriques. Travaux du Museum d'Histoire Naturelle "Gr. Antipa", 2: 87-96, 4 figs.

Baker, C.F., 1915. Two Amphipoda of Luzon. Philippine Journal of Science 10(D4): 251-256, 3 pls.

Barclay, I.M.T., 1982. New records of *Bathyporeia* (Amphipoda) from West Scotland. Journal of the Marine Biological Association of the United Kingdom 62: 229-231.

Barnard, J.L., 1950. The occurrence of *Chelura terebrans* Philippi in Los Angeles and San Francisco Harbors. Bulletin of the Southern California Academy of Sciences 49: 90-97, pls 32, 33.

Barnard, J.L., 1952a. A new amphipod of the genus *Ceradocus* (*Denticeradocus*) from Lower California. Bulletin of the Southern California Academy of Science 51: 55-59, pls 11-13.

Barnard, J.L., 1952b. A new species of amphipod from Lower California (genus *Eriopisa*). Pacific Science 6: 295-299, 2 figs.

Barnard, J.L., 1952c. Some Amphipoda from central California. Wasmann Journal of Biology 10: 9-36, 9 pls.

Barnard, J.L., 1953. On two new amphipod records from Los Angeles Harbor. Bulletin of the Southern California Academy of Sciences 52: 83-87, pl.15.

Barnard, J.L., 1954a. Marine Amphipoda of Oregon. Oregon State Monographs, Studies in Zoology 8: 1-103, unnumbered fig., 33 pls.

Barnard, J.L., 1954b. Four species of bathypelagic Gammaridea (Amphipoda) from California. Allan Hancock Foundation Publications, Occasional Paper 13: 52-69, pls 2-6.

Barnard, J.L., 1954c. Amphipoda of the family Ampeliscidae collected by the *Velero* III in the Caribbean Sea. Allan Hancock Atlantic Expedition Report 7: 1-13, 2 pls.

Barnard, J.L., 1954d. A new species of *Microjassa* (Amphipoda) from Los Angeles Harbor. Bulletin of the Southern California Academy of Sciences 53: 127-130, pls 35, 36.

Barnard, J.L., 1954e. Amphipoda of the family Ampeliscidae collected in the eastern Pacific Ocean by the *Velero* III and *Velero* IV. Allan Hancock Pacific Expeditions 18: 1-137, 38 pls.

Barnard, J.L., 1955a. Gammaridean Amphipoda (Crustacea) in the collections of Bishop Museum. Bernice P. Bishop Museum Bulletin 215: 1-46, 20 pls.

Barnard, J.L., 1955b. Notes on the amphipod genus *Aruga* with the description of a new species. Bulletin of the Southern California Academy of Sciences 54: 97-103, pls 27-29.

Barnard, J.L., 1955c. The wood boring habits of *Chelura terebrans* Philippi in Los Angeles Harbor. Essays in Natural Science in Honor of Captain Allan Hancock. 87-98 pp, 2 pls. Los Angeles: Allan Hancock Foundation, University of Southern California.

Barnard, J.L., 1955d. Two new spongicolous amphipods (Crustacea) from California. Pacific Science 9: 26-30, 2 figs.

Barnard, J.L., 1956. Two rare amphipods from California with notes on the genus *Atylus*. Bulletin of the Southern California Academy of Sciences 55: 35-43, pls 12-14.

Barnard, J.L., 1957a. A new genus of phoxocephalid Amphipoda (Crustacea) from Africa, India, and California. Annals and Magazine of Natural History, series 12, 10: 432-438, 4 figs.

Barnard, J.L., 1957b. A new genus of haustoriid amphipod from the northeastern Pacific Ocean and the southern distribution of *Urothoe varvarini* Gurjanova. Bulletin of the Southern California Academy of Sciences 56: 81-84, pl.16.

Barnard, J.L., 1957c. New bathypelagic amphipods of the genera *Rhachotropis* and *Lepechinella* with keys to the genera. Bulletin of the Southern California Academy of Sciences 56: 14-20, pls 3-5.

Barnard, J.L., 1958a. Revisionary notes on the Phoxocephalidae (Amphipoda), with a key to the genera. Pacific Science 12: 146-151.

Barnard, J.L., 1958b. Amphipod crustaceans as fouling organisms in Los Angeles-Long Beach Harbors, with reference to the influence of seawater turbidity. California Fish and Game 44: 161-170, 2 figs, 5 tables.

Barnard, J.L., 1958c. A new genus of dexaminid amphipod (marine Crustacea) from California. Bulletin of the Southern California Academy of Sciences 56: 130-132, pls 26, 27.

Barnard, J.L., 1958d. A remarkable new genus of corophiid amphipod from coastal marine bottoms of southern California. Bulletin of the Southern California Academy of Sciences 57: 85-90, pls 26-28.

Barnard, J.L., 1958e. Index to the families, genera, and species of the gammaridean Amphipoda (Crustacea). Occasional Paper of the Allan Hancock Foundation Publications 19: 1-145.

Barnard, J.L., 1959a. Liljeborgiid amphipods of southern California coastal bottoms, with a revision of the family. Pacific Naturalist 1(4): 12-28, 12 figs.

Barnard, J.L., 1959b. The number of species of gammaridean Amphipoda (Crustacea). Bulletin of the Southern California Academy of Science 58: 16.

Barnard, J.L., 1959c. The question of decline in systematic activity, measured in the marine Amphipoda. Systematic Zoology 7: 123-125, 2 figs.

Barnard, J.L., 1959d. Estuarine Amphipoda in: Ecology of Amphipoda and Polychaeta of Newport Bay, California. Occasional Paper of the Allan Hancock Foundation Publications 21: 13-69, 14 pls.

Barnard, J.L., 1959e. Epipelagic and under-ice Amphipoda of the central arctic basin. Geophysical Research Papers No. 63, Scientific Studies at Fletcher's Ice Island, T-3, 1952-1955, 1: 115-153, 22 pls.

Barnard, J.L., 1959f. The common pardaliscid Amphipoda of southern California, with a revision of the family. Pacific Naturalist 1(12): 36-43, 4 figs.

Barnard, J.L., 1959g. Generic partition in the amphipod family Cheluridae, marine wood borers. Pacific Naturalist 1(3): 1-2, 5 figs.

Barnard, J.L., 1960a. The amphipod family Phoxocephalidae in the eastern Pacific Ocean, with analyses of other species and notes for a revision of the family. Allan Hancock Pacific Expeditions 18: 175-368, 75 pls, 1 chart.

Barnard, J.L., 1960b. Insects of Micronesia Crustacea: Amphipoda (strand and terrestrial Talitridae). Insects of Micronesia, B.P. Bishop Museum 4: 13-30, 13 figs.

Barnard, J.L., 1960c. New bathyal and sublittoral ampeliscid amphipods from California, with an illustrated key to *Ampelisca*. Pacific Naturalist 1(16): 1-36, 11 figs.

Barnard, J.L., 1961a. Gammaridean Amphipoda from depths of 400 to 6000 meters. Galathea Report 5: 23-128, 83 figs.

Barnard, J.L., 1961b. Relationship of Californian amphipod faunas in Newport Bay and in the open sea. Pacific Naturalist 2: 166-186, 2 figs.

Barnard, J.L., 1962a. Benthic marine Amphipoda of southern California: families Aoridae, Photidae, Ischyroceridae, Corophiidae, Podoceridae. Pacific Naturalist 3: 1-72, 32 figs.

Barnard, J.L., 1962b. Benthic marine Amphipoda of southern California: families Tironidae to Gammaridae. Pacific Naturalist 3: 73-115, 23 figs.

Barnard, J.L., 1962c. Benthic marine Amphipoda of southern California: families Amphilochidae, Leucothoidae, Stenothoidae, Argissidae, Hyalidae. Pacific Naturalist 3: 116-163, 23 figs.

Barnard, J.L., 1962d. South Atlantic abyssal amphipods collected by R.V. *Vema*. Abyssal Crustacea, Vema Research Series 1: 1-78, 79 figs.

Barnard, J.L., 1962e. Benthic marine Amphipoda of southern California: family Oedicerotidae. Pacific Naturalist 3: 349-371, 10 figs.

Barnard, J.L., 1962f. A new species of sand-burrowing marine Amphipoda from California. Bulletin of the Southern California Academy of Sciences 61: 249-252, 2 figs.

Barnard, J.L., 1963. Relationship of benthic Amphipoda to invertebrate communities of inshore sublittoral sands of southern California. Pacific Naturalist 3: 437-467, 7 figs.

Barnard, J.L., 1964a. Deep-sea Amphipoda (Crustacea) collected by the R/V "Vema" in the eastern Pacific Ocean and the Caribbean and Mediterranean Seas. Bulletin of the American Museum of Natural History 127: 3-46, 33 figs, 1 table.

Barnard, J.L., 1964b. Los anfipodos bentonicos marinos de la costa occidental de Baja California. Revista de la Sociedad Mexicana de Historia Natural 24: 205-274, 11 figs, 5 tables.

Barnard, J.L., 1964c. Revision of some families, genera and species of gammaridean Amphipoda. Crustaceana 7: 49-74, 2 tables.

Barnard, J.L., 1964d. Some bathyal Pacific Amphipoda collected by the U.S.S. *Albatross*. Pacific Science 18: 315-335, 12 figs.

Barnard, J.L., 1964e. Marine Amphipoda of Bahia de San Quintin, Baja California. Pacific Naturalist 4: 55-139, 21 figs, 17 charts, 13 tables.

Barnard, J.L., 1965a. Marine Amphipoda of atolls in Micronesia. Proceedings of the United States National Museum 117: 459-552, 35 figs.

Barnard, J.L., 1965b. Marine Amphipoda of the family Ampithoidae from southern California. Proceedings of the United States National Museum 118(3522): 1-46, 27 figs.

Barnard, J.L., 1966a. Submarine canyons of southern California part V systematics: Amphipoda. Allan Hancock Pacific Expeditions 27(5): 1-166, 46 figs.

Barnard, J.L., 1966b. Benthic Amphipoda of Monterey Bay, California. Proceedings of the United States National Museum 119 (3541): 1-41, 7 figs.

Barnard, J.L., 1967a. Bathyal and abyssal gammaridean Amphipoda of Cedros Trench, Baja California. Bulletin of the United States National Museum Bulletin 260: 1-205, 92 figs.

Barnard, J.L., 1967b. New species and records of Pacific Ampeliscidae (Crustacea: Amphipoda). Proceedings of the United States National Museum 121(3576): 1-20, 4 figs.

Barnard, J.L., 1967c. A new genus of Galapagan amphipod inhabiting the buccal cavity of the sea-turtle, *Chelonia mydas*. Proceedings of the Symposium on Crustacea at Ernakulum, India 1: 119-125, 4 figs.

Barnard, J.L., 1967d. New and old dogielinotid marine Amphipoda. Crustaceana 13: 281-291, 6 figs.

Barnard, J.L., 1967e. *Echiniphimedia*, an amphipod genus from the Antarctic Ocean. Proceedings of the United States National Museum 124(3627): 1-15, 6 figs.

Barnard, J.L., 1969a. Gammaridean Amphipoda of the rocky intertidal of California: Monterey Bay to La Jolla. Bulletin of the United States National Museum 258: 1-230, 65 figs.

Barnard, J.L., 1969b. A biological survey of Bahia de Los Angeles Gulf of California, Mexico, IV. Benthic Amphipoda (Crustacea). Transactions of the San Diego Society of Natural History 15: 175-228, 30 figs.

Barnard, J.L., 1969c. The families and genera of marine gammaridean Amphipoda. Bulletin of the United States National Museum 271: 1-535, 173 figs.
Barnard, J.L., 1970a. Sublittoral Gammaridea (Amphipoda) of the Hawaiian Islands. Smithsonian Contributions to Zoology 34: 1-286, 180 figs.
Barnard, J.L., 1970b. South African *Ampelisca excavata* K.H. Barnard (Amphipoda, Gammaridea), a redescription with notes on the domicile. Crustaceana 19: 67-83, 5 figs, 1 pl.
Barnard, J.L., 1970c. The identity of *Dexamonica* and *Prinassus* with a revision of Dexaminidae (Amphipoda). Crustaceana 19: 161-180, 5 figs.
Barnard, J.L., 1971a. Keys to the Hawaiian marine Gammaridea, 0-30 meters. Smithsonian Contributions to Zoology 58: 1-135, 68 figs.
Barnard, J.L., 1971b. Gammaridean Amphipoda from a deep-sea transect off Oregon. Smithsonian Contributions to Zoology 61: 1-86, 48 figs.
Barnard, J.L., 1972c. A review of the family Synopiidae (= Tironidae), mainly distributed in the deep sea (Crustacea: Amphipoda). Smithsonian Contributions to Zoology 124: 1-94, 46 figs.
Barnard, J.L., 1972a. Gammaridean Amphipoda of Australia, Part I. Smithsonian Contributions to Zoology 103: 1-333, 194 figs.
Barnard, J.L., 1972b. The marine fauna of New Zealand: algae-living littoral Gammaridea (Crustacea Amphipoda). Memoir of the New Zealand Oceanographic Institute 62: 7-216, 109 figs.
Barnard, J.L., 1973a. Deep-sea Amphipoda of the genus *Lepechinella* (Crustacea). Smithsonian Contributions to Zoology 133: 1-31, 12 figs.
Barnard, J.L., 1973b. Revision of Corophiidae and related families (Amphipoda). Smithsonian Contributions to Zoology 151: 1-27, 1 fig.
Barnard, J.L., 1974a. Evolutionary patterns in Gammaridean Amphipoda. Crustaceana 27: 137-146, 1 fig.
Barnard, J.L., 1974b. Gammaridean Amphipoda of Australia, part I. Smithsonian Contributions to Zoology 139: 1-148, 83 figs.
Barnard, J.L., 1975. Amphipoda: Gammaridea. pp. 313-366, pls 70-85. **In** R.I. Smith & J.T. Carlton (eds). Light's Manual:Intertidal Invertebrates of the Central California Coast, 3rd edition. 716 pp. Berkeley, Los Angeles, and London: University of California Press.
Barnard, J.L., 1976a. Amphipoda (Crustacea) from the Indo-Pacific tropics: a review. Micronesica 12: 169-181.
Barnard, J.L., 1976b. Affinities of *Paraniphargus lelouparum* Monod, a blind anchialine amphipod (Crustacea) from the Galapagos Islands. Proceedings of the Biological Society of Washington 89: 421-431.
Barnard, J.L., 1977a. A new species of *Synchelidium* (Crustacea, Amphipoda) from sand beaches in California. Proceedings of the Biological Society of Washington 90: 877-883, 4 figs.
Barnard, J.L., 1977b. The cavernicolous fauna of Hawaiian lava tubes 9. Amphipoda (Crustacea) from brackish lava ponds on Hawaii and Maui. Pacific Insects 17: 267-299, 16 figs.
Barnard, J.L., 1978a. Redescription of *Plioplateia* K.H. Barnard, a genus of amphipod (Crustacea) from South Africa. Annals of the South African Museum 77: 47-55, 4 figs.
Barnard, J.L., 1978b. Redescription of the amphipod, *Calliopiella michaelseni* Schellenberg from South Africa, with comparison to a new genus from the Pacific Ocean. Annals of the South African Museum 75: 33-40, 3 figs.
Barnard, J.L., 1979a. Revision of American species of the marine amphipod genus *Paraphoxus* (Gammaridea: Phoxocephalidae). Proceedings of the Biological Society of Washington 92: 368-379.
Barnard, J.L., 1979b. Littoral gammaridean Amphipoda from the Gulf of California and the Galapagos Islands. Smithsonian Contributions to Zoology 271: vi + 149 pp, 74 figs.
Barnard, J.L., 1980a. Revision of *Metharpinia* and *Microphoxus* (marine phoxocephalid Amphipoda from the Americas). Proceedings of the Biological Society of Washington 93: 104-135, 5 figs.
Barnard, J.L., 1980b. The Genus *Grandifoxus* (Crustacea: Amphipoda: Phoxocephalidae) from the northeastern Pacific Ocean. Proceedings of the Biological Society of Washington 93: 490-514, 2 figs.
Barnard, J.L., 1981. Redescription of *Iphiplateia whiteleggei*, a New Guinea marine amphipod (Crustacea). Proceedings of the Biological Society of Washington 94(4): 1211-1218, figs 1-4.
Barnard, J.L., 1989. Rectification of *Halirages regis* and *H. huxleyanus* (Crustacea: Amphipoda), from marine Antarctica, with description of a new genus, *Austroregia*. Proceedings of the Biological Society of Washington 102: 701-715, 7 figs.
Barnard J.L. & J.B.R. Agard, 1986. A new species of *Ampelisca* (Crustacea, Amphipoda) from Trinidad. Bulletin of Marine Science 39: 640-649, 4 figs.
Barnard, J.L. & C.M. Barnard, 1980. Two new phoxocephalid genera, *Fuegiphoxus* and *Phoxorgia*, from Magellanic South America (Amphipoda: Crustacea). Proceedings of the Biological Society of Washington 93: 849-874, 7 figs.
Barnard, J.L. & C.M. Barnard, 1981. The amphipod genera *Eobrolgus* and *Eyakia* (Crustacea: Phoxocephalidae) in the Pacific Ocean. Proceedings of the Biological Society of Washington 94: 295-313, 1 fig.
Barnard, J.L. & C.M. Barnard, 1982a. Revision of *Foxiphalus* and *Eobrolgus* (Crustacea: Amphipoda: Phoxocephalidae) from American oceans. Smithsonian Contributions to Zoology 372: 1-35, 5 figs.
Barnard, J.L. & C.M. Barnard, 1982b. Biogeographical microcosms of world freshwater Amphipoda (Crustaces). Polskie Archiwum Hydrobiologii 29: 255-273, 2 figs.
Barnard, J.L. & C.M. Barnard, 1982c. The genus *Rhepoxynius* (Crustacea: Amphipoda: Phoxocephalidae) in American seas. Smithsonian Contributions to Zoology 357: 1-49, 6 figs.
Barnard, J.L. & C.M. Barnard, 1983. Freshwater Amphipoda of the world, I. Evolutionary patterns and II. Handbook and bibliography. xix + 830 pp, 50 figs, 7 graphs, 98 maps, 12 tables. Mt. Vernon, Virginia, Hayfield Associates.
Barnard, J.L., D. Bowers & E.C. Haderlie, 1980. Chapter 22: Amphipoda. The amphipods and allies. pp. 559-566. **In** R.H. Morris, D.P. Abbott & E.C. Haderlie (eds). Intertidal Invertebrates of California. Stanford, California: Stanford University Press.
Barnard, J.L. & J. Clark, 1982a. *Huarpe escofeti*, new genus, new species, a burrowing marine amphipod from Argentina (Crustacea, Amphipoda, Urohaustoriidae). Journal of Crustacean Biology 2: 281-295, 6 figs.
Barnard, J.L. & J. Clark, 1982b. *Puelche orensanzi*, new genus, new species, a phoxocephalopsid amphipod from the shores of Argentina (Crustacea, Amphipoda, Phoxocephalopsidae). Journal of Crustacean Biology 2: 261-272, 5 figs.
Barnard, J.L. & J. Clark, 1984. Redescription of *Phoxocephalopsis zimmeri* with a new species, and

establishment of the family Phoxocephalopsidae (Crustacea, Amphipoda) from Magellanic South America. Journal of Crustacean Biology 4: 85-105, 10 figs.

Barnard, J.L. & J. Clark, 1985. A new sea-cave amphipod from Bermuda (Dulichiidae). Proceedings of the Biological Society of Washington 98: 1048-1053, 3 figs.

Barnard, J.L. & M.M. Drummond, 1976. Clarification of five genera of the Phoxocephalidae (marine Amphipoda). Proceedings of the Biological Society of Washington 88: 515-547, 4 figs.

Barnard, J.L. & M.M. Drummond, 1978. Gammaridean Amphipoda of Australia, part III: the Phoxocephalidae. Smithsonian Contributions to Zoology 245: 1-551, 269 figs.

Barnard, J.L. & M.M. Drummond, 1979. Gammaridean Amphipoda of Australia, part IV. Smithsonian Contributions to Zoology 269: 1-69, 38 figs.

Barnard, J.L. & M.M. Drummond, 1981. Three corophioids (Crustacea: Amphipoda) from Western Port, Victoria. Proceedings of the Royal Society of Victoria 93: 31-41, 7 figs.

Barnard, J.L. & M.M. Drummond, 1982a. Redescription of *Exoediceros fossor* (Stimpson, 1856) an Australian marine fossorial amphipod, the type-genus of the new family Exoedicerotidae. Proceedings of the Biological Society of Washington 95: 610-620, 5 figs.

Barnard, J.L. & M.M. Drummond, 1982b. Discovery of *Cheirocratus* (Crustacea: Amphipoda) on Australian shores. Proceedings of the Royal Society of Victoria 94: 107-120, 7 figs.

Barnard, J.L. & M.M. Drummond, 1982c. Gammaridean Amphipoda of Australia, part V: superfamily Haustorioidea. Smithsonian Contributions to Zoology 360: 1-148, 58 figs.

Barnard, J.L. & M.M. Drummond, 1983. *Warreyus*, a new genus of Exoedicerotidae (Crustacea, Amphipoda) based on *Exoediceros maculosus* Sheard. Proceedings of the Royal Society of Victoria 95: 65-75, 5 figs.

Barnard, J.L. & M.M. Drummond, 1984a. Redescription of *Notoediceros tasmaniensis* Bousfield and a note on the synonymy of *Warreyus* Barnard and Drummond with *Exoediceroides* Bousfield (Crustacea: Amphipoda: Exoedicerotidae). Proceedings of the Royal Society of Victoria 96: 25-32, 4 figs.

Barnard, J.L. & M.M. Drummond, 1984b. A new paracalliopiid, *Katocalliope kutyeri* gen. et sp. nov. (Crustacea: Amphipoda) from Queensland. Proceedings of the Royal Society of Victoria 96: 147-153, 4 figs.

Barnard, J.L. & R.R. Given, 1960. Common pleustid amphipods of southern California, with a projected revision of the family. Pacific Naturalist 1(17): 37-48, 6 figs.

Barnard, J.L. & W.S. Gray, 1968. Introduction of an amphipod crustacean into the Salton Sea, California. Bulletin of the Southern California Academy of Sciences 67: 219-232, 4 figs.

Barnard, J.L. & D.E. Hurley, 1975. Redescription of *Parawaldeckia kidderi* (Smith) (Amphipoda, Lysianassidae). Crustaceana 29: 68-73, 2 figs.

Barnard, J.L. & C.L. Ingram, 1986. The supergiant amphipod *Alicella gigantea* Chevreux from the North Pacific gyre. Journal of Crustacean Biology 6: 825-839, 8 figs.

Barnard, J.L. & C.L. Ingram, 1990. Lysianassoid Amphipoda (Crustacea) from deep-sea thermal vents. Smithsonian Contributions to Zoology 449: 1-80, 43 figs.

Barnard, J.L. & G.S. Karaman, 1975. The higher classification in amphipods. Crustaceana 28: 304-310.

Barnard, J.L. & G.S. Karaman, 1980. Classification of gammarid Amphipoda. Crustaceana, Supplement 6: 5-16.

Barnard, J.L. & G.S. Karaman, 1982. Classificatory revisions in gammaridean Amphipoda Crustacea), part 2. Proceedings of the Biological Society of Washington 95: 167-187, fig.1.

Barnard, J.L. & G.S. Karaman, 1983. Australia as a major evolutionary center for Amphipoda (Crustacea). Memoirs of the Australian Museum 18: 45-61, 6 figs.

Barnard, J.L. & G.S. Karaman, 1987. Revisions in classification of gammaridean Amphipoda (Crustacea) part 3. Proceedings of the Biological Society of Washington 100: 856-875.

Barnard, J.L. & E. Shulenberger, 1976. Clarification of the abyssal amphipod, *Paralicella tenuipes* Chevreux. Crustaceana 31: 267-274, 2 figs.

Barnard, J.L. & J.D. Thomas, 1983. A new species of *Amphilochus* from the gorgonian *Pterogorgia anceps* in the Caribbean Sea. pp. 179-187, 3 figs. **In** P.A. John (ed.). Selected Papers on Crustacea. Trivandrum: The Aquarium.

Barnard, J.L. & J.D. Thomas, 1984. Two new species of the *Siphonoecetes* complex from the Arabian Gulf and Borneo (Crustacea: Amphipoda). Proceedings of the Biological Society of Washington 97: 864-881, 9 figs, 1 table.

Barnard, J.L. & J.D. Thomas, 1987a. New species of *Neomegamphopus* from tropical America (Crustacea: marine Amphipoda). Proceedings of the Biological Society of Washington 100: 147-163, 6 figs.

Barnard, J.L. & J.D. Thomas, 1987b. A new species of *Chevalia* from the Caribbean Sea (Crustacea: Amphipoda). Proceedings of the Biological Society of Washington 100: 532- 542, 6 figs.

Barnard, J.L. & J.D. Thomas, 1988. Ipanemidae, new family, *Ipanema talpa*, new genus and species, from the surf zone of Brazil (Amphipoda: Gammaridea: Haustorioidea). Proceedings of the Biological Society of Washington 101: 614-621, 4 figs.

Barnard, K.H., 1916. Contributions to the crustacean fauna of South Africa. 5.-The Amphipoda. Annals of the South African Museum 15: 105-302, pls 26-28.

Barnard, K.H., 1925. Contributions to the crustacean fauna of South Africa.-No. 8. Further additions to the list of Amphipoda. Annals of the South African Museum 20: 319-380, pl.34.

Barnard, K.H., 1927. A study of the freshwater isopodan and amphipodan Crustacea of South Africa. Transactions of the Royal Society of South Africa 14: 139-215, 9 figs, pls 5-11.

Barnard, K.H., 1930. Amphipoda. British Antarctic ("Terra Nova") Expedition, 1910. Natural History Reports, Zoology 8: 307-454, 63 figs.

Barnard, K.H., 1931a. Diagnosis of new genera and species of amphipod Crustacea collected during the 'Discovery' investigations, 1925-1927. Annals and Magazine of Natural History (10)7: 425-430.

Barnard, K.H., 1931b. Amphipoda. Great Barrier Reef Expedition 1928-29, British Museum (Natural History), Science Reports 4: 111-135, 4 figs.

Barnard, K.H., 1932. Amphipoda. Discovery Reports 5: 1-326, 174 figs, 1 pl.

Barnard, K.H., 1935. Report on some Amphipoda, Isopoda, and Tanaidacea in the collections of the Indian Museum. Records of the Indian Museum 37: 279-319, 21 figs.

Barnard, K.H., 1937. Amphipoda. John Murray Expedition 1933-34, Scientific Reports, British Museum (Natural History) 4: 131-201, 21 figs.

Barnard, K.H., 1940. Contributions to the crustacean fauna of South Africa. XII. Further additions to the Tanaidacea Isopoda, and Amphipoda, together with keys for the identification of the hitherto recorded marine and fresh water species. Annals of the South African Museum 32: 381-543, 35 figs.

Barnard, K.H., 1951. New records and descriptions of new species of isopods and amphipods from South Africa. Annals and Magazine of Natural History, series 12, 4: 698-709, 7 figs.

Barnard, K.H., 1952. Description of a new species of amphipod. Transactions of the Royal Society of South Africa 33: 279-282, 3 figs.

Barnard, K.H., 1954. New records and new species of Crustacea from South Africa. Annals Museum Congo Tervuren, Zoology 1: 120-131, 8 figs.

Barnard, K.H., 1955. Additions to the fauna-list of South African Crustacea and Pycnogonida. Annals of the South African Museum 43: 1-107, 53 figs.

Barnard, K.H., 1957. Additions to the fauna-list of South African Crustacea. Annals and Magazine of Natural History, series 12, 10: 1-12, 8 figs.

Barnard, K.H., 1958. Further additions to the crustacean fauna-list of Portuguese East Africa. Memorias do Museum Dr. Alvaro de Castro, 4: 1-23, 7 figs.

Barnard, K.H., 1965. Isopoda and Amphipoda collected by the Gough Island Scientific Survey. Annals of the South African Museum 48: 195-210, 3 figs.

Barrois, T., 1888a. Catalogue des crustaces marins recueillis aux Acores durant les mois d'Aout et de Septembre 1887. 110 pp, 4 pls. Lille: le Bigot.

Barrois, T., 1888b. Remarques sur le dimorphisme sexuel chez quelques amphipodes du genre *Moera* (*M. scissimana* Costa = *M. integrimana* Heller, *M. grossimana* Montagu = *M. donatoi* Heller). Bulletin de la Societe Zoologique de France 13: 57-59.

sindale, R., 1938. The intertidal fauna of the Mersey Estuary. Journal of the Marine Biological Association of he United Kingdom 23: 83-98, pl.3.

Bassindale, R., 1941. Studies on the biology of Bristol Channel IV. The invertebrate fauna of the southern shores of the Bristol Channel and Severn Estuary. Proceedings of the Bristol Naturalists' Society (4)9: 143-201.

Bassindale, R., 1942a. Studies on the biology of the Bristol Channel, VII. The distribution of amphipods in the Severn Estuary and Bristol Channel. Journal of Animal Ecology, London 11: 131-144, 3 figs, 1 table.

Bassindale, R., 1942b. Studies on the biology of Bristol Channel VIII. An account of the collecting stations, and corrections to the fauna list. Proceedings of the Bristol Naturalists' Society (4)9: 304-315, fig.2.

Batcheller, R. & E.L. Mills, 1965. Behavioral studies on the commensal amphipod crustacean, *Listriella clymenellae* Mills. Biological Bulletin 129: 398.

Bate, C.S., 1851. On a new genus and several new species of British Crustacea. Annals and Magazine of Natural History, series 2, 7: 318-321, pl.10, figs 10, 11, pl.11.

Bate, C.S., 1854. *Bellia arenaria*. Annals and Magazine of Natural History, series 2, 13: 504.

Bate, C.S., 1856. On the British Edriophthalma. Report of the Twenty-Fifth Meeting of the British Association for the Advancement of Science 1855: 18-62, pls 12-22.

Bate, C.S., 1857a. British Edriophthalma. Annals and Magazine of Natural, series 2, 20: 524-525.

Bate, C.S., 1857b. On a new amphipod. The Natural History Review 4: 229-230, pl.16.

Bate, C.S., 1857c. British Amphipoda. Annals and Magazine of Natural History, series 2, 19: 271.

Bate, C.S., 1857d. A synopsis of the British edriophthalmous Crustacea. Annals and Magazine of Natural History, series 2, 19: 135-152, 2 figs.

Bate, C.S., 1858a. Description of two rare crustaceans from the coast of Durham, one of them a new species. Transactions of the Tyneside Naturalists' Field Club 4: 15-16, pl.2 [part].

Bate, C.S., 1858b. On some new genera and species of Crustacea Amphipoda. Annals and Magazine of Natural History, series 3, 1: 361-362.

Bate, C.S., 1859. On the fossil crustacean found in the magnesian limestone of Durham by Mr. J. Kirkby, and on a new species of amphipod. Quarterly Journal of The Geological Society of London 15: 137-140, pl. 6.

Bate, C.S., 1862. Catalogue of the specimens of amphipodous Crustacea in the collection of the British Museum, iv + 399 pp., pls 1, 1a, 2-58. London: British Museum of Natural History.

Bate, C.S., 1864. Characters of new species of crustaceans discovered by J.K. Lord on the coast of Vancouver Island. Zoological Society of London, Proceedings of the Scientific Meetings 1864: 661-668.

Bate, C.S. & J.O. Westwood, 1863. A History of the British Sessile-Eyed Crustacea 1: lvi, 507 pps, many unnumbered figs. London: John van Voorst.

Bate, C.S. & J.O. Westwood, 1868. A History of the British Sessile-Eyed Crustacea 2: 536 pps, many unnumbered figs. London: John van Voorst.

Bauer, V., 1928. Uber das Tierleben auf dem Seegras wiesen des Mittelmeeres. Zoologische Jahrbucher, Systematik 56: 1-42, 10 figs, 6 pls.

Beanland, F.L., 1940. Sand and mud communities in the Dovey Estuary. Journal of the Marine Biological Association of the United Kingdom 24: 589-611, 3 figs, 7 tables.

Beauchamp, P. & R. de Lami, 1921. La bionomie intercotidale de l'Ile de Brehat. Bulletin Biologique de la France et de la Belgique 55: 184-238, pls 4-7. [Amphipods on pp. 236-237.]

Beger, H., 1953a. Der Rohrenflohkrebs *Corophium curvispinum*, eine Neuerscheinung in deutschen Wasserwerken. Gesundheits-Amphipoda) Ingenieur 74(9/10): 162-164, 2 figs.

Behning, A., 1914. *Corophium curvispinum* G.O. Sars und seine geographische Verbreitung. Zoologische Jahrbucher, Systematik 37: 385-400, 13 figs.

Bell, T., 1855. Account of the Crustacea. Pp. 400-411, pls 34, 35. **In** Vol. 2 of "The Last of the Arctic Voyages... H.M.S. Assistance., Captain Sir Edward Belcher". London: C.B. Lovell Reeve.

Bellan-Santini, D., 1965a. Contribution a l'etude du genre *Hippomedon* (Crustacea Amphipoda) en mer Mediterranee. RecueillesTravaux de la Station Marine d'Endoume, Bulletin 36: 161-180, 9 figs.

Bellan-Santini, D., 1965b. Contribution a l'etude des amphipodes profonds de la Mediterranee (parages de Monaco - cotes de Corse). Bulletin de l'Institut Oceanographique 65(1355): 16 pp., 4 figs.

Bellan-Santini, D., 1971a. Etude des crustaces amphipodes de la biocenose des algues photophiles dans la region provencale. Rapports Committee Internationale Mer Mediterranee 20: 221-223.

Bellan-Santini, D., 1971b. Amphipodes des milieux portuaires. Tethys 3: 255-263.

Bellan-Santini, D., 1972a. Amphipodes provenant des contenus stomacaux de trois especes de poissons Nototheniidae recoltes en Terre Adelie (Antarctique). Tethys 4: 683-702, 10 pls.

Bellan-Santini, D., 1972b. Invertebres marine des XIIeme et XVeme Expeditions Antarctiques Francaises en Terre Adelie 10. - Amphipodes Gammariens. Tethys Supplement 4: 157-238, 37 pls.

Bellan-Santini, D., 1973. Sur deux nouvelles especes

Mediterraneenes de *Bathyporeia* (Amphipoda - Haustoriidae). Bulletin de la Societe Zoologique de France 98: 91-103, 5 figs.

Bellan-Santini, D., 1974. Amphipodes bathyaux de Mediterranee. Bulletin de l'Institut Oceanographique, Monaco 71(1427): 20 pp., 8 figs.

Bellan-Santini, D., 1975. Au sujet d'une nouvelle espece d'*Atylus* (Amphipoda, Dexaminidae) de Mediterranee: *Atylus massiliensis* n. sp. Bollettino del Museo Civico de Storia Naturale, Verona 1: 473-479, 2 pls.

Bellan-Santini, D., 1979. Etat actuel de la connaissance sur les Ampeliscidae en Mediterranee (Mer Noire exclue). Rapports Committee Internationale Mer Mediterranee 25/26, 4: 129-130.

Bellan-Santini, D., 1980. Relationship between populations of amphipods and pollution. Marine Pollution Bulletin 11: 224-227, 4 figs.

Bellan-Santini, D., 1981. Influence des pollutions sur le peuplement des amphipodes dans la biocenose des algues photophiles. Tethys 10(2): 185-194, 2 figs.

Bellan-Santini, D., 1982a. Family Dexaminidae. Pp. 212-232, figs 145-157. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de l'Institut Oceanographique 13.

Bellan-Santini, D., 1982b. Donnees preliminaires sur la faune de crustaces amphipodes installee dans des reseaux cavitaires artificiels. Journee Etude Recifs Artificielles et Mariculture Suspend, Cannes, C.I.E.S.M., pp. 99-104.

Bellan-Santini, D., 1982c. Family Ampeliscidae. Pp. 19-69, figs 13-47. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de l'Institut Oceanographique 13.

Bellan-Santini, D., 1983. Distribution des *Ampelisca* (Crustacea, Amphipoda) de Mediterranee. Pp. 155-161. **In** P.A. John (ed.). Selected Papers on Crustacea. Trivandrum: The Aquarium.

Bellan-Santini, D., 1984. Amphipodes profonds de Mediterranee (Campagnes Biomede I, Polymede I et II). Bollettino del Museo Civico di Storia Naturale, Verona 10: 263-313, 8 figs.

Bellan-Santini, D., 1985a. Amphipodes des expeditions antarctiques chiliennes dans les iles Shetland du Sud (I. Les Ampeliscidae). Bollettino del Museo Civico di Storia Natural, Verona 10: 241-262, 8 figs.

Bellan-Santini, D., 1985b. Etude de la faune profonde de Mediterranee: les amphipodes des trois campagnes Polymede 1, Polymede 2 et Biomede 1. Rapports Committee International Mer Mediterranee 29, 5: 333-334.

Bellan-Santini, D. & J.C. Dauvin, 1981. Description d'une nouvelle espece d'*Ampelisca* des cotes Francaises (Amphipoda). Crustaceana 40(3): 242-252, 4 figs.

Bellan-Santini, D. & J.C. Dauvin, 1985. Morphologie et microstructure d'un formation cuticulaire enigmatique chez une nouvelle *Ampelisca* (Crustacea Amphipoda). Comptes Rendus de l'Academie des Sciences, Paris 300 (Serie III, No.9): 389-393, 2 pls.

Bellan-Santini, D. & J.C. Dauvin, 1986. *Ampelisca remora* (Amphipoda): nouvelle espece des cotes de Galice (Atlantique nord-est). Crustaceana 51(1): 38-48, 5 figs.

Bellan-Santini, D. & R.A. Kaim-Malka, 1977. *Ampelisca* nouvelles de Mediterranee (Crustacea-Amphipoda). Bollettino del Museo Civico di Storia Naturale, Verona 4: 479-523, 16 figs.

Bellan-Santini, D. & M. Ledoyer, 1973. Inventaire des amphipodes gammariens recoltes dans la region de Marseille. Tethys 4: 899-934.

Bellan-Santini, D. & M. Ledoyer, 1974. Gammariens (Crustacea-Amphipoda) des Iles Kerguelen et Crozet. Tethys 5: 635-707, 39 pls.

Bellan-Santini, D. & M. Ledoyer, 1986. Gammariens (Crustacea, Amphipoda) des Iles Marion et Prince Edward. Bolletino Museo Civico Storia Naturale Verona 13: 349-435, figs 1-31.

Bellan-Santini, D. & J.C. Marques, 1984. Contribution a l'etude des amphipods des cotes du Portugal. Ciencia Biologia (Portugal) 5: 131-149, 1 fig., 20 tables.

Bellan-Santini, D. & D.J. Reish, 1977. Utilisation de crustaces peracarides marins (Isopodes et Amphipodes) dans les etudes de toxicologie. Revue Internationale Oceanographique Mediterranee 48: 103-105.

Berents, P.B., 1983. The Melitidae of Lizard Island and adjacent reefs, The Great Barrier Reef, Australia (Crustacea: Amphipoda). Records of the Australian Museum 35: 101-143, 29 figs.

Berents, P.B., 1985. *Warragaia rintouli* n. gen., n. sp. (Amphipoda: Urohaustoriidae) from New South Wales, Australia. Records of the Australian Museum 36: 253-258, 3 figs.

Bertelsen, E., 1937. Contributions to the animal ecology of the fjords of Angmagssalik and Kangerdlugssuaq in east Greenland. Meddelelser om Gronland 108(3): 58 pp., 2 pls.

Biernbaum, C.K., 1979. Influence of sedimentary factors on the distribution of benthic amphipods of Fishers Island Sound, Connecticut. Journal of Experimental Marine Biology and Ecology 38: 201-223, 4 figs, 1 appendix.

Biernbaum, C.K., 1981. Seasonal changes in the amphipod fauna of *Microciona prolifera* (Ellis and Solander) (Porifera: Demospongia) and associated sponges in a shallow salt-marsh creek. Estuaries 4: 85-96, 9 figs.

Birklund, J., 1977. Biomass, growth and production of the amphipod *Corophium insidiosum* Crawford, and preliminary notes on *Corophium volutator* (Pallas). Ophelia 16(2): 187-203, 12 figs.

Birstein, J.A., 1959. Deep-sea Malacostraca of the north-western part of the Pacific Ocean, their distribution and relations. XVth International Congress of Zoology, Section III, paper 33: 4 pp.

Birstein, J.A. & M.E. Vinogradov, 1955. Pelagicheskie gammaridy (Amphipoda-Gammaridea) Kurilo-Kamchatskoi Vpadiny. Akademiia Nauk SSSR, Instituta Okeanologii, Trudy 12: 210-287, 35 figs.

Birstein, J.A. & M.E. Vinogradov, 1958. Pelagicheskie gammaridy (Amphipoda, Gammaridea) severo-zapadnoi chasti Tikogo Okeana. Akademiia Nauk SSSR, Instituta Okeanologii, Trudy 27: 219-257, 17 figs.

Birstein, J.A. & M.E. Vinogradov, 1960. Pelagicheskie gammaridy tropicheskoi chasti Tixogo Okeana. Akademiia Nauk SSSR, Instituta Okeanologii, Trudy 34: 165-241, 34 figs.

Birstein, J.A. & M.E. Vinogradov, 1962a. Notes on the family Pardaliscidae (Amphipoda) with the description of a new genus. Crustaceana 3: 249-258, 2 figs.

Birstein, J.A. & M.E. Vinogradov, 1962b. Pelagicheskie gammaridy (Amphipoda, Gammaridea), sobrannye sovetskoi antarkticheskoi expeditsiei na dizel'-elektroxode "OB'" k jogu ot 40° jo. sh. Akademiia Nauk SSSR, Issledovanija Fauny Morei 1(10): 36-57, 12 figs.

Birstein, J.A. & M.E. Vinogradov, 1963. The Deep-Sea pelagic amphipods of the Philippine Trench. Akademiia Nauk SSSR, Instituta Okeanologii, Trudy 71: 81-93, 7 figs.

Birstein, J.A. & M.E. Vinogradov, 1964. Pelagicheskie gammaridy severnoi chasti Indiiskogo Okeana. Akademiia

Nauk SSSR, Instituta Okeanologii, Trudy 65: 152-195, 10 figs.

Birstein, J.A. & M.E. Vinogradov, 1970. 0 faune pelagicheskix gammaridy Kurilo-Kamchatskogo raiona Tixogo Okeana. Akademiia Nauk SSSR, Instituta Okeanologii, Trudy 86: 401- 419, 8 figs.

Birstein, J.A. & N.G. Vinogradova, 1960. Donnye ultraabissal'nye gammaridy severo-zapadnoi chasti Tixogo Okeana. I. Semeistva Liljeborgiidae, Astyridae, Lepechinellidae, Gammaridae. Akademiia Nauk SSSR, Instituta Okeanologii, Trudy 34: 147-164, 10 figs.

Birula, A.A., 1897. Recherches sur la biologie et zoogeographie, principalement des mers Ruses.-II. Hydrozoaires...crustaces...Golfes du Enisei et de l'Obi. Annales de la Musee Zoologique de l'Academie Imperiale des Science de St. Petersbourg 1897: 78-116, pls 9-10. [Pls 9-10 not of amphipods, amphipods on pp. 104-109.]

Bjorck, W., 1915. Biologisk-faunistiska undersokningar av Oresund. II. Crustacea Malacostraca och Pantopoda. Lunds Universiteit Arsskrifter, new series, Afddelning 2, Band 11, 7: 98 pp.

Bjorck, W., 1916. Bidrag till Kannedomen om Kattegats Fauna I. Crustacea. Arkiv for Zoologi 10(16): 14 pp., 1 pl.

Blake, C.H., 1929. New Crustacea from the Mount Desert region. Biological Survey of the Mount Desert Region, Wistar Institute of Anatomy and Biology 3: 34 pp., 15 figs.

Blanc, H., 1884. Die Amphipoden der Kieler Bucht nebst einer histologischen Darstellung der "Calceoli". Nova Acta der Kaisersliche Leopoliensis-Caroliensis Deutschen Akademie der Naturforscher 47: 39-104, pls 6-10.

Blegvad, H., 1932. Investigations of the bottom fauna at outfalls of drains in the sound. Report of the Danish Biological Station 37: 1-20, 4 figs.

Blokhin, S.A. & V.A. Pavlyuchkov, 1983. Feeding of grey whales off Chukotka. Reports of the International Whaling Commission 33: 549-552, 1 fig.

Boeck, A., 1861. Bemaerkninger Angaaende de Ved de Norske Kyster forekommende Amphipoder. Forhandlinger Skandinaviske Naturforskeres Ottende 8: 631-677.

Boeck, A., 1871a. Bidrag til Californiens Amphipodefauna. Forhandlinger i Videnskabs-Selskabet i Christiania 1871: 32-51, 1 pl.

Boeck, A., 1871b. Crustacea Amphipoda Borealia et Arctica. Forhandlinger i Videnskabs-Selskabet i Christiania 1870: 83-280.

Boeck, A., 1872. De Skandinaviske og Arktiske Amphipoder. I: 160 pp., 7 pls. Christiania: A.W. Brogger.

Boeck, A., 1876. De Skandinaviske og Artiske Amphipoder. iv + 712 pp., 32 pls. Christiania: A.W. Brogger.

Boesch, D.F. & R.J. Diaz, 1974. New records of peracarid crustaceans from oligohaline waters of the Chesapeake Bay. Chesapeake Science 15: 56-59, 1 fig.

Bone, D.G., 1972. Aspects of the biology of the antarctic amphipod *Bovallia gigantea* Pfeffer at Signy Island, South Orkney Islands. British Antarctic Survey Bulletin 27: 105-122, 13 figs.

Bonnier, J., 1887. Catalogue des crustaces malacostraces recueillis sans la Baie de Concarneau. Bulletin Scientifique du Nord de la France et de La Belgique, series 2, 10: 296-356.

Bonnier, J., 1889a. Les amphipodes du Boulonnais. Bulletin Scientifique de la France et de la Belgique 20: 373-398, pls 12-13.

Bonnier, J., 1889b. Les amphipodes du Boulonnais. I. *Unicola crenatipalmata* Spence Bate. Bulletin Scientifique de la France et de la Belgique, series 3, 2: 229-254, 1 fig., pls 12, 13.

Bonnier, J., 1890. Les amphipodes du Boulonnais. II. *Microprotopus maculatus* Norman, III. *Cressa dubia* Spence Bate. Bulletin Scientifique de la France et de la Belgique 22: 287-315, pls 8-10.

Bonnier, J., 1893. Les amphipodes du Boulonnais (1). Bulletin Scientifique de la France et de la Belgique 24: 161-207, pls 5-8.

Bonnier, J., 1896. Edriophthalmes. Resultats scientifiques de lacampagne du "Caudan" dans le Golfe de Gascogne. Annales de la Universite de Lyon 26: 527-689, pls 28-40.

Boone, L., 1930. Scientific results of the cruises of the yachts "Eagle" and "Ara", 1921-1928, William K. Vanderbilt, commanding. Crustacea: Anomura, Macrura, Schizopoda, Isopoda, Amphipoda, Mysidacea, Cirripedia, and Copepoda. Bulletin of the Vanderbilt Marine Museum 3: 221 pp., 83 pls.

Borowsky, B., 1980. The pattern of tubesharing in *Microdeutopus gryllotalpa* (Crustacea: Amphipoda). Animal Behavior 28: 790-797.

Bos, J. R., 1874. Bijdrage tot de Kennis van de Crustacea Hedriophthalmata van Nederland en Zijne Kusten. Akademisch Proefschrift ter Verkrijging van den Graad van Doctor in de Wis-En Natuurkunde aan de Hoogeschool te Groningen. 100 pp., 2 pls.

Bosc, L.A.G., 1802. See Latreille, 1802.

Bosworth, Jr., W.S. 1973. Three new species of *Eohaustorius* (Amphipoda, Haustoriidae) from the Oregon coast. Crustaceana 25: 253-260, 2 figs.

Bourdillon, A., 1956. Etude de la migration chez *Chelura terebrans* (crustace Amphipoda). Academie des Sciences, Paris Comptes Rendus Hebdomadaires des Seances 242: 937-939.

Bousfield, E.L., 1951. Pelagic Amphipoda of the Belle Isle Strait region. Journal of the Fisheries Research Board of Canada 8: 134-163, 14 figs.

Bousfield, E.L., 1956a. Malacostracan crustaceans from the shores of western Nova Scotia. Nova Scotian Institute of Science, Proceedings 24: 25-38, 3 figs.

Bousfield, E.L., 1956b. Studies on the shore crustacea collected in eastern Nova Scotia and Newfoundland, 1954. National Museum of Canada, Bulletin 142: 127-152, 1 fig.

Bousfield, E.L., 1958. Littoral marine arthropods and mollusks collected in western Nova Scotia, 1956. Nova Scotian Institute of Science, Proceedings 24: 303- 325, 1 fig.

Bousfield, E.L., 1962. New haustoriid amphipods from the Canadian Atlantic region. National Museum of Canada, Bulletin 183: 63-75, 6 figs.

Bousfield, E.L., 1964. Insects of Campbell Island. Talitrid amphipod crustaceans. Pacific Insects Monograph 7: 45-57, 5 figs.

Bousfield, E.L., 1965. Haustoriidae of New England (Crustacea:Amphipoda). Proceedings of the U.S. National Museum 117: 159-240, 31 figs.

Bousfield, E.L., 1969. New records of *Gammarus* (Crustacea: Amphipoda) from the middle Atlantic region. Chesapeake Science 10: 1-17, 4 figs.

Bousfield, E.L., 1970. Terrestrial and aquatic amphipod crustacea from Renell Island. The Natural History of Renell Island, British Solomon Islands 6: 155-168, 4 figs.

Bousfield, E.L., 1971. Amphipoda of the Bismarck Archipelago and adjacent Indo-Pacific islands (Crustacea). Steenstrupia 1: 255-293, 20 figs.

Bousfield, E.L., 1973. Shallow-water gammaridean Amphipoda of New England. vii-xii + 312 pp., 13 figs, 69 pls. Ithaca & London: Cornell University Press.

Bousfield, E.L., 1977. A new look at the systematics of gammaroidean amphipods of the world. Crustaceana, Supplement 4: 282-316, 1 fig.

Bousfield, E.L., 1978. A revised classification and phylogeny of amphipod crustaceans. Transactions of the Royal Society of Canada 4: 343-390, 6 figs.

Bousfield, E.L., 1979. The amphipod superfamily Gammaroidea in the northeastern Pacific region: systematics and distribution ecology. Bulletin of the Biological Society of Washington 3: 297-359, 12 figs.

Bousfield, E.L., 1981a. Evolution in North Pacific coastal marine amphipod crustaceans. Evolution Today, Proceedings of the Second International Congress of Systematics and Evolutionary Biology: 69-89, 18 figs.

Bousfield, E.L., 1981b. British marine Amphipoda: Gammaridea (R.J. Lincoln). Canadian Journal of Fisheries and Aquatic Sciences 38: 732-733. [A Review.]

Bousfield, E.L., 1982. Amphipoda (palaeohistory). McGraw-Hill Yearbook of Science & Technology 1982-1983: 96-100.

Bousfield, E.L., 1983. An updated phyletic classification and palaeohistory of the Amphipoda. Pp. 257-277, 2 figs. **In** F.R. Schram (ed.). Crustacean Phylogeny. San Diego: Museum of Natural History.

Bousfield, E.L. & L.B. Holthuis, 1969. Proposed use of the plenary powers for the suppression of the names proposed between 1814 and 1820 by C.S. Rafinesque for two genera and four species belonging to the order Amphipoda (Class Crustacea), and matters connected therewith. Z.N.(S.) 1879. Bulletin of Zoological Nomenclature 26: 105-112.

Bousfield, E.L. & J.D. Hubbard, 1968. New records of gammaridean amphipod crustaceans from the intertidal zone of Prince William Sound, Alaska. Natural History Papers, National Museum of Canada 40: 11 pp., 2 figs.

Bousfield, E.L. & N.L. Tzvetkova, 1982. Studies on Dogielinotidae (Amphipoda, Talitroidea) from the shallow waters of the North Pacific region. Marine Invertebrates of Coastal Biocenoses of the Arctic Ocean and the Pacific Ocean, Explorations of the Fauna of the Seas 9: 76-94, 7 figs.

Bouvier, E.-L., 1907. Quelques impressions d'un naturaliste au cours d'une campagne scientifique de S.A.S. le Prince de Monaco (1905). Bulletin de l'Institut Oceanographique, Monaco 93: 103 pp., 69 figs.

Bouvier, E.-L., 1914. Les crustaces de profondeur et les pycnogonides recueillis par le Pourquoi-Pas? sous la direction de M. le Dr. Jean Charcot, dans l'Atlantique septentrional, au cours de la campagne estivale de 1913. Bulletin du Museum (National) d'Histoire Naturelle, Paris 20: 215-221, several figures.

Bovallius, C., 1878. Notes on *Pterygocera arenaria* Slabber. Kongliga Svenska Vetenskaps Akademiens Handlingar, Bandet 4, 8: 27 pp.

Bovallius, C., 1885. Some forgotten genera of Amphipoda. Kongliga Svenska Vetenskaps Akademiens Handlingar 10(14): 17 pp.

Bovallius, C., 1886. Amphipoda Synopidea. Nova Acta Regiae Societatis Scientiarum Upsalaiensis, series 3, 13(9): 36 pp., 3 pls.

Bowen, M.A., P.O. Smith, D. Boesch & J. Van Montfrans, 1979. Comparative biogeography of benthic macrocrustaceans of the middle Atlantic (U.S.A.) continental shelf. Bulletin of the Biological Society of Washington 3: 214-255, 14 figs.

Bowman, T.E., 1974. The "sea flea" *Dolobrotus mardeni* n. gen., n. sp., a deep-water American lobster bait scavenger (Amphipoda: Eusiridae). Proceedings of the Biological Society of Washington 87: 129-138, 27 figs.

Bowman, T.E. & R.B. Manning, 1972. Two arctic bathyal crustaceans: the shrimp *Bythocaris cryonesus* new species, and the amphipod *Eurythenes gryllus*, with in situ photographs from Ice Island T-3. Crustaceana 23: 187-201, 5 figs, 1 pl.

Bowman, T.E. & J.C. McCain, 1967. Variation and distribution of the pelagic amphipod *Cyphocaris challengeri* in the northeast Pacific (Gammaridea: Lysianassidae). Proceedings of the United States National Museum 122(3588): 14 pp., 9 figs.

Bowman, T.E. & R.A. Wasmer, 1984. The deep-sea amphipod *Paracyphocaris praedator* (Gammaridea: Lysianassidae) associated with the pelagic shrimp *Oplophorus novaezeelandiae* as an egg-mimic. Proceedings of the Biological Society of Washington 97: 844-848, 1 fig.

Bradley, J.C., 1908. Notes on two amphipods of the genus *Corophium* from the Pacific coast. University of California Publications in Zoology 4: 227-252, pls 9-13.

Brady, G.S., 1907. On the crustacean fauna of a salt-water pond at Amble. Transactions of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne, new series, 1: 330-336, pls 9-10.

Branch, G.M., 1975. The ecology of *Patella* from the Cape Peninsula South Africa. 5. Commensalism. Zoologica Africana 10: 133-162.

Brandt, J.F., 1851. Krebse. Dr. A. Th. v. Middendorff's Reise in den Aussersten Norden und Osten Sibiriens, Zoologie 2: 77-148, pls 5, 6.

Brattegard, T., 1964. *Hyale pontica* Rathke (Amphipoda) from Western Norway. Sarsia 15: 23-25.

Brattegard, T. & W. Vader, 1972. A collection of Peracarida from More and Romsdal, northwestern Norway. Sarsia 49: 33-40.

Bregazzi, P.K., 1972. Habitat selection by *Cherimedon femoratus* (Pfeffer) and *Tryphosella kergueleni* (Miers) (Crustacea: Amphipoda). Bulletin of the British Antarctic Survey 31: 21-31, 6 figs.

Brehaut, R., 1972. The distribution of some common intertidal organisms in the baliwick of Guernsey. Report and Transactions of the Society of Guernsey 19: 39-69, 28 figs.

Brian, A., 1932. Sulla partenogenesi geografica del *Corophium Bonelli* Sars (nota preliminare). Bolletino Museo Laboratorio Zoologia ed Anatomia Comparata Universita di Genova 12(52): 1-4, 1 pl.

Brian, A., 1938. Le cenobiosi dei pali nella Laguna Veneta. Atti della Societa di Scienze e Lettere di Genova 3: 121-142, 7 figs, 1 pl.

Brian, A., 1939. Gli anfipodi della Laguna di Venezia. Bollettino degli Istituti di Zoologia e Anatomia Comparata della R. Universita' di Genova, series 2, 19(110): 8 pp., 2 figs.

Brian, L. 1940. Notizie ecologiche su alcuni anfipodi bentonici del litorale di Genova. Bollettino degli Istituti di Zoologia e Anatomia Comparata della Reale Universita' di Genova, series 2, 20(120): 6 pp., 5 figs.

Broch, H. & E. Koefoed, 1907. (List of species in:) Journal des stations compte rendu, par station, des observations oceanographiques. Duc D'Orleans, Croisiere Oceanographique...Mer du Gronland 1905: 125-272.

Brohmer, P., 1982. Amphipoda, in: Fauna von Deutschland; ein Bestimmungsbuch unserer heimischen Tierwelt. 582 pp. Heidelberg: Quelle & Meyer.

Bruce, J.R., J.S. Colman & N.S. Jones, eds., 1963. Marine fauna of the Isle of Man and its surrounding seas. 307 pp. Liverpool: University Press.

Bruggen, E. von der, 1906. Die Amphipoden des Katharinenhafens (Murmankuste) und seiner Umgebungen. Travaux de la Societe Imperiale des Naturalistes de St.

Petersbourg 36: livr. 1, (8): 10 pp., 1 pl.

Bruggen, E. von der, 1907a. Amphipoda. Zoologische Ergebnisse der russischen Expeditionen nach Spitzbergen. Annuaire du Musee Zoologique Academie Imperiale des Sciences de St. Petersbourg 11: 214-244, 9 figs.

Bruggen, E. von der, 1907b. Zwei neue Amphipoden-Arten aus Wladiowostok. Annales de la Musee Zoologique, Academie Imperiale des Sciences de Saint-Petersbourg 12: 478-483, 5 figs.

Bruggen, E. von der, 1909. Beitrage zur Kenntnis der Amphipoden-Fauna der russischen Arctis. Memoires de l'Academie Imperiale des Sciences de St. Peterbourg, series 8, Physico-Mathematique Classe 18(16): 56 pp., 3 pls, 4 figs.

Brusca, G.J., 1967. The ecology of pelagic Amphipoda, II, observations on the reproductive cycles of several pelagic amphipods from the waters off southern California. Pacific Science 21: 449-456.

Bruzelius, R.M., 1859. Bidrag till kannedomen om skandinaviens Amphipoda Gammaridea. Kongliga Svenska Vetenskaps-Akademiens Handlingar, new series, 3: 104 pp., 4 pls.

Bryazgin, V.F., 1974a. Species of the family Lysianassidae (Amphipoda, Gammaridea) first recorded for the Barents Sea. Akademiia Nauk SSSR, Zoologichesckii Zhurnal 53: 1570-1574, 3 figs.

Bryazgin, V.F., 1974b. A contribution to the fauna of Gammaridea (Amphipoda) in the Barentz Sea. Akademiia Nauk SSSR, Zoologicheskii Zhurnal 53: 1417-1420, 4 figs.

Buchanan, J.B., 1957. The bottom fauna communities across the continental shelf off Accra, Ghana (Gold Coast). Proceedings of the Zoological Society of London 130: 1-56, 1 pl., 10 figs.

Buchholz, R., 1874. 8. Crustaceen. Die Zweite deutsche Nordpolarfahrt in den Jahren 1869 und 1870 unter Fuhrung des Kapitan Karl Koldewey, 2, II, Zoologie: 262-399, 15 pls.

Budnikova, L.L., 1985. New species from the family Photidae (Amphipoda, Gammaridea) from the coastal zone of the Sikhote-alin biosphere state reserve (Sea of Japan). Zoologicheskii Zhurnal 64: 455-459, 2 figs. [in Russian]

Bulycheva, A.I., 1934. Sur Amphipoden-Fauna des weissen Meeres. Gosuddarstvennyi Gidrologicheskii Institut, Issledovanija Morei SSSR 20: 57-63, 10 figs.

Bulycheva, A.I., 1936a. Zur Amphipodenfauna de Baltischen Meeres. Issledovanija Morei SSSR 24: 222-231, 3 figs.

Bulycheva, A.I., 1936b. New species of Amphipoda from the Japan Sea. Annals and Magazine of Natural History, series 10, 18: 242-256, 35 figs.

Bulycheva, A.I., 1951. Novye vid Amphipoda iz Barentsova Morja. Akademiia Nauk SSSR, Doklady 77: 925-928, 1 fig.

Bulycheva, A.I., 152. Novye vidy bokoplavov (Amphipoda, Gammaridea) iz Japonskogo Morja. Akademiia Nauk SSSR, Trudy Zoologicheskogo Instituta 12: 195-250, 39 figs.

Bulycheva, A.I., 1955. Novye vidy bokoplavov (Amphipoda, Gammaridea) iz Japonskogo Morja. II. Akademiia Nauk SSSR, Trudy Zoologicheskogo Instituta 21: 193-207, 6 figs.

Bulycheva, A.I., 1957a. Morskie bloxi morej SSSR i sopredel'nyx vod (Amphipoda-Talitroidea). Akademiia Nauk SSSR, Opredeliteli po Faune SSSR 65: 185 pp., 66 figs.

Bulycheva, A.I., 1957b. Amfipody (Amphipoda) severo-zapadnoi chasti Japanskogo Morja. Akademiia Nauk SSSR, Issledovania Dal'nevostoch Morei 4: 85-126, 3 figs.

Bulycheva, A.I., 1957c. Fauna Amphipoda Belogo Morja. Materialy po Kompleksnomu Izucheniyo Belogo Morya 1: 391-410.

Busdosh, M., D.M. Lavigne & G.A. Robilliard, 1982a. Habitat separation by the amphipods *Pontoporeia affinis* and *P. femorata* near Prudhoe Bay, Alaska. Oikos 39: 77-82, 2 figs.

Bushueva, I.V., 1977. About ecology and distribution of Amphipoda Gammaridea in shoal waters of the Novaya Zemlya and Franz Josef Land. **In** Biocoenoses of the shelf of Franz Josef Land and the fauna of adjacent waters. Zoological Institute ofthe Academy of Sciences of the USSR. Leningrad, Explorations of the Fauna of the Seas 14: 277-290, 4 figs.

Bushueva, I.V., 1978. A new amphipod species (Amphipoda, Gammaridea) from the Davis Sea (Eastern Antarctic). Zoologicheskii Zhurnal 57: 450-453, 1 fig.

Bushueva, I.V., 1982. A new species of the genus *Pseudharpinia* from the Davis Sea (Antarctic). Zoologicheskiy Zhurnal 61: 1262-1265, 1 fig. [in Russian]

Bussarawich, S., A. Nateewathana & J. Hylleber, 1984. Distribution of marine benthic amphipods off Phuket Island, with emphasis on tin mining and a model of species-individual relationships. Phuket Marine Biological Center, Research Bulletin 32: 1-21, 9 figs, 1 table.

Bygrave, W., 1911. Report on the plankton of the English Channel in 1906. Marine Biological Association of the United Kingdom, International Fisheries Investigation, 3rd Report (Southern Area): 236-267.

Bynum, K.H. & R.S. Fox, 1977. New and noteworthy amphipod crustaceans from North Carolina, U.S.A. Chesapeake Science 18: 1-33, 18 figs.

Cabioch, L. & C. Rodriguez Babio, 1975. Sur deux especes d'amphipodes nouvelles pour la faune marine de Roscoff. Travaux de la Station Biologique de Roscoff 22(22): 15-16.

Callame, B., 1950. Observations sur le nid de l'amphipode *Jassa falcata* (Montagu). Comptes Rendus Academie des Sciences, Paris 231: 552-554, unnumbered fig.

Calman, W.T., 1896. On species of *Phoxocephalus* & *Apherusa*. Transactions of the Royal Irish Academy 30: 743-754, pls 31, 32.

Calman, W.T., 1898. On a collection of Crustacea from Puget Sound. Annals of the New York Academy of Science 11: 259-292, pls 31-34.

Calman, W.T., 1908. I. Crustacea (excluding Copepoda). Notes on a small collection of plankton from New Zealand.-I. Annals and Magazine of Natural History, series 8, 1: 232-240, 5 figs.

Calman, W.T., 1910. On two new species of wood-boring Crustacea from Christmas Island. Annals and Magazine of Natural History, series 8, 5: 181-186, pl 5.

Calman, W.T., 1920. On marine boring animals. pp 62-78, pl 1. **In** P.M. Crosthwaite & G.R. Redgrave (eds). The Deterioration of Structures of Timber, Metal and Concrete Exposed to the Action of Sea-water. First Report. London.

Calman, W.T., 1921. Notes on marine wood-boring animals.-Crustacea. Proceedings of the Zoological Society of London 1921(1): 215-220.

Camp, D.K., N.H. Whiting & R.E. Martin, 1977. Nearshore marine ecology at Hutchinson Island, Florida: 1971-1974. V. Arthropods. Florida Marine Research Publications 25: 1-63, 13 figs.

Candeias, A., 1934. Crustaceos planctonicos das costas de Portugal. Memorias e Estudos Museu Zoologico, Coimbra, series 1, 75: 1-8, 6 figs.

Caporiacco, L. Di, 1936. Notizie preliminari sui risultati zoologici della spedizione. Pp. 47-51. **In** La Spedizione Geografica Italiana al Karakoram (1929 VII E.F.). Storia del Viaggio e Risultati Geografici. Pubblicazione

effecttuata sotto gli auspici: Della Reale Societa Geografica Italiana, del Club Alpino Italiano e del Comune de Milano. Milano-Roma: S.A. Arti Grafiche Bertarelli.
Carl, G.C., C.J. Giguet & G.A. Hardy, 1951. Biology of the Scott Island Group, British Columbia. Province of British Columbia. Report of the Provincial Museum of Natural History and Anthropology 1950: 21-63, 17 figs.
Carl, J., 1923. Amphipodes. Museum d'Histoire Naturelle de Geneve Catalogue des Invertebres de la Suisse 15: 1-27, 27 figs.
Carlton, J.T., 1985. Transoceanic and interoceanic dispersal of coastal marine organisms: the biology of ballast water. Oceanography and Marine Biology, An Annual Review 23: 313-371, 1 fig.
Carter, J.W., 1982. Natural history observations on the gastropod shell-using amphipod *Photis conchicoa* Alderman, 1936. Journal of Crustacean Biology 2: 328-341, 2 figs.
Carter, J.W. & D.W. Behrens, 1980. Gastropod mimicry by another pleustid amphipod in central California. The Veliger 22: 376-377, 1 fig.
Carus, J.V., 1885. Amphipods. Pp. 390-421. **In** Prodromus Faunae Mediterraneae sive Decriptio Animalium Maris Mediterranei Incolarum quam Comparata Silva Rerum Quatenus Innotuit Adiectis locis et Nominibus Vulgaribus Eorumque Auctoribus in Commodum Zoologorum Conessit 1: xi + 525 pp. Stuttgart: E. Schweizerbart'sche verlagshandlung (E.Koch).
Carvalho, R.N. de, 1931. Catalogo da coleccao de invertebrados de Portugal existentes no Museu Zoologico da Universidada de Coimbra. Crustacea I. Amphipoda. Memorias e Estudios Museu Zoologico, Universita Coimbra, series 1, 54: 1-8.
Caspers, H., 1939. Die Bodenfauna der Helgolander Tiefen Rinne. Helgolander Wissenschaftliche Meeres-undersuchungen 2: 1-112, 33 figs.
Caspers, H., 1950. Die Lebensgemeinschaft der Helgolander Austernbank. Helgolander Wissen-schaftliche Meeresuntersuchungen 3: 119-169, 15 figs.
Caspers, H., 1951. Quantitative Untersuchungen uber die Bodentierwelt des Schwarzen Meeres im bulgarischen Kustenbereich. Archiv fur Hydrobiologie 45: 1-192, 66 figs, 7 pls.
Caspers, H., 1952. Untersuchungen uber die Tierwelt von Meeressalinen an der bulgarischen Kuste des Schwarzen Meeres. Zoologischer Anzeiger 148: 243-259, 4 figs.
Caspers, H., 1953. Der tierische Bewuchs an Helgolander Seetonnen. Helgolander Wissen-schaftliche Meeres-untersuchungen 4: 138-159, 9 figs.
Caspers, H., 1957. Black Sea and Sea of Azov. Chapter 25 in Volume 1 of Treatise on Marine Ecology and Paleoecology, edited by Joel W. Hedgpeth, Geological Society of America, Memoir 67.
Catta, J.-D., 1875. Note pour servir a l'histoire des amphipodes du Golfe de Marseille. Revue des Sciences Naturelles 4: 161-169.
Catta, J.-D., 1876. Note sur quelques crustaces erratiques. Annales des Sciences Naturelles, series 6, Zoologie, 3: 1-33, 2 pls.
Cazaux, C. & P.J. Labourg, 1973. Contribution a l'etude de la faune marine de la region d'Arcachon. VII. Bulletin de la Societe Linneenne de Bordeaux 3: 133-143, 2 figs.
Cecchini, C., 1928a. Gli anfipodi del R. Museo Zoologico de Firenze Fam. Lysianassidae - Gen. *Pseudalibrotus*, *Lysianassa*, *Aristias*, *Anonyx*, *Socarnes*. Atti della Reale Accademia Fisiocritici Siena, series 10, 3: 113-128, 4 figs.
Cecchini, C., 1928c. Gli anfipodi del R. Museo Zoologico di Firenze Fam. Gammaridae - Gen. *Gammarellus*, *Melita*, *Ceradocus*, *Maera*, *Elasmopus*. Atti della Reale Accademia Fisiocritici Siena, series 10, 3: 377-393, 1 fig.
Cecchini, C., 1928b. Gli anfipodi del R. Museo Zoologico de Firenze Fam. Lysianassidae - Gen. *Scopelocheirus*, *Orchomenella*; - Fam. Ampeliscidae, Corophiidae, Ampithoidae, Aoridae. Atti della Reale Accademia Fisiocritici Siena, series 10, 3: 301-318, 2 figs.
Cecchini, C., 1928d. Gli anfipodi del R. Museo di Firenze Fam. Gammaridae - Gen. *Pherusa*, *Gammarus*, *Gammaracanthus*. Atti della Reale Accademia Fisiocritici Siena, series 10, 3: 477-492.
Cecchini, C., 1928e. Contributo alla conoscenze degli anfipodi. Memoria Reale Comitato Talassografico Italiano, 142: 1-10, 2 pls.
Cecchini, C., 1929a. Gli anfipodi del R. Museo Zoologico di Firenze Fam. Talitridae. Atti della Reale Accademia Fisiocritici Siena 3: 611-625.
Cecchini, C., 1929b. Gli anfipodi del R. Museo Zoologico di Firenze Fam. Talitridae; fam. Leucothoidae; fam. Dexaminidae; fam. Pleustidae; fam. Calliopiidae. Atti della Reale Accademia Fisiocritici Siena 3: 767-780.
Cecchini, C., 1929c. Gli anfipodi del R. Museo Zoologico di Firenze Fam. Gammaridae - Gen. *Carinogammarus* e *Niphargus*; fam. Haustoriidae; fam. Photidae. Atti della Reale Accademia Fisiocritici, Siena, series 10, 3: 543-558, 1 fig.
Cecchini, C. & P. Parenzan, 1935 degli anfipodi. Memoria Reale Comitato Talassografico Italiano, 142: 1-10, 2 pls.
Cecchini, C. & P. Parenzan, 1935. Anfipodi del Golfo di Napoli. Publicazioni Stazione Zoologica Napoli 14: 153-250, 55 figs.
Cejas, J.R., A. Brito & G. Lozano, 1983. Sobre algunos gammaridos (Crustacea, Amphipoda) nuevos para la fauna marina de Canarias. Vieraea 12: 317-328, 3 figs.
Chapman, G. & J.E. Santler, 1955. Aspects of the fauna and flora of the Azores. V. Crustacea. Annals and Magazine of Natural History, series 12, 8: 371-376.
Chapman, J.W. & J.A. Dorman, 1975. Diagnosis, systematics and notes on *Grandidierella japonica* (Amphipoda: Gammaridea) and its introduction to the Pacific Coast of the United States. Bulletin of the Southern California Academy of Sciences 74: 104-108, 5 figs.
Charniaux-Cotton, H., 1951. Contribution a la fauna des amphipodes de Banyuls observations sur la ponte en hiver. Vie et Milieu 2: 371-380.
Chevais, S., 1937. Croissance et races locales de *Corophium volutator*. Travaux Station Biologique Roscoff, Paris 15: 101-132, 3 figs, pl. 7.
Chevreux, E., 1884. Crustaces amphipodes et isopodes des environs du Croisic. Association Francaise pou l'Avancement des Sciences, Compte Rendu de la 12 session: 517-520.
Chevreux, E., 1886. Description de trois especes nouvelles d'amphipodes du sudouest de la Bretagne. Bulletin de la Societe Zoologique de France 11: 40-42.
Chevreux, E., 1887a. Nouvelles especes de crustaces amphipodes du sud-ouest de la Bretagne. Association Francaise pour l'Avancement des Sciences Congres de Toulouse, 4 pp.
Chevreux, E., 1887b. Catalogue des crustaces amphipodes marins du sud-ouest de la Bretagne, suivi d'un apercu de la distribution geographique des amphipodes sur les cotes de France. Bulletin de la Societe Zoologique de France 12: 288-340, 8 figs, pl. 5.
Chevreux, E., 1887c. Crustaces amphipodes nouveaux dragues par l'*Hirondelle*, pendant sa campagne de 1886. Bulletin de la Societe Zoologique de France 12: 566-580.
Chevreux, E., 1888a. Sur quelques crustacea amphipodes

recueillis aux environs de Cherchell. Association Francaise pour l'Avancement des Sciences 1888, 17: 10 pp., pl. 6.

Chevreux, E., 1888b. Sur quelques crustaces amphipodes provenant d'un dragage de L'*Hirondelle* au large de Lorient. Bulletin de la Societe Zoologique de France 13: 4 pp.

Chevreux, E., 1888c. Troisieme campagne de l'*Hirondelle*, 1887. Sur quelques crustaces amphipodes du littoral de Acores. Bulletin de la Societe Zoologique de France 13: 31-35.

Chevreux, E., 1888d. Contribution a l'etude de la distribution geographique des amphipodes sur les cotes de France. Bulletin de la Societe d'Etudes Scientific de Paris, 11: 12-23.

Chevreux, E., 1889a. Amphipodes nouveaux provenant des campagnes de l'*Hirondelle* 1887-1888. Bulletin de la Societe Zoologique de France, 14: 284-289, 3 figs (unnumbered).

Chevreux, E., 1889b. Sur la presence d'une rare et interessante espece d'amphipode, *Eurythenes* (1) *gryllus* Mandt, dans les eaux profondes de l'ocean, au voisinage des Acores. Bulletin de la Societe Zoologique de France 14: 298-300, 1 fig. (unnumbered).

Chevreux, E., 1890a. Description de l'*Orchomene grimaldii*, amphipode nouveau des eaux profondes de la Mediterranee. Bulletin de la Societe Zoologique de France 15: 164-166.

Chevreux, E., 1890b. *Microprotopus maculatus* et *Microprotopus longimanus*. Bulletin de la Societe Zoologique de France 15: 148-153, 7 figs.

Chevreux, E., 1891a. Quatrieme campagne de L'*Hirondelle*, 1888. *Hyale grimaldii* et *Stenothöe dolfusi*. Bulletin de la Societe Zoologique de France 16: 257-262, 10 figs.

Chevreux, E., 1891b. *Podoprion bolivari*, amphipode nouveau de la famille des Lysianassidae. Voyage de la goelette *Melita* aux Canaries et au Senegal, 1889-1890. Memoir de la Societe Zoologique de France 4: 5-10, pl. 1.

Chevreux, E., 1895a. Les amphipodes des premieres campagnes de la *Princesse-Alice*. Memoir de la Societe Zoologique de France 7: 424-435, 14 figs.

Chevreux, E., 1895b. Sur un amphipode, *Pseudotiron bouvieri*, nov. gen. et. sp., de la famille des Syrrhoidae, nouvella pour la faune Mediterraneenne. Bulletin de la Societe Zoologique de France 20: 165-170, 14 figs.

Chevreux, E., 1899a. Sur deux especes geantes d'amphipodes provenant des campagnes du yacht Princesse Alice. Bulletin de la Societe de France 24: 152-158, 6 figs.

Chevreux, E., 1899b. Sur quelques interessantes especes d'amphipodes provenant de la derniere campagne du yacht *Princesse Alice*. Bulletin de la Societe de France 24: 147-152, 5 figs.

Chevreux, E., 1899c. Revision des amphipodes de la cote oceanique de France. Comptes Rendus Association Francaise pour L'Avancement des Sciences 1898: 474-484.

Chevreux, E., 1900a. Amphipodes provenant des campagnes de l'*Hirondelle* (1885-1888). Resultats des Campagnes Scientifiques Accomplies par le Prince Albert I. Monaco 16: iv + 195 pp., 18 pls.

Chevreux, E., 1900b. Campagnes de la *Melita*. Description d'un amphipode nouveau appartenant au genre *Grubia* Czerniawski. Bulletin de la Societe Zoologique de France 25: 95-101, 5 figs.

Chevreux, E., 1901a. Crustaces amphipodes. Mission scientifique de M Ch. Alluaud aux Iles Sechelles (Mars, Avril, Mai, 1892). Memoires de la Societe de France 14: 388-438, 65 figs.

Chevreux, E., 1901b. Description d'un crustace amphipode nouveau de la famille des Stenothoidae (*Parametopa kervillei* nov. gen. et sp.) capture au moyen d'une nasse par M. Henri Gadeau de Kerville, dans la region d'Omonville-la-Rogue (Manche). Bulletin Societe des Amis Sciences Naturelles de Rouen 1900: 231-237, pl. 3.

Chevreux, E., 1901c. Amphipodes recueillis par la *Melita* sur les cotes occidentale et meridionale de Corse. Association Franaise pour l'Avancement des Sciences 1901, 30: 692-699, pl. 5.

Chevreux, E., 1902a. Campagnes scientifiques de S.A.S. Le Prince Albert I de Monaco. Description d'un amphipod marin appartenant au genre *Hyalella* Smith. Bulletin de la Societe Zoologique de France 27: 223-227, 2 figs. [but has *Hyale richardi* as figs]

Chevreux, E., 1902b. Description d'un amphipode marin appartenant au genre *Hyalella* Smith. Bulletin de la Societe Zoologique de France 27: 223-227, 2 figs.

Chevreux, E., 1903. Note preliminaire sur les amphipodes de la famille des Lysianassidae recueillis par la *Princesse-Alice* dans les eaux profondes de l'Atlantique et de la Mediterranee. Bulletin de la Societe Zoologique de France 28: 81-97, 7 figs.

Chevreux, E., 1905a. *Cyphocaris alicei*, nouvelle espece d'amphipode voisine de *Cyphocaris challengeri* Stebbing. Bulletin de la Museum Oceanographique, Monaco 27: 6 pp., 2 figs.

Chevreux, E., 1905b. Description d'un amphipode (*Katius obesus*, nov. gen. et sp.), suivie d'une liste des amphipodes de la tribu des gammarin ramenes par le filet a grande ouverture pendant la derniere campagne de la *Princesse-Alice* en 1904. Bulletin de la Museum Oceanographique, Monaco 35: 5 pp., 3 figs, on extra page 7 also is a list.

Chevreux, E., 1905c. *Paracyphocaris praedator* type d'un nouveau genre de Lysianassidae. Bulletin de la Museum Oceanographique de Monaco 32: 6 pp., 3 figs.

Chevreux, E., 1905d. Diagnoses d'amphipodes nouveaux provenant de l'expedition antaracique du Francais. Bulletin de la Societe Zoologique de France 30: 159-165, 3 figs.

Chevreux, E., 1905e. Description d'un amphipode (*Cyphocaris richardi* nov. sp.) provenant des peches au filet a grande ouverture de la derniere campagne du yacht *Princesse-Alice* (1904). Bulletin de la Museum Oceanographique, Monaco 24: 5 pp., 2 figs.

Chevreux, E., 1906a. Crustaces amphipodes. Expedition Antarctique Francaise (1903-1905) commandee par le Dr Jean Charcot. Sciences Naturelles: Documents Scientifiques, 100 pp., 56 figs.

Chevreux, E., 1906b. Diagnoses d'amphipodes nouveaux provenant de l'expedition antarctique du *Francais*. III. Oediceridae-Calliopidae. Pp. 76-80, 2 figs, IV. Atylidae. Pp. 82-86, 3 figs. V. Phliadidae. Pp. 87-89, 2 figs. Bulletin de la Societe Zoologique de France 31: 76-89.

Chevreux, E., 1906c. Diagnoses d'amphipodes nouveaux provenant de l'expedition antarctique du "Francais". (II. Metopidae-Iphimedidae). Bulletin de la Societe Zoologique de France 32: 37-40, 2 figs.

Chevreux, E., 1907a. Diagnoses d'amphipodes nouveaux recueillis dans les possessions francaises de L'Oceanie, par M.L. Seurat, directeur du laboratoire de recherches biologiques de Rikitea. Bulletin du Museum d'Histoire Naturelle 1907: 412-417.

Chevreux, E., 1907b. *Orchomenella lobata* nouvelle espece d'amphipode des regions arctiques. Bulletin de l'Institut Oceanographique, Monaco 96: 6 pp., 3 figs.

Chevreux, E., 1908a. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique nord. Bulletin de l'Institut Oceanographique, Monaco, 117: 13 pp., 7 figs.

Chevreux, E., 1908b. Amphipodes. Pp. 49-50. In Henri

Gadeau de Kerville's Liste methodique des especes, sous-especes et varietes d'animaux recueillis en Khroumirie (Nord-ouest de la Tunisie) in his Voyage Zoologique en Khroumirie (Tunise) Mai-Juin 1906: xviii + 316 pp., 29 pls. Paris.

Chevreux, E., 1908c. Amphipodes recueillis dan les possessions francaises de l'Oceanie par M. Le Dr. Seurat, directeur du laboratoire de recherches biologiques de Rikitea (Iles Gambier). 1902-1904. Memoire de la Societe Zoologique de France 20: 470-527, 35 figs.

Chevreux, E., 1908d. Sur trois nouveaux amphipodes Mediterraneens appartenant au genre *Corophium* Latreille. Bulletin de la Societe Zoologique de France 33: 69-75, 6 figs.

Chevreux, E., 1908e. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique nord. Bulletin de l'Institut Oceanographique 129: 12 pp., 6 figs.

Chevreux, E., 1908f. Description de deux nouvelles especes d'amphipodes des parages de Monaco. Bulletin de l'Institut Oceanographique 113: 8 pp., 6 figs.

Chevreux, E., 1908g. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique nord. Bulletin de l'Institut Oceanographique de Monaco 122: 8 pp., 4 figs.

Chevreux, E., 1908h. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique nord. Bulletin de l'Institut Oceanographique 121: 15 pp., 8 figs.

Chevreux, E., 1909. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique nord. Bulletin de l'Institut Oceanographique 150: 7 pp., 3 figs.

Chevreux, E., 1910a. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique nord. Bulletin de l'Institut Oceanographique 156: 4 pp., 2 figs.

Chevreux, E., 1910b. Note sur les crustaces amphipodes d'Algerie et de Tunisie. Bulletin de la Societe de Histoire Naturelles de Afrique Nord 9: 135-137.

Chevreux, E., 1911a. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique nord. Bulletin de l'Institut Oceanographique 204: 13 pp., 6 figs.

Chevreux, E., 1911b. Sur quelques amphipodes des iles Sandwich de sud. Anales de Museo Nacional Buenos Aires 21 (series 3, volume 14): 403-407, 3 figs.

Chevreux, E., 1911c. Sur les amphipodes des Expeditions Antarctiques Francaises. Academie des Sciences, Paris, Comptes Rendus 153: 1166-1168.

Chevreux, E., 1911d. Campagnes de la *Melita*. Les amphipodes d'Algerie et de Tunisie. Memoir de la Societe Zoologique de France 23: 145-285, pls 6-20.

Chevreux, E., 1912a. Diagnoses d'amphipodes nouveaux. Deuxieme Expedition dans l'Antarctique, dirigee par le Dr. Charcot, 1908-1910. Bulletin du Museum d'Histoire Naturelle, Paris 18: 208-218.

Chevreux, E., 1912b. Description d'un amphipode nouveau provenant de la campagne de l'*Hirondelle II* en 1911. Bulletin de l'Institut Oceanographique 233: 4 pp., 2 figs.

Chevreux, E., 1912c. Description d'un amphipode, *Orchomene similis* nov. sp. des cotes de Bretagne. Bulletin de la Societe Zoologique de France 37: 283-284, 1 fig.

Chevreux, E., 1912d. Amphipodes. Deuxieme Expedition Antarctique Francaise (1908-1910) commandee par le Dr. Jean Characot, Sciences Naturelles: Documents Scientifiques, pp. 79-186, 62 figs.

Chevreux, E., 1913a. Amphipoda. Crustaces II. Voyage de Ch. Alluaud et R. Jeannel en Afrique Orientale (1911-1912), Resultats Scientifiques, pp. 11-22, 6 figs.

Chevreux, E., 1913b. Sur quelques interessantes especes d'amphipodes provenant des parages de Monaco et des peches pelagiques de la *Princesse-Alice* et de l'*Hirondelle II* en Mediterranee. Bulletin de l'Institut Oceanographique 262: 26 pp., 9 figs.

Chevreux, E., 1914. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique nord. Bulletin de l'Institut Oceanographique 296: 4 pp., 3 figs.

Chevreux, E., 1915. Amphipodes de la Nouvelle-Caledonie et des Iles Loyalty. **In** F. Sarasin & J. Roux (eds). Nova Caledonia, Zoologique, 2 (Livre 1, number 1), 14 pp., 3 pls.

Chevreux, E., 1916. Sur les amphipodes du genre *Cyphocaris* Boeck recueillis par la *Princesse-Alice* au moyen du filet Richard a grande ouverture. Bulletin de l'Institut Oceanographique de Monaco 319: 7 pp., 2 figs.

Chevreux, E., 1919. Note preliminaire sur les amphipodes recueillis par les expeditions du *Travailleur* dt du *Talisman* (1880-1883). Bulletin du Museum d'Histoire Naturelle 1919: 574-580; 1920: 7-12. [cited in text as 1919-1920].

Chevreux, E., 1920. Sur quelques amphipodes nouveaux ou peu connus provenant des cotes de Bretagne. Bulletin de la Societe Zoologique de France 45: 75-87, 9 figs.

Chevreux, E., 1922. Sur un nouveau genre d'amphipodes de la faune francaise. Bulletin du Museum d'Histoire Naturelle 28: 487-488, 1 fig.

Chevreux, E., 1925. Amphipodes I.-Gammariens. Voyage de la goelette *Melita* aux Canaries et au Senegal (1889-1890). Bulletin de la Societe Zoologique de France 50: 278-311, 12 figs.

Chevreux, E., 1926a. Diagnoses d'amphipodes nouveaux provenant des campagnes de la *Princesse-Alice* dans l'Atlantique et dans l'Ocean Arctique. Bulletin de l'Institut Oceanographique 475: 12 pp., 6 figs.

Chevreux, E., 1926b. Amphipodes I.-Gammariens (*suite*). Voyage de la goelette *Melita* aux Canaries et au Senegal 1889-1890. Bulletin de la Societe Zoologique de France 50: 365-398, figs 13-35.

Chevreux, E., 1927. Crustaces amphipodes. Expedition Scientifique de Travailleur et du Talisman Pendant les Annees 1880, 1881, 1882, Malacostraces (Suite) 9: 41-152, 14 pls.

Chevreux, E., 1935. Amphipodes provenant des campagnes du Prince Albert I de Monaco. Resultats des Campagnes Scientifiques accomplies par le Prince Albert I, 90: 214, 16 pls.

Chevreux, E. & E.-L. Bouvier, 1892. *Perrierella crassipes*, espece et genre nouveaux d'amphipodes des cotes de France. Bulletin de la Societe Zoologique de France 17 50-54, 1 fig.

Chevreux, E. & E.-L. Bouvier, 1893. Les amphipodes de Saint-Vaast-la-Hougue. Annales des Sciences Naturelles Zoologie, series 7, 15: 109-144, pl. 2.

Chevreux, E. & L. Fage, 1925. Amphipodes. Faune de France 9: 488 pp., 438 figs.

Chevreux, E. & J. de Guerne, 1888. Sur un amphipode nouveau (*Cyrtophium chelonophilum*), commensal de *Thalassocaretta* L. Comptes Rendus Academie des Sciences Paris 88: 4 pp.

Chilton, C., 1882a. Additions to the New Zealand Crustacea. Transactions and Proceedings of the New Zealand Institute 14: 171-174, pl. 8.

Chilton, C., 1882b. Additions to the New Zealand Custacea [sic]. New Zealand Journal of Science 1: 44.

Chilton, C., 1883. Further additions to our knowledge of the New Zealand Crustacea. Transactions and Proceedings of the New Zealand Institute 15: 69-86, 3 pls.

Chilton, C., 1884a. Additions to the sessile-eyed Crustacea of New Zealand. Transactions and Proceedings of the New Zealand Institute 16: 249-265, pls 17-21.

Chilton, C., 1884b. *Moera Petriei* (G.M. Thomson). New Zealand Journal of Science 2: 230-231.

Chilton, C., 1885a. On an example of polymorphism in the Amphipoda. Annals and Magazine of Natural History, series 5, 16: 368-376, pl. 10.

Chilton, C., 1885b. Notes on a few Australian Edriophthalmata. Proceedings of the Linnean Society of New South Wales 9: 1035-1044, pls 46-47.

Chilton, C., 1892a. Notes on some New Zealand Amphipoda and Isopoda. Transactions and Proceedings of the New Zealand Institute 24: 258-269.

Chilton, C., 1892b. On a tubicolous amphipod from Port Jackson. Records of the Australian Museum 2: 1-6, pl. 1.

Chilton, C., 1897. A new amphipod from New Zealand (Family Pontoporeiidae). Annals and Magazine of Natural History, series 6, 19: 1-6, pl. 5.

Chilton, C., 1900. A New-Zealand species of the amphipodan genus *Cyproidia*. Annals and Magazine of Natural History, series 7, 5: 241-246, pl. 5.

Chilton, C., 1906a. Report of some Crustacea dredged off the coast of Auckland. Transactions of the New Zealand Institute 38: 265-268.

Chilton, C., 1906b. Note on a New Zealand amphipod belonging to the genus *Seba*. Annals and Magazine of Natural History, series 7, 17: 569-573, 1 fig.

Chilton, C., 1906c. List of Crustacea from the Chatham Islands. Transactions and Proceedings of the New Zealand Institute 38: 269-273.

Chilton, C., 1909a. Note on the amphipodan genera *Bircenna, Kuria,* and *Wandelia*. Transactions of the New Zealand Institute 41 (new issue): 59-63, 3 figs.

Chilton, C., 1909b. The Crustacea of the subantarctic Islands of New Zealand. Subantarctic Islands of New Zealand 26: 601-671, 19 figs.

Chilton, C., 1911a. Miscellaneous notes on some New Zealand Crustacea. Transactions and Proceedings of the New Zealand Institute 44: 128-135.

Chilton, C., 1911b. Notes on the dispersal of marine Crustacea by means of ships. Transactions and Proceedings of the New Zealand Institute 43: 131-133.

Chilton, C., 1911c. The Crustacea of the Kermadec Islands. Transactions and Proceedings of the New Zealand Institute 43: 544-573, 4 figs.

Chilton, C., 1911d. Crustacea. Scientific results of the New Zealand government trawling expedition, 1907. Records of the Canterbury Museum 1: 285-312, pl. 58.

Chilton, C., 1912. The Amphipoda of the Scottish National Antarctic Expedition. Transactions of the Royal Society of Edinburgh 48: 455-520, 2 pls.

Chilton, C., 1913. Revision of the Amphipoda from South Georgia in the Hamburg Museum. Mitteilungen Naturhistorisches Museum, Hamburg 30: 53-63.

Chilton, C., 1914. A new amphipodan genus and species (Family Dexaminidae) from New Zealand. Journal of the Linnean Society of London, Zoology 32: 331-336, pls 26, 27.

Chilton, C., 1915. The New Zealand species of the amphipodan genus *Elasmopus*. Transactions and Proceedings of the New Zealand Institute 47 (new issue): 320-330, 12 figs.

Chilton, C., 1916a. Some Australian and New Zealand Gammaridae. Transactions and Proceedings of the New Zealand Institute 48: 359-370, 6 figs.

Chilton, C., 1916b. *Parapherusa crassipes* (Haswell), an amphipod of Australasian seas. Annals and Magazine of Natural History, series 8, 18: 199-207, pls 8-10.

Chilton, C., 1916c. A new species of the amphipodan genus *Hyale* from New Zealand. Annals and Magazine of Natural History, series 8, 17: 362-366, 5 figs.

Chilton, C., 1917a. The identity of the two amphipods, *Ampelisca eshrichtii*, Krøyer, and *A. macrocephala*, Liljeborg, considered from an antarctic point of view. Journal of Zoological Research 2: 75-93, 7 figs.

Chilton, C., 1917b. Further notes on the New Zealand amphipod *Hyale grenfelli*, Chilton. Annals and Magazine of Natural History, series 8, 19: 273-276, 3 figs.

Chilton, C., 1917c. Notes on the distribution of the amphipods, *Elasmopus rapax* A. Costa, and *Maera inaequipes* (A. Costa). Journal of Zoological Research 2: 17-19.

Chilton, C., 1919a. *Ceina*, an aberrant genus of the amphipodan family Talitridae. Transactions and Proceedings of the New Zealand Institute 51: 118-129, 25 figs.

Chilton, C., 1919b. Destructive boring Crustacea in New Zealand. New Zealand Journal of Science and Technology 2: 1-15, 12 figs.

Chilton, C., 1920a. The occurrence in Brisbane River of the New Zealand amphipod, *Paracorophium excavatum* (G.M. Thomson). Memoirs of the Queensland Museum 7: 44-51, 19 figs.

Chilton, C., 1920b. Some New Zealand Amphipoda: No. 1. Transactions and Proceedings of the New Zealand Institute 52: 1-8, 5 figs.

Chilton, C., 1920c. Note on the occurrence in the River Ganges of the amphipod, *Ampelisca pusilla* Sars. Records of the Indian Museum 19: 79-80.

Chilton, C., 1921a. Amphipoda. Fauna of the Chilka Lake. Memoirs of the Indian Museum 5: 519-558, 12 figs.

Chilton, C., 1921b. Some New Zealand Amphipoda No. 2. Transactions and Proceedings of the New Zealand Institute, new issue, 53: 220-234, 5 figs.

Chilton, C., 1921c. The occurrence in the Philippine Islands of the fresh-water amphipod *Paracalliope fluviatilis* (G.M. Thomson). Philippine Journal of Science 17: 513-514.

Chilton, C., 1921d. Report on the Amphipoda obtained by the F.I.S. "Endeavour" in Australian seas. Biological Results of the Fishing Experiments Carried on by the F.I.S. "Endeavour", 1909-14, 5: 33-92, 16 figs.

Chilton, C., 1921e. A small collection of Amphipoda from Juan Fernandez. The Natural History of Juan Fernandez and Easter Island, Zoology 3: 81-92, 4 figs.

Chilton, C., 1921f. Two examples of abnormal antennae in the Crustacea Amphipoda. Annals and Magazine of Natural History, series 9, 8: 116-118, figs 1, 2, 2a.

Chilton, C., 1922a. The flora and fauna of Nuyt's Archipelago and the Investigator Group. No. 1-The Amphipoda and Isopoda. Transactions and Proceedings of the Royal Society of South Australia 46: 34-38.

Chilton, C., 1922b. Amphipoda. Results of Dr. E. Mjobergs Swedish Scientific Expeditions to Australia 1910-13 XXXI. Kunglia Svenska Vetenskapsakademiens Handlingar 63(3): 11 pp., 4 figs.

Chilton, C., 1923a. Some New Zealand Amphipoda: No. 3. Transactions and Proceedings of the New Zealand Institute, new issue, 54: 240-245, 5 figs.

Chilton, C., 1923b. Occasional notes on Australian Amphipoda. Records of the Australian Museum 14: 79-100, 5 figs.

Chilton, C., 1924a. Some New Zealand Amphipoda: No. 4. Transactions and Proceedings of the New Zealand Institute, new issue, 55: 269-280, 9 figs.

Chilton, C., 1924b. Some New Zealand Amphipoda: No. 5. Transactions and Proceedings of the New Zealand Institute new issue, 55: 631-637, 20 figs.

Chilton, C., 1925a. Some Amphipoda and Isopoda from the Chatham Islands. Records of the Canterbury Museum 2: 317-320.

Chilton, C., 1925b. Some Amphipoda from the South Orkney Islands. Comunicaciones del Museo Nacional de Historia Natural, Buenos Aires 2: 175-180.

Chilton, C., 1925c. The Amphipoda of Tale Sap. Zoological Results of a Tour in the Far East. Memoirs of the Asiatic Society of Bengal 6: 531-539, 3 figs.

Chilton, C., 1926a. Abnormal telson in the amphipod *Bovallia monoculoides* (Haswell). New Zealand Journal of Science and Technology 8: 109-110, 3 figs.

Chilton, C., 1926b. New Zealand Amphipoda: No. 6. Transactions and Proceedings of the New Zealand Institute 56: 512-518, 4 figs.

Chinchilla, M. & F.A. Comin, 1977. A contribution to the study of the crustaceans of the Ebre Delta. Treballs Instituta Catalana Historia Natural 8: 119-144 [not seen, from Amphipod Newsletter 9].

Clark, J. & J.L. Barnard, 1985. *Lucayarina catacumba*, new genus, new species, a Bahamian sea-cave amphipod (Crustacea: Amphipoda: Lysianassidae). Proceedings of the Biological Society of Washington 98: 243-254, 5 figs.

Clark, J. & J.L. Barnard, 1986. *Tonocote*, a new genus and species of Zobrachoidae from Argentina (Crustacea: Marine Amphipoda). Proceedings of the Biological Society of Washington 99: 225-236, 6 figs.

Clark, J. & J.L. Barnard, 1987. *Chono angustiarum*, a new genus and species of Zobrachoidae (Crustacea: Amphipoda) from Magellan Strait, with a revision of Urohaustoriidae. Proceedings of the Biological Society of Washington 100: 75-88, 6 figs.

Clavenad, M., 1879. Restauration des fondations du batiment des substances, premiere partie. La *Limnoria terebrans* auteur des degats observes dans les fondations du batiment des subsistances. Memoires de la Societe Nationale des Sciences Naturelles et Mathematiques de Cherbourg, series, 3 (or volume 22), 2: 73-85, 2 figs, pl. 7.

Cleve, P.T., 1900. Report on the plankton collected by the Swedish Expedition to Greenland in 1899. Svenska Vetenskapsakademien Handlingar 34(3): 21 pp.

Coineau, N., 1977. Le genre *Pseudingolfiella* aux Kerguelen. Comite National Francais des Recherches Antarctiques, Paris 42: 287-294, 4 figs.

Coineau, N. & G.C. Rao, 1972. Isopodes et amphipodes des sables intertidaux des Iles Andaman et Nicobar (Golfe du Bengale). Vie et Milieu, series A, 23: 65-100, 15 figs.

Colgan, N., 1907. *Corophium grossipes* in east Ireland. Irish Naturalist 16: 181.

Colgan, N., 1908. The ship-worm and wood-boring crustaceans in Kingstown Harbor. Irish Naturalist 17: 9-14.

Colman, J., 1940. On the faunas inhabiting intertidal seaweeds. Journal of the Marine Biological Association of the United Kingdom 24: 129-183, 3 figs.

Colosi, G., 1921. Crostacei. Missione zoologica del Dott. E. Festa in Cirenaica. Bolletino Museo Zoologia ed Anatomia Comparata Universita di Torino 36(739): 7 pp.

Conlan, K.E., 1982. Revision of the gammaridean amphipod family Ampithoidae using numerical analytical methods. Canadian Journal of Zoology 60: 2015-2027, 4 figs.

Conlan, K.E., 1983. The amphipod superfamily Corophioidea in the northeastern Pacific region 3. Family Isaeidae: systematics and distributional ecology. Publications in Natural Sciences, National Museum of Natural Sciences-Canada 4: 1-75, 36 figs.

Conlan, K.E., 1990. Revision of the crustacean amphipod genus *Jassa* Leach (Corophioidea: Ischyroceridae). Canadian Journal of Zoology 68(10): 2031-2075, figs 1-29.

Conlan, K.E. & E.L. Bousfield, 1982a. The amphipod superfamily Corophioidea in the northeastern Pacific region, Family Ampithoidae: systematics and distributional ecology. Publications in Biological Oceanography, National Museums of Canada 10: 41-75, 17 figs.

Conlan, K.E. & E.L. Bousfield, 1982b. The superfamily Corophioidea in the North Pacific region. Family Aoridae: systematics and distributional ecology. Publications in Biological Oceanography, National Museums of Canada 10: 77-101, 11 figs.

Cooper, R.D., 1974. Preliminary diagnoses of three new amphipod species from Wellington Harbour (note). New Zealand Journal of Marine and Freshwater Research 8: 239-241.

Cooper, R.D. & A.A. Fincham, 1974. New species of Haustoriidae, Phoxocephalidae, and Oedicerotidae (Crustacea: Amphipoda) from northern and southern New Zealand. Records of the Dominion Museum 8: 159-179, 13 figs.

Costa, A., 1851. Pp. 44-47, fig. 2. **In** Gugl. Hope's Catalogo dei Crostacei Italiani e di Molti Altri del Mediterraneo. Napoli: Azzolino. 1851-1853. Fauna del Regno di Napoli [and] Catalogo de' Crostacei del Regno di Napoli. Miscellaneous pp. of incomplete editions seen; see Stebbing, 1888: 247-250.]

Costa, A., 1853. Relazione sulla memoria del Dottor Achille Costa, di ricerche su' crostacei amfipodi del regno di Napoli. Rendiconto della Societa Reale Borbonica, Accademia delle Scienze, new series, 2: 167-178.

Costa, A., 1857. Ricerche sui crostacei amfipodi del regno di Napoli. Memorie della Reale Accademia de Scienze di Napoli 1: 165-235, 4 pls.

Costa, A., 1862. Osservazioni sul genere *Lysianassa* e descrizionedi una novella specie. Annuario del Museo Zoologico della Reale Universita di Napoli 1: 79-82, figs 18-23, pl. 2.

Costa, A., 1864. Di due nuove specie di crostacei anfipodi del Golfo di Napoli. Annuario del Museo Zoologico della Reale Universita di Napoli 2: 153-157, figs 7,8, pl. 2.

Costa, A., 1867. Saggio della collezione de' crostacei del Mediterraneo del Museo Zoologico della Universita di Napoli inviato alla esposizione di Parigi del 1867. (Napoli dalla stamperia di Antonio Cons). Reprint from: Annuario del Museo Zoologico Della R. Universita di Napoli 4: 1-13, pls 1-2 [see Stebbing 1888 for underived title and pagination].

Costa, A., 1883a. Diagnosi di nuovi artropodi trovati in Sardegna. Bollettino della Societa Entomologica Italiana 15: 332-341.

Costa, A., 1883b. Risultamento di ricerche fatte in Sardegna nella primavera del 1882. Notizie ed osservazioni sulla geofauna Sarda. Societa Reale di Napoli, Atti Della Reale Accademia Delle Scienze Fisiche e Matematiche, series 2, 1: 81-82, 106-107.

Costa, A. & O.G. Costa, 18XX. On the Dates of Publication of Costa (O.G.) and (A.) Fauna del Regno di Napoli, 1829-1886. The Journal of the Society for the Bibliography of Natural History 1(1936-1943): 35-41.

[Costa, O.G. &] A. Costa, 1840. (no author stated) Catalogo de Crostacei del Regno di Napoli. Pp. 1-7.

[Costa, O.G.], 1844. Catalogo de'crostacei raccolti nel Golfo di Taranto nella primavera del 1830. Atti della Reale

Accademia delle Scienze, Sezione della Societa Reale Borbonica 5: 67-74, 3 pls.
Costa, S., 1961. Amphipodes. Campagne de la *Calypso* en mer d'Alboran et dans la baie Ibero-Marocaine. 3. Annales Institut Oceanographique 39: 269-275.
Coutiere, H., 1904. Sur un type nouveau d'amphipode *Grandidierella mahafalensis,* provenant de Madagascar. Bulletin de la Association Philomatique 6: 11 pp. [?166-174], 18 figs.
Cowles, R.P., 1930. A biological study of the offshore waters of Chesapeake Bay. Bulletin of the United States Bureau of Fisheries 46: 277-381, 16 figs.
Coyle, K.O., 1980. A new genus and species of Oedicerotidae (Crustacea, Amphipoda) from southeast Bering Sea. Syesis 13: 197-204, 5 figs.
Coyle, K.O., 1982. The amphipod genus *Grandifoxus* Barnard (Gammaridea, Phoxocephalidae) in Alaska. Journal of Crustacean Biology 2: 430-450, 10 figs.
Coyle, K.O. & G.J. Mueller, 1981. New records of Alaskan marine Crustacea, with descriptions of two new gammaridean Amphipoda. Sarsia 66: 7-18, 5 figs.
Crane, J.M., 1969. Mimicry of the gastropod *Mitrella carinata* by the amphipod *Pleustes platypa.* The Veliger 12: 200, pl. 36.
Crawford, G.I., 1935. *Corophium curvispinum,* G.O. Sars, var. *devium,* Wundsch, in England. Nature 136: 685-686.
Crawford, G.I., 1936. Additions to the Plymouth Marine Fauna (1931)in the crustacean order Tanaidacea, Isopoda, and Amphipoda. Journal of the Marine Biological Association of the United Kingdom 21: 95-106, 1 fig.
Crawford, G.I., 1937a. The fauna of certain estuaries in west England and south Wales, with special reference to the Tanaidacea, Isopoda and Amphipoda. Journal of the Marine Biological Association of the United Kingdom 21: 647-662, 2 figs.
Crawford, G.I., 1937b. A review of the amphipod genus *Corophium,* with notes on the British species. Journal of the Marine Biological Association, United Kingdom 21: 589-630, 4 figs.
Crawford, G.I., 1937c. Notes on the distribution of burrowing Isopoda and Amphipoda in various soils on the sea bottom near Plymouth. Journal of the Marine Biological Association of the United Kingdom 21: 631-646, 1 fig.
Crawford, G.I., 1939. The amphipod *Melita pellucida* new to Ireland and the Isle of Man. Annals and Magazine of Natural History, series 11, 3: 530-531.
Crawshay, L.R., 1912. On the fauna of the outer western area of the English Channel. Journal of the Marine Biological Association of the United Kingdom, new series, 9: 292-393. [Amphipoda: 349-351.]
Croker, R.A., 1967a. Niche specificity of *Neohaustorius schmitzi* and *Haustorius* sp. (Crustacea: Amphipoda) in North Carolina. Ecology 48: 971-975, 3 figs.
Croker, R.A., 1967b. Niche diversity in five sympatric species of intertidal amphipods (Crustacea: Haustoriidae). Ecological Monographs 37: 173-200, 20 figs.
Croker, R.A., 1968a. Return of juveniles to the marsupium in the amphipod *Neohaustorius schmitzi* Bousfield. Crustaceana 14: 215.
Croker, R.A., 1968b. Distribution and abundance of some intertidal sand beach amphipods accompanying the passage of two hurricanes. Chesapeake Science 9: 157-162.
Croker, R.A. & E.B. Hatfield, 1980. Space partitioning and interactions in an intertidal sand-burrowing amphipod guild. Marine Biology 61: 79-88, 9 figs.
Croker, R.A., R.P. Hager & K.J. Scott, 1975. Macroinfauna of northern New England marine sand. II. Amphipod-dominated intertidal communities. Canadian Journal of Zoology 53: 42-51, 5 figs.
Cuadras, J. & F. Pereira, 1977. Invertebrates associated with *Dardanus arrosor* (Anomura, Diogenidae). Vie et Milieu 27A: 301-310, 4 figs.
Culpepper, T.J. & W.E. Pequegnat, 1969. A taxonomic and ecological study of selected benthic gammarid crustaceans from the northeastern Gulf of Mexico. Texas A&M University, Department of Oceanography, A&M Project 286-6: 102 pp. (mimeograph).
Cunningham, R.O., 1871. Notes on the reptiles, Amphibia, fishes, Mollusca, and Crustacea obtained during the voyage of H.M.S. 'Nassau' in the years 1866-69. Transactions of the Linnean Society of London 27: 465-502, pls 58-59.
Czerniavsky, W., 1868. Materialia as zoographiam Ponticamcomparatum. Studiosi universitatis charcoviensis. Trudy Syezda Russixy Yestestvoiechytatelei, Syezda 1 Zool. [not seen, partly copied from Stebbing, 1888].
Daborn, G.R., 1976a. Colonization of isolated aquatic habitats. Canadian Field Naturalist 90: 56-57. [duck transport]
Dahl, E., 1938. An amphipod, *Corophium insidiosum* G.I. Crawford, new to Sweden. Kungliga Fysiografiska Sallskapets i Lund Forhandlingar 8(18): 3 pp.
Dahl, E., 1944a. The Swedish brackish water Malacostraca. Kunglia Fysiografiska Sallskapets i Lund Forhandlingar 14(9): 101-117.
Dahl, E., 1944b. Nagra foga uppmarksammade sandkraftdjur fran Vastkusten. Fauna och Flora, Uppsala 5: 226-232, 3 figs.
Dahl, E., 1944c. Amphipods of the family Ampeliscidae from professor Sixten Bock's expedition to Japan 1914. Arkiv for Zoologi 36A(1): 18 pp., 10 figs.
Dahl, E., 1945. *Menigratopsis svennilssoni* n. gen. et. spec., a lysianassid amphipod from The Sound. Kungliga Fysiografiska Sallskapets i Lund Forhandlingar 15(24): 7 pp., 4 figs.
Dahl, E., 1946a. Notes on some Amphipoda from the Gullmar Fiord. Arkiv for Zoologi 38A(8): 8 pp., 5 figs.
Dahl, E., 1946b. The Amphipoda of The Sound. Pt. 2. Aquatic Amphipoda, with notes on changes in the hydrography and fauna of the area. Kungliga Fysiografiska Sallskapets i Lund Forhandlingar N.F. 57(16): 49 pp., 5 figs.
Dahl, E., 1948. On the smaller Arthropoda of marine algae, especially in the polyhaline waters off the Swedish west coast. Undersokningar over Oresund 35: 5-193, 42 figs.
Dahl, E., 1950. Sentida faunaforandringar i Oresund. Skanes Naturskyd-dsforenings Arsskrift 37: 19-38, 9 figs, 1 table.
Dahl, E., 1954. A collection of Amphipoda from the Ross Sea. Arkiv for Zoology, series 2, 7: 281-293, 41 figs.
Dahl, E., 1958. Fresh and brackish water amphipods from the Azores and Madeira. Boletim do Museu Municipal do Funchal 11 (27): 5-25.
Dahl, E., 1959. Amphipoda from depths exceeding 6000 meters. Galathea Report 1: 211-240, 20 figs.
Dahl, E., 1964. The amphipod genus *Acidostoma.* Zoologische Mededelingen 39: 48-58, 18 figs.
Dahl, E., 1977. The amphipod functional model and its bearing upon systematics and phylogeny. Zoologica Scripta 6: 221-228, 7 figs.
Dahl, E., 1979. Deep-sea carrion feeding amphipods. Oikos 33: 167-175.
Damas, D. & E. Koefoed, 1907. Le plankton de la mer du Gronland. Duc d'Orleans, Croisiere Oceanographique Mer du Gronland 1905: 347-453, 15 figs.
Dana, J.D., 1849. Synopsis of the genera of Gammaracea. American Journal of Sciences and Arts, series 2, 8: 135-140.

Dana, J.D., 1852a. Conspectus crustaceorum quae in orbis terrarum circumnavigatione, CAROLO WILKES e classe Reipublicae Faederatae Duce, lexit et descripsit JACOBUS D. DANA. Pars III. [Amphipoda.No. I.]. Proceedings of the American Academy of Arts and Sciences 2: 201-220.

Dana, J.D., 1852b. On the classification of the Crustacea Choristopoda or Tetradecapoda. American Journal of Sciences and Arts, series 2, 14 [appendix]: 297-316.

Dana, J.D., 1853. Crustacea. Part II. United States Exploring Expedition 14: 689-1618, atlas of 96 pls.

Dana, J.D., 1856. Catalogue and descriptions of Crustacea collected in California by Dr. John L. Le Conte. Proceedings of the Philadelphia Academy of Natural Science 7: 175-177.

Dang, N.T., 1965. Mot so loai giap xac moi tim thay trong nuroc ngot va nuroc lo mien Bac Viet-nam. Tap San Sinh Vat-Dia Hoc 4: 146-152, 4 figs.

Dang, N.T., 1968. Novye bokoplavy (Amphipoda) presnykh i solonovatykh vod severnogo v'etnama. Zoologicheskii Zhurnal 47: 212-222, 4 figs.

Danielssen, D.C., 1861. Beretning om en zoologisk Reise foretagen i Sommeren 1857. Nyt Magazin for Naturvidenskaberne 11: 1-58.

Darteville, E., 1934. Amphipodes du Cap Malembe (Cabinda). Cercle Zoologique Congolais, Brussels, Bulletin 11: 48-50.

Dauvin, J.C., 1981. Sur une annelide polychete et cinq amphipodes nouveaux pour la faune de Roscoff, France. Travaux de la Station Biblogique de Roscoff, new series, 27: 7-9.

Dauvin, J.C. & D. Bellan-Santini, 1982. Description de deux nouvelles especes d'*Ampelisca* des cotes Francaises Atlantiques (Crustacea-Amphipoda): *Ampelisca toulemonti* n.sp. et *Ampelisca spooneri* n.sp. Cahiers de Biologie Marine 23: 253-268, 4 figs, 2 tables.

Dauvin, J.C. & D. Bellan-Santini, 1985. Collection des ampeliscides d'Edouard Chevreux du museum national d'histore naturelle: description d' *Ampelisca melitae* et d' *A. monoculata* n. spp. et redescription d' *A. verga* Reid. Bulletin du Museum National Histoire Naturelle, Paris, series 4, 7 section A, 3: 659-675, 7 figs.

Dauvin, J.C. & D. Bellan-Santini, 1987. Evolution a long terme (1978-1986) des populations d'amphipodes des sables fins de la Pierre Noire (Baie de Morlaix, manche occidentale) apres la catastrophe de l'Amoco Cadiz. Marine Environmental Research 21: 247-273, 7 figs, 6 tables.

Dauvin, J.C. & F. Gentil, 1979. Crustaces peracarides (cumaces, amphipodes) nouveaux pour l'inventaire de la faune marine de Roscoff. Travaux de la Station Biologique de Roscoff, new series, 25: 7-9.

Dauvin, J.C. & F. Gentil, 1980. Nouvelles especes pour l'inventaire de la faune marine de la region de Roscoff: annelides, polychetes et crustaces amphipodes. Travaux de la Station Biologique de Roscoff, new series, 26: 5-10.

Dauvin, J.C. & F. Gentil, 1983. Description de deux nouvelles especes de Liljeborgiidae des cotes Francaises (Crustacea Amphipoda): *Listriella dentipalma* n.sp. et *Listriella spinifera* n.sp. Cahiers de Biologie Marine 24: 429-442, 4 figs, table 1.

Davis, A., 1956. A note on *Melita hergensis* Reid (Crustacea, Amphipoda). Annals and Magazine of Natural History, series 12, 9: 511-512, 1 fig.

Davis, F.M., 1923. Quantitative studies on the fauna of the sea bottom. No.1.-Preliminary investigation of the Dogger Bank. Fishery Investigations, Ministry of Agriculture and Fisheries, London, series 2, 6(2): 54 pp., 12 figs.

Davis, F.M., 1925. Quantitative studies on the fauna of the sea bottom. No.2.-Results of the investigations in the southern North Sea, 1921-24. Fishery Investigations, Ministry of Agriculture and Fisheries, London, series 2, 8(4): 50 pp., 2 figs.

Dawydoff, M.C., 1952. Contribution a l'etude des invertebres de la faune marine benthique de l'Indochine. Institut Oceanographique de Nhatrang (Viet-Nam), Contribution 9: 158 pp. [Amphipods: 133.]

Day, J.H., 1974. Crustacea: Amphipoda. Pp. 87-92, 15 figs. **In** A Guide to Marine Life on South African Shores, iii + 300 pp. Cape Town & Rotterdam: A.A. Balkema.

De Broyer, C., 1973. Notes sur les *Orchomene* (amphipodes, Lysianassidae) de l'ocean Austral. 1. Description d'*Orchomene hureaui* n.sp. de Terre Adelie. Bulletin Institut Royal des Sciences Naturelles de Belgique, 49 Biologie (7): 12 pp., 4 figs.

De Broyer, C., 1975a. Notes sur les *Orchomene* (Amphipoda, Lysianassidae) de l'Ocean Austral. 2. Nouvelle description d'*Orchomene chelipes* (Walker) et d'*Orchomene goniops* Walker de la Mer de Ross. Journal of Natural History 9: 457-470, 6 figs.

De Broyer, C., 1975b. Revision du genre *Adeliella* (Amphipoda, Gammaridea, Lysianassidae) et description d'une nouvelle espece antarctique. Crustaceana 28: 73-85, 7 figs.

De Broyer, C., 1977a. Analysis of the gigantism and dwarfness of Antarctic and Subantarctic gammaridean Amphipoda. Proceedings of the Third SCAR Symposium on Antarctic Biology: 327-334.

De Broyer, C., 1977b. Revision des genres *Ambasiopsis* K.H. Barnard et *Neoambasia* Dahl (Crustacea, Amphipoda). Journal of Natural History 11: 679-692, 8 figs.

De Broyer, C., 1980. *Monoculodes jazdzeweskii*, une nouvelle espece antarctique (Crustacea, Amphipoda, Oedicerotidae). Bulletin de l'Academie Polonaise des Sciences, Serie des Sciences Biologiques, series 2, 28: 381-387, 2 figs.

De Broyer, C., 1984. Evolution du complexe *Orchomene* Boeck (Amphipoda, Lysianassidae). Annales de la Societe Royale Zoologique de Belgique, 114, supplement 1: 197-198.

De Broyer, C., 1985a. Amphipodes lysianassoides necrophages des Iles Kerguelen (Crustacea): 1. *Orchomenella guillei* n. sp. Bulletin du Museum National D'Histoire Naturelle Paris, series 4, 7, section A, 1: 205-217, 7 figs.

De Broyer, C., 1985b. Notes sur les *Orchomene* de l'Ocean Austral. 3. Revision d'*Orchomenella acanthura* (Schellenberg) (Crustacea Amphipoda: Lysianassoidea). Journal of Natural History 19: 729-738, 5 figs.

De Broyer, C., 1985c. Description de *Falklandia* gen. n. de l'Ocean Austral et definition des Lysianassoidea uristidiens (Crustacea, Amphipoda). Zoologica Scripta 14: 303-312, 6 figs.

De Geer, C., 1778. Memoires pour servir a l'histoire des insectes 7: xii + 950 pp., 49 pls. Stockholm: Pierre Hesselberg.

De Kay, J.E., 1844. Zoology of New-York, or the New-York fauna; comprising detailed descriptions of all the animals hitherto observed within the state of New-York, with brief notices of those occasionally found near its borders, and accompanied by appropriate illustrations. Part VI. Crustacea: 1-70, 13 pls (pl. descriptions list only 12). Albany: Carroll & Cook.

Della-Valle, A., 1893. Gammarini del Golfo di Napoli. Fauna und Flora des Golfes von Neapel und der angrenzender Meeres-Abschnitte. Monographie 20: xi + 948 pp., atlas (Atlante) of 61 pls.

Dementieva, T., 1931. On the variability of the Amphipoda of the northern seas. Akademiia Nauk SSSR, Trudy Okeanolografii Instituta 1: 65-82, 12 figs.

Den Hartog, C., 1964. The amphipods of the deltaic region of the rivers Rhine, Meuse and Scheldt in relation to the hydrography of the area. Part III. The Gammaridae. Netherlands Journal of Sea Research 2: 407-457, 11 figs.

Dennell, R., 1933. The habits and feeding mechanism of the amphipod *Haustorius arenarius* Slabber. Journal of the Linnean Society of London, Zoology 38: 363-388, 13 figs.

Derjugin, K.M., 1915. La faune du Golfe de Kola et les conditions de son existence. Memoires de l'Academie des Sciences Petrograd, series 8, 34(1): ix + 929 pp., 55 figs, 14 pls.

Derjugin, K.M., 1928. Fauna Belogo Moria i usloviia ee sushchestvovaniia. Izdanie Gostudarstvennogo Gidrologicheskogo Instituta, 7-8: xii + 511 pp.

Derzhavin, A.N., 1923. Bemerkung uber Crustacea Malacostraca der unteren Petschora. Russkii Gidrobiologicheskii Zhurnal 2: 11-115. [with German summary]

Derzhavin, A.N., 1930. Arctic elements in the fauna of peracarids of the Sea of Japan. Hydrobiological Journal SSSR 8(10-12):326-329. [in Russian]

Desmarest, A.G., 1825. Addition de quelques especes rares de la Mediterranee. Pp. 421-427, Considerations generales sur la classe des Crustaces, et description de especes de ces animaux, qui vivent dans la mer, sur les cotes, ou dans les eax de la France. 420 pp. and supplementary pp. 421-427. Paris, Strasbourg.

Dexter, D.M., 1971. Life history of the sandy-beach amphipod *Neohaustorius schmitzi* (Crustaca: Haustoriidae). Marine Biology 8: 232-237, 2 figs.

Dexter, D.M., 1983a. A guide to sandy beach fauna of New South Wales. Wetlands 3: 94-104, 6 figs, 1 table, 1 photograph.

Dexter, D.M., 1983b. Community structure of intertidal sandy beaches in New South Wales, Australia. Pp. 461-472, 4 figs, 3 tables. **In** A. McLachlan & T. Erasmus (eds). Sandy Beaches as Ecosystems. The Hague: W. Junk.

Dexter, D.M., 1985. Distribution and life histories of abundant crustaceans of four sandy beaches of south-eastern New South Wales. Australian Journal of Marine and Freshwater Research 36: 281-289, 2 figs.

Dickinson, J.J., 1978. Faunal comparison of the gammarid Amphipoda (Crustacea) in two bathyal basins of the California Continental Borderland. Marine Biology 48: 367-372, 2 figs.

Dickinson, J.J., 1982. The systematics and distributional ecology of the family Ampeliscidae (Amphipoda: Gammaridea) in the northeastern Pacific region I. The genus *Ampelisca*. Publications in Biological Oceanography, National Museum of Canada 10: 1-39, 21 figs, 3 tables.

Dickinson, J.J., 1983. The systematics and distributional ecology of the superfamily Ampeliscoidea (Amphipoda: Gammaridea) in the northeastern Pacific region. II. The genera *Byblis* and *Haploops*. Publications in Natural Sciences, National Museum of Natural Sciences 1: 1-38, 17 figs, 6 tables.

Dickinson, J.J. & A.G. Carey Jr., 1978. Distribution of gammarid Amphipoda (Crustacea) on Cascadia Abyssal Plain (Oregon). Deep-Sea Research 25: 97-106, 2 figs.

Dickinson, J.J. & R.L. Wigley, 1981. Distribution of gammaridean Amphipoda (Crustacea) on Georges Banks. NOAA Technical Reports NMFS SSRF 746: 25 pp., 16 figs, 1 table.

Dickinson, J.J., R.L. Wigley, R.D. Brodeur & S. Brown-Leger, 1980. Distribution of gammaridean Amphipoda (Crustacea) in the middle Atlantic Bight region. NOAA Technical Reports NMFS SSRF, 741: vi + 46 pp., 26 figs.

Dickson, G.W., J.C. Patton, J.R. Holsinger & J. Avise, 1979. Genetic variation in cave-dwelling and deep-sea organisms, with emphasis on *Crangonyx antennatus* (Crustacea: Amphipoda) in Virginia. Brimleyana 2: 119-130, 2 figs.

Divakaran, O., 1983. Female reproductive system of *Parhyale hawaiensis* (Dana) (Crustacea: Amphipoda). Pp. 143-148, 7 figs. **In** P.A. John (ed.). Selected Papers on Crustacea. Trivandrum: The Aquarium.

Diviacco, G., 1979a. Amphipods of fouling in the conduits of the electric power station of Torvaldaliga (Civitavecchia). Atti della Societa Toscana di Scienze Natural Residente in Pisa, Memorie B 86: 312-315, 1 fig.

Diviacco, G., 1979b. I crostacei anfipodi del fouling nella centrale termoelettrica di Vado Lfig. (Savona). Bollettino Dei Musei E Degli Instituti Biologici Dell'Universita Di Genova Italy 47: 93-99, 2 figs, 1 table.

Diviacco, G., 1979c. Remarks on crustaceans amphipods of the Orberello Lagoons (Grosseto). Atti della Societa Toscana di Scienze Natural Residente in Pisa, Memorie B 86: 62-64.

Diviacco, G., 1980. Osservazioni sui crostacei anfidodi del Porto di Genova. Memorie di Biologia Marina e di Oceanografia 10: 387-388.

Diviacco, G., 1981a. Remarks on crustaceans Amphipoda of the Po River Delta. Rapport et Proces-Verbaux des Reunions. Commission Internationale pour l'Exploration Scientifique de la Mer Mediterrannee 27: 175-176.

Diviacco, G., 1981b. Ecologia e distribuzione dei crostacei anfipodi nella Laguna di Orbetello. Bollettino del Museo Civico di Storia Naturale-Verona 7: 303-317.

Diviacco, G., 1982a. Osservazioni sui crostacei anfipodi delle Lagune Costiere Pugliese. Bolletino dei Musei e Degli Istituti Biologici dell'Universita di Genova, 50 supplement: 178-182, 1 fig., 1 table.

Diviacco, G., 1982b. Note sui crostacei anfipodi delle Lagune Laziali e Campane. Bolletino dei Musei e Degli Istituti Biologici dell'Universita di Genova, 50 supplement: 173-177, 1 fig., 1 table.

Diviacco, G., 1983a. Primo ritrovamento di *Dautzembergia* [sic] *megacheir* (Walker) in Mediterraneo e considerazioni sul genre *Dautzembergia* [sic] Chevreux (Crustacea, Amphipoda). Bollettino del Museo Civico di Storia Naturale, Verona 9: 631-640, 4 figs.

Diviacco, G., 1983b. Osservazioni sui crostacei anfipodi della centrale termoelettrica di Torvaldaliga. Natura-Societa Italiana de Scienze Naturali e del Museo Civico de Storia Naturale e Acquario Civico, Milano 74: 83-95, 5 figs, 1 table.

Diviacco, G., 1983c. Distribution of the crustacean amphipods in the east Tyrrhenian lagoons. Rapport et Proces-Verbaux des Reunions. Commission Internationale pour l'Exploration Scientifique de la Mer Mediterrannee 28: 315-318, 1 fig., 1 table.

Diviacco, G., R. Ambrogi, D. Bedulli & C.N. Bianchi, 1983. Bionomics of amphipods in the marine infralittoral bottoms facing the "Sacca del Canarin" (Po River Delta). Atti del Museo Civico di Storia Naturale, Trieste 35: 173-183, 4 figs, 2 tables. [in Italian]

Diviacco, G. & G. Relini, 1981a. Gli anfipodi della Laguna di Orbetello. Quaderni del Laboratorio di Tecnologia della Pesca, 3, supplement 1: 4 figs, table 2.

Divoky, G.J., 1976. The pelagic feeding habits of Ivory and Ross' Gulls. The Condor 78: 85-90, fig. 1.

Dommasnes, A., 1968. Variations in the meiofauna of *Corallina officinalis* L. with wave exposure. Sarsia 34: 117-124, 5 figs.

Dons, C., 1935. Norges strandfauna VII. Amphipoder. Det

Kongelige Norske Videnskabers Selskab Forhandlinger 7(30): 107-110.

D'Orbigny, C., 1821. Sur le *Corophium longicornis* de M. de Latreille; Crustace observe dans les Bouchotz a moules, des communes d'Esnaudes et Charon, pres La Rochelle. Journal de Physique et Chimie, d'Historie Naturelle et des Arts 93: 194-200.

Downer, D.F. & D.H. Steele, 1979. Some aspects of the biology of *Amphiporeia lawrenciana* Shoemaker (Crustacea, Amphipoda) in Newfoundland waters. Canadian Journal of Zoology 57: 257-263, 9 figs.

Duhig, M. & C. Humphries, 1955. *Amphilochus brunneus* Delle Valle, an amphipod new to Britain and Ireland and notes on other amphipods not previously recorded in Irish coastal waters. Proceedings of the Royal Irish Academy, series B, 57: 123-129.

Dunbar, M.J., 1942. Marine macroplankton from the Canadian eastern arctic. Canadian Journal of Research 20D: 33-46, 11 figs.

Dunbar, M.J., 1954. The amphipod Crustacea of Ungava Bay, Canadian eastern arctic. Journal of the Fisheries Research Board of Canada 11: 709-798, 42 figs.

Dupuis, C., 1975. Objections aux propositions de Bousfield & Holthuis (1969) concernant une douzaine de genres d'amphipodes. Bulletin of Zoological Nomenclature 32: 3-5.

D'Urban, W.S.M., 1880. The zoology of the Barents Sea. Annals and Magazine of Natural History, series 5, 6: 253-277.

Edgar, G.J., 1983. The ecology of south-east Tasmanian phytal animal communities. IV. Factors affecting the distribution of ampithoid amphipods among algae. Journal of Experimental Marine Biology and Ecology 70: 205-225, 4 figs, 9 tables.

Edmondson, C.H., 1951. Some central Pacific crustaceans. Occasional Papers of the Bernice P. Bishop Museum 20: 183-243, 38 figs.

Elmhirst, R., 1925. I.-Associations between the amphipod genus *Metopa* and coelenterates. II.-The feeding habits of the sea-anemone, *Actinoloba*. Scottish Naturalist 155: 149-152.

Elmhirst, R., 1931. Studies in the Scottish marine fauna.-The Crustacea of the sandy and muddy areas of the tidal zone. Proceedings of the Royal Society of Edinburgh 51: 169-175, 2 figs.

Elton, C., 1937. Marine animals collected by Mr. A.W. Moore at Etah, north-West Greenland, during the Oxford University Ellesmere Land Expedition, 1934-35. Annals and Magazine of Natural History, series 10, 20: 432-434.

Enequist, P., 1950. Studies on the soft-bottom amphipods of the Skagerak. Zoologii Bidrag fran Uppsala 28: 297-492, 67 figs.

Entz, B., 1943. Adatok a Magyarorszagi *Corophium curvispinum* G.O. Sars forma *devium* Wundsch Alaktanahoz es biologiajahoz. Arbeiten des Ungarischen Biologischen Forschungsinstitutes 15: 3-41, 5 figs.

Entz, B., 1949. Beitrage zur Kenntnis der Morphologie und Biologie des *Corophium curvispinum* G.O. Sars forma *devium* Wundsch in Ungarn. Archiv fur Hydrobiologie 42: 423-469, 2 figs.

Escofet, A., 1970. Amphipoda marinos de la Provincia de Buenos Aires. I. *Bathyporeiapus bisetosus* sp. nov. (Gammaridea: Oedicerotidae). Neotropica 16: 101-106, 1 fig.

Escofet, A., 1971. Amphipoda marinos de la Provincia de Buenos Aires. II. Observaciones sobre el genero *Bathyporeiapus* Schellenberg (Gammaridea: Oedicerotidae), con la descripcion de *Bathyporeiapus* sp. nov. Neotropica 17(54): 107-115, figs 1-24a, 24b-27.

Escofet, A., 1973a. Observaciones sobre alimentacion y habitos cavadores en *Bathyporeiapus ruffoi* y *Bathyporeiapus bisetosus* (*Amphipoda, Oedicerotidae*). Physis Seccion A. Buenos Aires 32(84): 95-103, 4 figs.

Escofet, A., 1973b. Los generos de anfipodos mas comunes en el area de Mar del Plata clave para su reconocimiento. Instituto de Biologia Marina, Comision de Investigaciones Cientificas de la Provincia de Buenos Aires: 2-22, 62 figs.

Escofet, A., 1977. Sobre la biologia y ecologia de *Stephensenia haemotopus* (Amphipoda Lysianassidae). Neotropica 23: 155-160, 1 fig.

Fabricius, J.C., 1775. Systema entomologiae, sistens insectorum classes, ordines, genera species adiectis synonymis, locis, descritionibus, observationibus. 832 pp. Flensbergi et Lipsiae.

Fabricius, J.C., 1777. Genera Insectorum. Chilonii: Litteris Mich. Friedr. Bartschii.

Fabricius, J.C., 1779. Reise nach Norwegen mit Bemerkungen aus der Naturhistorie und Oekonomie, Hamburg: Carl Ernst Bohn.

Fabricius, J.C., 1781. Species insectorum exhibentes eorum differentias specificas, synonyma, auctorum, loca natalia, metamorphosin adiectis observationibus, descriptionibus 50: viii + 552 pp. Hamburgi et Kilonii: Carol Ernest Bohnii.

Fabricius, J.C., 1787. Mantissa insectorum sistens eorum species nuper detectas adiectis characteribus genericis, differentiis specificis, emendationibus, observationibus 1: xvi + 348 pp. Hafniae: Christ. Gottl. Proft.

Fabricius, J.C., 1793. Entomologica systematica emendata et aucta 2: viii + 519 pp. Hafniae: Christ. Gottl. Proft.

Fabricius, J.C., 1798. Supplementum entomologiae systematicae. 572 pp., 175 pp. alpha index, 52 pp. index to supplement. Hafniae: Proft et Storch.

Fabricius, O., 1780. Fauna Groenlandica. Hafniae et Lipsiae: Ioannis Gottlob Rothe.

Fage, L., 1928. Remarques sur le comportement du *Tritaeta gibbosa* (Bate), crustace amphipode, commensal des eponges. Bulletin de la Societe Zoologie de France 53: 285-291.

Fage, L., 1931. Crustaces amphipodes et decapodes. Campagne de C. Bolivar et R. Jeannel dans l'Amerique du Nord (1928) 5. Archives de Zoologie Experimentale et Generale 71: 361-374, 19 figs.

Fage, L., 1932. La phase pelagique des amphipodes benthiques littoraux. Comptes Rendus Academie des Sciences, Paris 104: 1604-1606.

Fage, L., 1933. Peches planctoniques a la lumiere effectuees a Banyuls-sur-Mer et a Concarneau III Crustaces. Archives de Zoologie Experimentale et Generale 76: 105-248, 14 figs.

Fage, L. & R. Legendre, 1923. Essais de peche a la lumiere dans la baie de Concarneau. Bulletin de l'Institut Oceanographique 431: 1-20, 3 figs.

Fage, L. & T. Monod, 1936. La faune marine de Jameo de Agua Lac souterrain de l'Ile de Lanzarote (Canaries). Archives de Zoologie Experimentale et Generale 78: 97-113, 9 figs.

Faletans, N. de, 1958. Morphologie et ecologie de *Corophium lacustre* Vanhoffen. Memoires de la Societe Nationale des Sciences Naturelles et Mathematiques de Cherbourg, series 5, 7: 62-85, 6 figs.

Faulkner, G.H., 1925. Amphipod crustaceans attacking cod ovary. Scottish Naturalist 154: 131-132.

Fearn-Wannan, H.J., 1968a. Littoral Amphipoda of Victoria. Part 1. Proceedings of the Royal Society of Victoria, new

series, 81: 31-58, 18 figs.
Fearn-Wannan, H.J., 1968b. Littoral Amphipoda of Victoria. Part II. Proceedings of the Royal Society of Victoria, new series, 81: 127-135, 2 figs.
Feeley, J.B. & M.L. Wass, 1971. The distribution and ecology of the Gammaridae (Crustacea: Amphipoda) of the lower Chesapeake estuaries. Virginia Institute of Marine Science, Special Papers in Marine Science 2: 58 pp.
Fenwick, G.D., 1976. The effect of wave exposure on the amphipod fauna of the alga *Caulerpa brownii*. Journal of Experimental Marine Biology and Ecology 25: 1-18, 7 figs.
Fenwick, G.D., 1977. *Mesoproboloides excavata* n.sp. (Amphipoda: Gammaridea: Stenothoidae) from New Zealand. New Zealand Journal of Marine and Freshwater Research 11: 471-478, 22 figs.
Fenwick, G.D., 1983. Two new sand-dwelling amphipods from Kaikoura, New Zealand (Oedicerotidae and Lysianassidae). New Zealand Journal of Zoology 10: 133-145, 7 figs.
Fenwick, G.D., 1984a. Partitioning of a rippled sand habitat by five infaunal crustaceans. Journal of Experimental Marine Biology and Ecology 83: 53-72, 8 figs, 10 tables.
Fenwick, G.D., 1984b. Life-history tactics of brooding Crustacea. Journal of Experimental Marine Biology and Ecology 84: 247-264, 2 figs.
Fenwick, G.D., 1985. Life-histories of four co-occurring amphipods from a shallow, sand bottom at Kaikoura, New Zealand. New Zealand Journal of Zoology 12: 71-105, 21 figs.
Fenwick, G.D. & D.H. Steele, 1983. Amphipods of Placentia Bay Newfoundland. Memorial University of Newfoundland Occasional Papers in Biology 7: 1-22, 1 fig., 3 tables.
Field, L.H., 1974. A description and experimental analysis of Batesian Mimicry between a marine gastropod and an amphipod. Pacific Science 28: 439-447, 3 figs, 3 tables.
Filhol, M.H., 1885a. Recueil de memoires, rapports et documents relatifs a l'observation du passage de Venus sur le soleil. Academie des Sciences, Paris 3: 454-476. [Also Atlas p. 28 and pl. 53.]
Filhol, M.H., 1885b. Description de nouvelles especes de crustaces du genre *Allorchestes*. Bulletin de la Societe Philomathique de Paris, series 7, 9: 54.
Fincham, A.A., 1967. On the distribution in the Irish Sea of the amphipod *Bathyporeia nana* Toulmond 1966. Report of Marine Biological Station, Port Erin 79: 43-45.
Fincham, A.A., 1969. Amphipods of the shallow-water sand community in the northern Irish Sea. Journal of the Marine Biological Association of the United Kingdom 49: 1003-1024, 5 figs.
Fincham, A.A., 1970a. Rhythmic behavior of the intertidal amphipod *Bathyporeia pelagica*. Journal of the Marine Biological Association of the United Kingdom 50: 1057-1068, 7 figs.
Fincham, A.A., 1970b. Amphipods in the surf plankton. Journal of the Marine Biological Association of the United Kingdom 50: 177-198, 7 figs.
Fincham, A.A., 1971. Ecology and population studies of some intertidal and sublittoral sand-dwelling amphipods. Journal of the Marine Biological Association of the United Kingdom 51: 471-488, 9 figs.
Fincham, A.A., 1973. The association of amphipods in the shallow-water sand habitat of Strangford Lough, Co. Down. Journal of the Marine Biological Association of the United Kingdom 53: 119-181, 3 figs.
Fincham, A.A., 1974. Intertidal sand-dwelling peracarid fauna of Stewart Island. New Zealand Journal of Marine and Freshwater Research 8: 1-14, 3 figs.
Fincham, A.A., 1977. Establishment of a new genus in the family Phoxocephalidae (Crustacea: Amphipoda) and a description of a new species from North Island, New Zealand. Bulletin of the British Museum of Natural History (Zoology) 31: 285-292, 4 figs.
Fischetti, E., 1937. Cenobiosi della scogliera di S. Giuliano Boccadasse, con speciale riguardo agli antipodi. Bolletino Museo Zoologia ed Anatomia Comparata di Genova 17(96): 17 pp.
Flugge, H., 1977. Zur Taxonomie von *Corophium arenarium* und *C. volutator* (Crust: Amphipoda: Corophiidae). Abhandlungen und Verhandlungen des Naturwissenschaftlichen Vereins, Hamburg 20: 113-122, 2 figs.
Ford, E.B., 1923. Animal communities of the level seabottom in the waters adjacent to Plymouth. Journal of the Marine Biological Association of the United Kingdom 13: 164-224, 6 figs.
Fowler, G.H., 1886. List of the Amphipoda of the L.M.B.C. District. Proceedings of the Literary and Philosophical Society of Liverpool 40: 212-220 [appendix].
Fox, R.S., 1973. *Ceradocus shoemakeri* and *Eriopisa schoenerae*, new amphipods (Crustacea: Gammaridae) from the Bahama Islands. Journal of the Elisha Mitchell Scientific Society 89: 147-159, 8 figs.
Fox, R.S. & K.H. Bynum, 1975. The amphipod crustaceans of North Carolina estuarine waters. Chesapeake Science 16: 223-237, 3 figs.
Frame, A.B., 1980. Two new species of sand burrowing amphipod crustaceans from Long Island Sound and the New York Bight (Amphipoda: Haustoriidae). Estuaries 3: 75-83, 5 figs.
Fraser, J.H., 1932. Observations on the fauna and constituents of an estuarine mud in a polluted area. Journal of the Marine Biological Association of the United Kingdom, new series, 18: 69-85, 2 figs.
Frey, H. & R. Leuckart, 1847. Beitrage zur Kenntniss wirbelloser Thiere mit besonderer Berucksightigung der Fauna des norddeutschen Meeres. 170 pp, 2 pls. Braunschweig: Freidrich Vieweg und Sohn.
Frith, D.W., 1976. Animals associated with sponges at North Hayling, Hampshire. Zoological Journal of the Linnean Society 58: 353-362.
Frith, D.W., 1977. A preliminary analysis of the association of amphipods *Microdeutopus damnoniensis* (Bate), *M. anomalus* (Rathke) and *Corophium sextoni* Crawford with sponges *Halichondria panicea* (Pallas) and *Hymeniacidon perleve* (Montagu). Crustaceana 32: 113-118.
Frost, N., 1936. I.-Amphipoda from Newfoundland waters, with a description of a new species. Newfoundland Division of Fishery Research, Reports: Faunistic Series 1: 3-9, several figs.
Gallardo, A., 1963. Descripcion de una nueva specie de *Ampelisca* (Amphipoda). Gayana 7: 11 pp., 2 pls.
Gamo, S., 1975. A new gammaridean Amphipoda, *Lepidepecreum sagamiensis* sp. nov. from Sagami Bay. Proceedings of the Japanese Society for Systematic Zoology 11: 32-35, 3 pls.
Gamo, S., 1977. A new gammaridean Amphipoda, *Melita sexstachya* sp. nov. from Sagami Bay. Proceedings of the Japanese Society of Systematic Zoology 13: 65-71, 4 figs.
Gamo, S., 1981a. A new deep sea Amphipoda, *Lepechinella sagamiensis* sp. nov. from Sagami Bay. Proceedings of Japanese Society of Systematic Zoology 20: 16-20, 2 figs.
Gamo, S., 1981b. A new bathypelagic gammaridean amphipod, *Eusiropsis spinidorsalis* sp. nov. (Crustacea) taken off the Ogasawara Islands. Science Reports of the Yokohama National University, Section II, 28: 1-10, 4 figs.

Gauld, D.T., T.B. Bagenal & Connell, J.H., 1953. The marine fauna and flora of St. Kilda, 1952. Scottish Naturalist 65: 29-49, 3 maps.

Gauthier, H., 1936. *Eriopisa seurati,* nouvel amphipode du Sud-tunisien. Bulletin de la Societe d'Histoire Naturelle de l'Afrique du Nord 27: 133-143, 3 figs.

Gauthier, H., 1941. Sur l'ethologie d'un amphipode qui vit dans une coquille. Bulletin de la Societe d'Histoire Naturelle de l'Afrique du Nord 32: 245-266, 6 figs, 2 pls.

Gee, J.M., 1961. Ecological studies in South Benfleet Creek with special reference to the amphipod genus *Corophium.* The Essex Naturalist 30: 291-309, 6 figs, pl. 12.

Geldiay, R., A. Kocatas & G. Krapp-Schickel, 1971. Some littoral amphipods from the Gulf of Izmir (Egean Sea, Turkey, Mediterranean). Memorie del Museo Civico di Storia Naturale, Verona 18: 369-387, 3 figs.

Gentil, F. & J. M. Bermudez, 1976. Nouvelles especes pour l'inventaire de la faune marine de la region de Roscoff: annelides polychetes, crustaces (cumaces et amphipodes), echinodermes. Travaux de la Station Biologique de Roscoff, new series 23(34): 5-8.

[Geoffroy, E.L. &] [Anonymous], 1762 and 1764. Histoira bregee des insectes qui se trouvent aux environs de Paris; Dans laquelle ces animaux font ranges suivant un ordre methodique 2: (not seen) total pp and figs unknown, only title page, pp. 667-668 and pl. 21 seen. Paris: Durand.

Gerstfeldt, G., 1858. Ueber Einige zum Theil neue arten Platoden, Anneliden, Myriapoden und Crustaceen Sibirien's namentlich seines ostlichen Theiles und des Amur-Gebietes. Memoires des Savants Strangers. Memoires Presentes a l'Academie Imperiale des Sciencesde St. Petersbourg 8: 261-296.

Giambagi, D., 1929. Un nuevo anfipodo de agua dulce del genero *Corophium.* Anales del Museo Nacional de Historia Natural 34: 137-143, 3 figs.

Giard, A., 1908a. Un amphipode mimetique des hydraires: *Metopa rubrovittata* G.O. Sars. La Feuille des Jeunes Naturalistes, series 4, 38(454): 214.

Giard, A., 1908b. Deux amphipodes interessants du Pas-de-Calais (*Colomastix pusilla* Grube et *Microdeutopus gryllotalpa* Costa). La Feuille des Jeunes Naturalistes, series 4, 38(453): 185.

Giard, M.A., 1876. On an amphipod (*Urothoe marina*), a commensal of *Echinocardium cordatum*. Annals and Magazine of Natural History, series 4, 17: 261-263.

Gilat, E., 1960. The benthonic Amphipoda of the Mediterranean coast of Israel. I. Notes on the geographical distribution. Sea Fisheries Research Station Bulletin 31 (Israel), Bulletin of the Research Council of Israel 9B: 157-166, 1 fig.

Gilat (Gottlieb), E., 1962. The benthonic Amphipoda of the Mediterranean coast of Israel. II. Ecology and life history. Bulletin of the Research Council of Israel, Zoology 11B: 71-92, 16 figs, appendix.

Giles, G.M., 1885a. Natural history notes from H.M.'s Indian marine survey steamer 'Investigator', commander Alfred Carpenter, R.N. commanding [sic on comma]. No. 1. On the structure and habits of *Cyrtophium calamicola,* a new tubicolous amphipod from the Bay of Bengal. Journal of the Asiatic Society of Bengal 54: 54-59, pl. 1.

Giles, G.M., 1885b. Natural history notes from H.M.'s Indian marine survey steamer 'Investigator', commander Alfred Carpenter, R.N., commanding. No. 2. Description of a new species of the amphipod genus *Melita* from the Bay of Bengal. Journal of the Asiatic Society of Bengal 54: 69-71, pl. 3.

Giles, G.M., 1887. Natural history notes from H.M.'s Indian marine survey steamer 'Investigator', commander Alfred Carpenter, R.N., commanding. No. 6. On six new amphipods from the Bay of Bengal. Journal of the Asiatic Society of Bengal 56: 212-229, pls 3-8.

Giles, G.M., 1888. No. 9. Further notes on the Amphipoda of Indian waters. Natural history notes from H.M.'s Indian marine survey steamer 'Investigator', commander Alfred Carpenter, R.N., D.S.O., commanding. Journal of the Asiatic Society of Bengal 57: 220-255, pls 6-12.

Giles, G.M., 1890. Descriptions of seven additional new Indian amphipods. Natural history notes from H.M.'s Indian marine survey steamer 'Investigator', commander Alfred Carpenter, R.N., D.S.O., commanding.-No. 15. Journal of the Asiatic Society of Bengal 59: 63-74, pl. 2.

Giovannini, R., 1965. Revision des especes benthiques Mediterraneennes du genre *Hyale*. Recueil des Travaux de la Station Marine d'Endoume, Bulletin 37(53): 277-340, 23 figs.

Glennon, T.A., 1979. Description of the male of *Amphiporeia gigantea* Bousfield (Amphipoda, Haustoriidae). Crustaceana 34: 304-310, 4 figs.

Gmelin, J.F., 1788. In: Caroli a Linneis's [sic] Systema Naturae. Tom 1 Pars V 13th Edition Revised by Johann Friedrich Gmelin: 2963-3014. Lipsiae.

Goddard, J., 1984.Presumptive Batesian mimicry of an aeolid nudibranch by an amphipod crustacean. Shells and Sea Life 16: 220-222, 2 figs.

Goeke, G.D., 1982. *Tiron triocellatus,* a new species of amphipod (Gammaridea: Synopiidae) from western Atlantic and Gulf of Mexico. Journal of Crustacean Biology 2: 148-153, 2 figs.

Goeke, G.D., 1985. Amphipods of the family Ampeliscidae (Gammaridea) V. *Ampelisca hawaiiensis,* new species. Pacific Science 39: 261-265, 2 figs.

Goeke, G.D. & J.M. Gathof, 1983. Amphipods of the family Ampeliscidae (Gammaridea). II. Notes on the occurrence of *Ampelisca holmesi* in the northern Gulf of Mexico. Gulf Research Reports 7: 289-291, 1 fig.

Goeke, G.D. & R.W. Heard, 1983. Amphipods of the family Ampeliscidae (Gammaridea). I. *Ampelisca bicarinata* a new species of amphipod from the Gulf of Mexico. Gulf Research Reports 7: 217-223, 3 figs.

Goeke, G.D. & R.W. Heard, 1984a. Amphipods of the family Ampeliscidae (Gammaridea) III. *Ampelisca parapacifica,* A new species of amphipod from the western North Atlantic with the designation of a substitute name for *A. eschrichtii pacifica* Gurjanova, 1955. Gulf Research Reports 7: 331-337, 3 figs.

Goeke, G.D. & R.W. Heard, 1984b. Amphipods of the family Ampeliscidae (Gammaridea). IV. Infraspecific variation in *Ampelisca agassizi.* Gulf Research Reports 7: 393-395, 1 fig.

Goes, A., 1866. Crustacea Amphipoda maris Spetsbergiam alluentis, cum speciebus aliis arcticis enumerat. Ofversigt af Kongelige Vetenskaps-Akademiens Forhandligar 1865: 517-536, pls 36-41. [Reprint, pp. 1- 20.]

Gonzalez, E., 1986. A new record of *Paracorophium hartmannorum* Andres, 1975, from the Chilean coast, with a description of the adult (Amphipoda: Corophiidae). Proceedings of the Biological Society of Washington 99: 21-23, 4 figs.

Goodhart, C.B., 1939. Notes on the bionomics of the tube-building amphipod, *Leptocheirus pilosus* Zaddach. Journal of the Marine Biological Association of the United Kingdom 23: 311-325, 3 figs.

Goodhart, C.B., 1941. The ecology of the Amphipoda in a small estuary in Hampshire. Journal of Animal Ecology 10:

306-322, 1 fig.
Goodhart, C.B. & R. Harrison, 1940. Occurrence of some off-shore amphipods in the littoral zone. Nature 145: 109.
Goodsir, H.D.S., 1845. Description of some animals found amongst the gulf-weed. Annals and Magazine of Natural History, series 1, 15: 73-76, 1 pl.
Gorbunov, G., 1946. Bottom life of the Novosiberian shoalwaters and the central part of the Arctic Ocean. Works of Drifting Ice Expedition in the Central Arctic Ocean in Ice Breaking Steamer "T. Sedov": 30-138, 2 figs, 1 pl. [In Russian.]
Gordon, I. & E.W. Sexton, 1949. The multiform species *Jassa falcata* (Montagu, 1808) - Crustacea, Amphipoda. Proceedings of the Linnean Society of London 161: 144-145.
Goss-Custard, J.D., 1977a. The energetics of prey selection by redshank, *Tringa totanus* (L.) in relation to prey density. Journal of Animal Ecology 46: 1-19, 1 fig.
Goss-Custard, J.D., 1977b. Predator responses and prey mortality in redshank, *Tringa totanus* (L.), and a preferred prey, *Corophium volutator* (Pallas). Journal of Animal Ecology 46: 21-35.
Gosse, P.H., 1855a. Notes on some new or little-known marine animals. Annals and Magazine of Natural History, series 2, 16: 305-313, pl. 8.
Gosse, P.H., 1855b. A Manual of Marine Zoology for the British Isles, part I. 203 pp., 335 figs. London: John Van Voorst.
Goswami, S.C., R.A. Selvakumar & S.N. Dwivedi, 1976. Zooplankton production along central west coast of India. Proceedings of the Symposium on Warm Water Zooplankton: 337-353, 4 figs.
Gottlieb, E., 1960. The benthonic Amphipoda of the Mediterranean coast of Israel. I. Notes on the geographical distribution. Bulletin of the Research Council of Israel 9B: 157-166, 1 fig.
Graeffe, E., 1883. Ueber die Fauna der Schlammregion der Adria. Bolletino della Societa adriatica di Scienze Naturali, Trieste 8: 85-89.
Graeffe, E., 1902. V. Crustacea. Uebersicht der fauna des Golfes von Triest nebst Notizen uber Vorkommen, Lebensweise, Erscheinungs- und Leichzeit der einzelnen Arten. Arbeiten aus den Zoologischen Institute der Universitat Wein und der Zoologischen Station in Triest 13: 1-48.
Graham, H.W. & H. Gay, 1945. Season of attachment and growth of sedentary marine organisms at Oakland, California. Ecology 26: 375-386, 9 figs.
Gran, H.H., 1902. Das Plankton des norwegischen Nordmeeres von biologischen und hydrographischen Gesichtspunkten behandelt. Report on Norwegian Fishery- and Marine-Investigations, 2(5) (in part 2 of volume 2): 1-222, 1 pl., 16 figs.
Grant, J. & E.A. Lazo-Wasem, 1986a. Systematics and ecology of the estuarine amphipod crustacean *Lepidactylus dytiscus* Say, 1818 (Haustoriidae). Canadian Journal of Zoology 60: 2039-2045, 3 figs.
Gravely, F.H., 1927. Order Amphipoda. Suborder Gammaridea. The littoral fauna of Krusadai Island in the Gulf of Manaar.... Bulletin of the Madras Government Museum, Natural History Section, new series, 1: 123-124.
Gray, W.S., Jr. & J.C. McCain, 1969. The taxonomic status of *Mandibulophoxus gilesi* Barnard, 1957 (Crustacea: Amphipoda). Proceedings of the Biological Society of Washington 82: 189-192, 1 fig.
Greze, I.I., 1965. K biologii bokoplava *Ampelisca diadema* (A. Costa) v Chernom More. Pp. 3-14. **In** C. Sornik's "Benthos", Akademii Nauk SSSR, "Naukova Duika" 1965.
Greze, I.I., 1968. On the age changes in morphology of *Erichthonius difformis* (Amphipoda: Gammaridea) of the Black Sea. Zoologischeskii Zhurnal 47: 1095-1098, 1 fig. [in Russian]
Greze, I.I., 1972a. A comparative analysis of the structure of summer populations of *Pleonexes gammaroides* and *Ericthonius difformis* in the Mediterranean and Black Seas. Zoologicheskije Zhurnal 51: 1468-1476, 6 figs. [in Russian]
Greze, I.I., 1972b. Sur quelques rythmes du cycle biologique des especies d'amphipodes de la Mer Noire presentant des populations nombreuses. Marine Biology 16: 75-80, 5 figs.
Greze, I.I., 1974. O nekotorykh zakonomernostiakh razmnozheniiamassovykh vidov amfipod Chernogo Moria. Akademiia Nauk Ukrainskoi SSR, Ordena Trudovogo Krasnogo Znameni Institut Biologii Iuzhnykh Morei 32: 53-66, 4 figs.
Greze, I.I., 1975. *Nannonyx goesii reductus* subsp. n. (Amphipoda, Gammaridea) iz Chernogo Moria. Zoologicheskii Zhurnal 54: 297-299, 6 figs.
Greze, I.I., 1977. Amfipody Chernogo Morja i ix biologija. Akademiia Nauk Ukrainskoi SSR: 155 pp. Kiev: Naukova Dumka.
Grieg, J.A., 1925. Evertebrater fra bankerne ved Spitsbergen. Bergens Museum Aarbok 1923-24, Naturvidenskabelig Raekke 9: 33 pp.
Grieg, J.A., 1926a. Evertebrater fra bankerne ved Spitsbergen indsamlet av "Tovik" og "Armauer Hansen" somrene 1925 og 1926. (Fiskenaering og Bundfauna). Naturvidenskabelig Raekke 5: 3-28, 1 fig, 3 tables.
Grieg, M.J., 1909. Invertebres du Fond. Duc D'Orleans. Croissere Oceanographique Accomplie a Bord de la Belgica dan la Mer du Gronland 1905, Bruxelles 1907: 503-568, 5 figs.
Griffiths, C.L., 1973. The Amphipoda of southern Africa. Part I. The Gammaridea and Caprellidea of southern Mocambique. Annals of the South African Museum 60: 265-306, figs 4-11.
Griffiths, C.L., 1974a. The Amphipoda of southern Africa Part 2. The Gammaridea and Caprellidea of south west Africa south of 20°S. Annals of the South African Museum 62: 169-208, 7 figs.
Griffiths, C.L., 1974b. The Amphipoda of southern Africa Part 3. The Gammaridea and Caprellidea of Natal. Annals of the South African Museum 62: 209-264, 8 figs.
Griffiths, C.L., 1974c. The Amphipoda of southern Africa Part 4. The Gammaridea and Caprellidea of the Cape Province east of Cape Agulhas. Annals of the South African Museum 65: 251-336, 18 figs.
Griffiths, C.L., 1975. The Amphipoda of southern Africa Part 5. The Gammaridea and Caprellidea of the Cape Province west of Cape Agulhas. Annals of the South African Museum 67: 91-181, 21 figs.
Griffiths, C.L., 1976a. Guide to the Benthic Marine Amphipods of Southern Africa, 106 pp, 60 figs. Cape Town: South African Museum.
Griffiths, C.L., 1976b. Some new and notable Amphipoda from southern Africa. Annals of the South African Museum 72: 11-35, 12 figs.
Griffiths, C.L., 1977a. Deep-sea amphipods from west of CapePoint, South Africa. Annals of the South African Museum 73: 93-104, 6 figs.
Griffiths, C.L., 1977b. The South African Museum's Meiring Naude Cruises Part 6 Amphipoda. Annals of the South African Museum 74: 105-123, 10 figs.

Griffiths, C.L., 1979. A redescription of the kelp curler *Amphithoe humeralis* (Crustacea, Amphipoda) from South Africa and its relationship to *Macropisthopous*. Annals of the South African Museum 79: 131-138, 3 figs.
Gromov, V.V., 1965. Rasproprostranenie Kaspiiskogo Rachka *Corophium* v Sylvvenskom Zalive Kamskogo Vodoxranilishcha. Biologicheskie Nauki 4: 20-22.
Gronov, L.T., 1764. Zoophylacii Gronoviani Fasciculus Secundus Exhibens Enumerationem Insectorum Quae in Museo suo Adversat, Examini Subjecit, Systematice Disposuit Atque Descripsit Laur. Theod. Gronovius, pp. 141-236, pls 14-17. Leyden: Lugduni Batavorum.
Grube, A.E., 1861. Ein Ausflug nach Triest und dem Quarnero. Beitrage zur Kenntniss der Thierwelt dieses Gebietes. Berlin: Nicolaische Verlagsbuchhandlung: prefacial pp. + 175 pp., 5 pls. [Gammarideans mentioned and listed on pp. 24, 135-138, 168.]
Grube, A.E., 1864a. Beschreibungen einiger Amphipoden der istrischen Fauna. Archiv fur Naturgeschichte, Jahrgang 30, 1: 195-215, pl. 5.
Grube, A.E., 1864b. Ueber ein neues Crustaceum: *Icridium fuscum* Grube, pp. 58-59; Ueber die Crustaceen-Fauna des adriatischen und Mittelmeeres, pp. 59-64. Jahres-Bericht der Schlesischen Gesellschaft fur Vaterlandische Cultur, Breslau 41.
Grube, A.E., 1864c. Die Insel Lussin und ihre Meeresfauna. Nach einem sechswochentlichen Aufenthalte, 116 pp., 1 pl. Breslau: F. Hirt
Grube, A.E., 1866. Beitrage zur Kenntniss der istrischen Amphipodenfauna. Archiv fur Naturgeschichte, 32 Jahrgang, 1: 377-417, pls 9-10.
Grube, A.E., 1868. Beschreibungen einiger Pycnogonoiden und Crustaceen. Abhandlung der Schlesischen Gesellschaft Naturwissen Abtheilung, 1868/1869: 115-129, 1 pl.
Guerin, F.E., 1836. Description de quelques genres nouveaux de crustaces appartenant a la famille des hyperines. Magasin de Zoologie Journal 6(VII): 1-10 + 2 unnumbered pp., pls 17-18, 19.
Guerin, M., 1832. Pp. 44-46 and Pl. 27 of Atlas. **In** Expedition Scientifique de Moree. Section des Sciences Physiques. Zoologie. Deuxieme Section. - Des Animaux Articules. Volume 3, part 1. Paris: F.G. Levrault. [1832-1835.]
Guerin-Meneville, F.E., 1829. Les amphipodes, pp. 21-24 and pls 25-28. **In** Crustaces, Iconographie du Regne Animal de G. Cuvier. Volume 2. Paris.
Guerne, J. de, 1886. Sur quelques amphipodes marins du nord de la France. Bulletin de la Societe Zoologique de France 11: 42-44.
Guerne, J. de, 1887. Notes sur la faune des Acores. Diagnoses d'un mollusque, d'un rotifere et de trois crustaces nouveaux. Le Naturaliste Revue Illustree des Sciences Naturelles, series 2, 9: 194-195.
Guerne, J. de, 1888. Campagnes scientifiques du yacht Monegasque l'Hirondelle Troiseme Annee, 1887. Excursions zoologiques dans les Iles de Fayal et de San Miguel (Acores), 113 pp., 9 figs. Paris: Gauthier-Villars.
Guerne, J. de, 1889. Les amphipodes de l'interieur et du littoral des Acores. Bulletin de la Societe Zoologique de France 14: 353-360.
Guiart, J., 1913. Crustaces commensaux et parasites de la Baie de Concarneau. Bulletin de l'Institut Oceanographique 264: 11 pp., 2 figs.
Gurjanova, E.F., 1927. To the fauna of the Kola-Fjord, Barents Sea, White Sea, Kara Sea and Novaja Semlja. Travaux de la Societe des Naturalistes Leningrad 57: 23-38, 1 fig. [in Russian]
Gurjanova, E.F., 1928. Contribution to the fauna of amphipods in the Barents Sea. Transactions of the Insitute for Scientific Exploration of the North 37: 43-54. [in Russian]
Gurjanova, E.F., 1929a. On the fauna of Crustacea-Malacostraca of the Barents Sea, White Sea and Kara Sea. Travaux de la Societe des Naturalistes de Leningrad 59: 29-46, 7 figs. [in Russian]
Gurjanova, E.F., 1929b. Neue Formen arktischer Isopoden und Amphipoden. Zoologischer Anzeiger 81: 309-317, 8 figs.
Gurjanova, E.F., 1929c. Contribution to the question of the distribution of benthos in the Cheshskaya Bay. Transactions of the Institute for Scientific Exploration of the North 43: 58-100. [in Russian]
Gurjanova, E.F., 1930a. Ueber die Fauna der Crustracea-Malacostraca der Jenissej-Mundungen. Russkii Gidrobiolocheskii Zhurnal 8: 285-299, 10 figs.
Gurjanova, E.F., 1930b. Beitrage zur Fauna der Crustacea-Malacostraca des arktischen Gebietes. Zoologischer Anzeiger 86: 231-248, 12 figs.
Gurjanova, E.F., 1931. Zur Amphipoda- und Isopoda-Fauna der ostlichen Murmankuste (im Gebiet der Portschnicha-Bucht). Transactions of the Institute for Scientific Exploration of the North 48: 196-204. [in Russian]
Gurjanova, E.F., 1932. Some contribution to the fauna of Crustacea of the Brothers Laptev's Sea (of Nordenskjold's Sea). Gosudarstvennyi Gidrolog-icheskii Institut, Issledovaniia Morei SSSR 15: 157-187, 4 pls, 3 figs. [in Russian]
Gurjanova, E.F., 1933a. Contribution to the fauna of Crustacea-Malacostraca of the Obj-Enisej Bay. Gosuddarstvennyi Gidrologicheskii Institut, Issledovaniia Morei SSSR 18: 75-90, 3 figs. [in Russian]
Gurjanova, E.F., 1933b. Zur Amphipodenfauna des Karischen Meeres. Zoologischer Anzeiger 103: 119-128, 4 figs.
Gurjanova, E.F., 1934a. Neue Formen von Amphipoden des Karischen Meeres. Zoologischer Anzeiger 108: 122-130, 6 figs.
Gurjanova, E.F., 1934b. The Crustacea of the Kara Sea and the ways of the penetration of marine Atlantic fauna into the Arctis [sic]. Comptes Rendus Academie des Sciences de l'URSS, new series, 1: 91-96. [in Russian]
Gurjanova, E.F., 1934c. To the fauna of Amphipoda of the Barents Sea and of the White Sea. Gosuddarstvennyi Gidrologicheskii Institut, Issledovanija Morei SSSR 20: 87-89, 1 fig. [in Russian]
Gurjanova, E.F., 1935a. Zur Zoogeographie der Crustacea Malacostraca des arktischen Gebietes. Zoogeographica Jena, 2: 555-571, 1 fig.
Gurjanova, E.F., 1935b. Contribution to the fauna of Amphipoda and Isopoda of the southern part of the Kara Sea. Gosuddarstvennyi Gidrologicheskii Institut Issledovanija Morei S.S.S.R. 21: 65-87, 8 figs. [in Russian
Gurjanova, E.F., 1936a. The zoogeography of Kara Sea (contribution to the fauna of Amphipoda and isopods o the northern part of the Kara Sea). Bulletin de l'Academie des Sciences de l'URSS, serie biologie 1936(2-3): 565-594, 6 figs. [in Russian]
Gurjanova, E.F., 1936b. Contribution to the fauna of Crustacea Malacostraca of the arctic region. Transactions of the Arctic Institute, Leningrad 33: 31-44, 4 figs. [in Russian]
Gurjanova, E.F., 1936c. Beitrage zur Amphipodenfauna des Karischen Meeres. Zoologischer Anzeiger 116: 145-152, 3 figs.
Gurjanova, E.F., 1936d. Neue Beitrage zur Fauna der Crustacea-Malacostraca des arktischen Gebietes, Zoologischer Anzeiger 113: 245-255, 5 figs.

Gurjanova, E.F., 1938a. On the question of the composition and origin of the fauna of the polar basin bassalia. Comptes Rendus Academie des Sciences de l'URSS 20: 333-336. [in Russian]

Gurjanova, E.F., 1938b. Amphipoda, Gammaroidea of Siaukhu Bay and Sudzukhe Bay (Japan Sea). Reports of the Japan Sea Hydrobiological Expedition of the Zoological Institute of the Academy of Sciences USSR in 1934 1: 241-404, 59 figs. [in Russian]

Gurjanova, E.F., 1939. Contributions to the origin and history of the fauna of the polar basin (on the base of the study of the Crustacea-amphipods and isopods). Bulletin de l'Academie des Sciences de l'URSS, serie biologie, 1939, 5: 679-702, 4 figs. [in Russian]

Gurjanova, E.F., 1946. New species of Isopoda and Amphipoda from the Arctic Ocean. Works of Drifting Ice Expedition in the Central Arctic Ocean in Icebreaking Steamer G. Sedov: 272-297, 26 figs [in Russian]

Gurjanova, E.F., 1948. Amphipoda Tixogo Okeana II. Stenothoidae dal'Nevostochyx Morei. Notebooks of the Academician Sergei Alekseyich Zernov (Hydrobiologist), 287-325, 21 figs. [in Russian]

Gurjanova, E.F., 1949. Osovennosti Belogo Morja kak morskogo basseina i perspectivy iskusstvennogo povyshenija ego produktivnosti. Vestnik Leninskadokogo Universiteta 3: 26-41, 2 figs.

Gurjanova, E.F., 1951. Bokoplavy morej SSSR i sopredel'nykh vod (Amphipoda-Gammaridea). Akademiia Nauk SSSR, Opredeliteli po Faune SSSR 41: 1029 pp., 705 figs.

Gurjanova, E.F., 1952a. K faune vysshik rakoobraznyx (Crustacea- Malacostraca) severnoi chasti Tixogo Okeana. Issledovanija Dal'nevostochnyx morei SSSR 3: 113-115.

Gurjanova, E.F., 1952b. Novye vidy bokoplvov (Amphipoda, Gammaridea) iz dal'nevostochnyx morei. Akademii Nauk SSSR, Trudy Zoologicheskogo Instituta 12: 171-194, 17 figs.

Gurjanova, E.F., 1953. Novye dopolnenija k dal'nevostochnoi faune morskik bokoplavov. Akademiia Nauk SSSR, Trudy Zoologicheskogo Institute 13: 216-241, 19 figs.

Gurjanova, E.F., 1955a. Crustacea-Malacostraca Chukotkogo Morei i Beringova proliva. [Unknown Journal] 2: 169-214, 7 figs.

Gurjanova, E.F., 1955b. Novye vidy bokoplavov (Amphipoda, Gammaridea) iz severnoi chasti Tixogo Okeana. Zoologicheskogo Instituta Akademii Nauk SSSR, Trudy 18: 166-218, 23 figs.

Gurjanova, E.F., 1958. K faune amfipod (Amphipoda) Ostrova Makkuori. Biol. Sovetskoi Antart. Exped. 3: 55-56.

Gurjanova, E.F., 1962. Bokoplavy severnoi chasti Tixogo Okeana (Amphipoda-Gammaridea) chast' 1. Akademii Nauk SSSR, Opredeliteli po Faune SSSR 74: 440 pp., 143 figs.

Gurjanova, E.F., 1964. Fauna Amphipoda i Isopoda priatlanticheskoi vladiny arkticheskogo basseina (kotloviny Nansena). Arkt. Antarkt. Nauchno-Issl. Inst. 259: 255-314.

Gurjanova, E.F., 1965. K voprosu o sistematike i rodstvennyx otnoshchenijax rodov *Eriopisa, Eriopisella* i *Niphargus* (sem. Gammaridae, Crustacea-Amphipoda). Akademiia Nauk SSSR, Trudy Zoologicheskogo Instituta 35: 216-231, 4 figs.

Gurjanova, E.F., 1972. Novye vidy bokoplavov (Amphipoda, Gammaridea) iz severozapadnoi chasti Tikhogo Okeana. Akademiia Nauk SSSR, Trudy Zoologicheskogo Instituta 52: 129-200, 43 figs.

Gurjanova, E.F., 1977. Some new data in taxonomy of family *Phoxocephalidae* sensu lato (*Amphipoda, Gammaridea*). Report I. Akademija Nauk SSSR, Zoologicheskii Institut, Issledovanija Fauny Morei 21(29): 67-87, 9 figs.

Gurjanova, E.F., 1980a. Some new data in taxonomy of family *Phoxocephalidae* sensu lato (*Amphipoda, Gammaridea*). Report II. Akademija Nauk SSSR, Zoologicheskii Institut, Issledovanija Fauny Morei 25: 89-97, 4 figs.

Gurjanova, E.F., 1980b. Some new data in taxonomy of family *Phoxocephalidae* sensu lato (*Amphipoda, Gammaridea*). Report III. Akademija Nauk SSSR, Zoologicheskii Institut, Issledovanija Fauny Morei 25: 98-100.

Hager, R.P. & R.A. Croke, 1980. The sand-burrowing amphipod *Amphiporeia virginiana* Shoemaker 1933 in the tidal plankton. Canadian Journal of Zoology 58: 860-864, 5 figs.

Hale, H.M., 1927. The fauna of Kangaroo Island, South Australia. No. 1. - The Crustacea. Transactions and Proceedings of the Royal Society of South Australia 51: 307-321, 7 figs.

Hale, H.M., 1929. The crustaceans of South Australia. Handbooks of the Flora and Fauna of South Australia 2: 201-380, figs 202-364.

Hammersley-Heenan, R.H., 1893. A short account of the attacks of the *Teredo navalis,* and *Chelura terebrans* upon greenheart (*Nectandra rodioei*) and sneezewood (*Pteroxylon utile*) timbers. Transactions of the South African Philatelic Society 5: 313-317, 1 fig.

Hammond, R., 1965. On some amphipods from the coast of Norfolk. Journal of the Marine Biological Association of the United Kingdom 45: 153-160, 5 figs.

Hammond, R., 1967. The Amphipoda of Norfolk. Cahiers de Biologie Marine 8: 113-152, 4 figs.

Hansen, H.J., 1887. Oversigt over de paa Dijmphna-Togtet indsamlede Krebsdyr. Dijmphna-Togtets Zoologisk-Botaniske Udbytte 1887: 183-286, pls 20-24.

Hansen, H.J., 1888. Malacostraca marina Groenlandiae occidentalis. Oversigt over det vestlige Gronlands fauna af Malakostrake Havkrebsdyr. Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening, Kjobenhavn 1887: 5-226, pls 2-7.

Hansen, H.J., 1895. Pycnogonider og Malacostrake Krebsdyr. Meddelelser om Gronland 19: 121-143.

Hantzschel, W., 1939. Die Lebens-Spuren von *Corophium volutator* (Pallas) und ihre palaontologische Bedeutung. Senckenbergiana 21: 215-227, 7 figs.

Harada, E., 1971. A new amphipod of the genus *Siphonoecetes* from the shallow water bottom of southern Japan, with reference to the diagnoses of the genus and its species. Publications of the Seto Marine Biological Laboratory 18: 355-378, 11 figs.

Harford, W.G.W., 1877a. Description of three new species of sessile-eyed Crustacea, with remarks on *Ligia occidentalis*. Proceedings of the California Academy of Sciences 7: 116-118.

Harford, W.G.W., 1877b. Description of a new genus and three new species of sessile eyed Crustacea. Proceedings of the California Academy of Sciences, 7: 53-55.

Hargrave, B.T., 1984. Feeding rates of abyssal scavenging amphipods (*Eurythenes gryllus*) determined *in situ* by time-lapsed photography. Deep-Sea Research 32: 443-450, 1 fig.

Harrison, C.S., T.S. Hida & M.P. Sek, 1983. Hawaiian seabird feeding ecology. Wildlife Monographs, No. 85: 5-71, 3 appendices, 14 figs, 37 tables.

Hart, T.J., 1930. Preliminary notes on the bionomics of the amphipod, *Corophium volutator* Pallas. Journal of the Marine Biological Association of the United Kingdom 16: 761-789, 4 figs.

Hartknoll, R.G., 1971. The relationship of an amphipod and a spider crab with the snakelocks anemone. Marine

Biological Station University of Liverpool, Port Erin, Isle of Man, Annual Report, 83 for 1970: 37-42, 1 fig.

Haswell, W.A., 1879a. On Australian Amphipoda. Proceedings of the Linnean Society of New South Wales 4: 245-279, pls 7-12.

Haswell, W.A., 1879b. On some additional new genera and species of amphipodous crustaceans. Proceedings of the Linnean Society of New South Wales 4: 319-350, pls 18-24.

Haswell, W.A., 1880a. On some new amphipods from Australia and Tasmania. Proceedings of the Linnean Society of New South Wales 5: 97-105, pls 5-7.

Haswell, W.A., 1880b. Preliminary report on the Australian Amphipoda. Annals and Magazine of Natural History, series 5, 5: 30-34.

Haswell, W.A., 1882. Catalogue of the Australian Stalk- and Sessile-Eyed Crustacea: xxiv + 324 pp. (plus Addenda et Corrigenda), 4 pls. Sydney: Australian Museum.

Haswell, W.A., 1885a. Revision of the Australian Laemodipoda. Proceedings of the Linnean Society of New South Wales 9: 993-1000, pls 48-489.

Haswell, W.A., 1885b. Notes on the Australian Amphipoda. Proceedings of the Linnean Society of New South Wales 10: 95-114, pls 10-18.

Hazlett, A. & R. See, 1976. A study of *Fucus spiralis* and its associated fauna in Strangford Lough, Co. Down. Proceedings of the Royal Irish Academy, series B, 76(36): 607-618, 2 figs.

Healy, B., 1975. Fauna of the salt-marsh, North Bull Island, Dublin. Proceedings of the Royal Irish Academy, series B, 75: 225-244, 2 figs.

Heard, R.W., 1982a. Observations on the food and food habits of clapper rails (*Rallus longirostris* Boddaert) from tidal marshes along the east and Gulf Coasts of the United States. Gulf Research Reports 7: 125-135, 1 fig.

Heard, R.W., 1982b. Order Amphipoda. Pp. 36-44, figs 41-49. **In** Guide to Common Tidal Marsh Invertebrates of the Northeastern Gulf of Mexico. Alabama Sea Grant Consortium.

Heard, R.W. & D.G. Perlmutter, 1977. Description of *Colomastix janiceae* n.sp., a commensal amphipod (Gammaridea: Colomastigidae) from the Florida Keys, USA. Proceedings of the Biological Society of Washington 90: 30-42, 4 figs.

Heard-III, R.W. & W.B. Sikor, 1972. A new species of *Corophium* Latreille, 1806 (Crustacea: Amphipoda) from Georgia brackish waters with some ecological notes. Proceedings of the Biological Society of Washington 84: 467-476, 3 figs.

Hedley, C., 1901. The marine wood-borers of Australasia and their work. Australasian Association for the Advancement of Science, Report Eighth Meeting, for 1900, section D: 237-255, pls 7-10.

Heer, O., 1865. 'Die Urwelt der Schweiz'. 622 pp., pl. 11. Zurich: Friedrich Schulthess. [not seen]

Hellen, W., 1920. Zur Kenntnis der Amphipoden-Fauna Finlands. Meddelanden af Societas Pro Fauna et Flora Fennica 45: 131-138.

Heller, C., 1861a. Vorlaufiger Bericht uber die wahrend der Weltumseglung der k.k. Fregatte Novara gesammelten Crustaceen. Verhandlungen der Kaiserlich-Koniglichen Zoologisch-Botanischen Gesellschaft in Wien 11: 495-498.

Heller, C., 1861b. Beitrage zur Crustaceen-Fauna des rothen Meeres. Sitzungsberichte der Mathematisch-Naturwissenschaftlichen Classe der Kaiserlichen Academie der Wissenschaften 44: 241-295, 3 pls.

Heller, C., 1867. Beitrage zur naheren Kenntniss der Amphipoden des adriatischen Meeres. Denkschriften der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe Wien 26(2): 62 pp., 4 pls.

Heller, C., 1868. Crustaceen. Reise der Osterreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. Von Wullerstorf-Urbair. Zoologischer Theil 2(3): 280 pp., 25 pls.

Heller, C., 1875. Die Crustaceen, Pycnogoniden und Tunicaten der K.K. Osterr.- Ungar. Nordpol-Expedition [sic]. Denkschriften der Kaiserliche Akademie der Wissenschaften Mathematisch- Naturwissenschaftliche Classe 25: 25-46, 5 pls.

Herbst, G.N., 1981. The distribution of amphipod crustaceans within Israel. Israel Journal of Zoology 30: 105-106.

Herbst, G.N., D.P. Weston & J.G. Lorma, 1979. The distributional response of amphipod and decapod crustaceans to a sharp thermal front north off Cape Hatteras, North Carolina. Symposium on the composition and evolution of crustaceans in the world ocean. Bulletin of the Biological Society of Washington 3: 188-213, 10 figs.

Herbst, J.F.W., 1793. Garneelasseln. Onisci gammarelli. Part 6, pp. 105-146. **In** Volume 2 of Versuch einer Naturgeschichte der Krabben und Krebse nebst einer systematischen Beschreibung ihrer verschiedenen Arten, [pls 34-36, not seen]. Berlin und Stralsund.

Herdman, W.A., 1889. Second annual report of the Liverpool Marine Biological Station on Puffin Island. Proceedings of the Liverpool Biological Society 3: 23-45, 1 fig.

Herhaus, K.F., 1978. Der erste Nachweis von *Corophium curvispium* [sic] Sars, 1895 (Crustacea, Amphipoda, Corophiidae) im Dortmund-Ems-Kanal. Natur und Heimat 38: 99-102, 1 fig.

Hesse, M., 1868. Description d'un nouveau crustace appartenant au genre *Limnorie*. Annales des Sciences Naturelles Zoologie, serie 5, 10: 101-120, pl. 9.

Hesse, M., 1873. Memoire sur des crustaces rares ou nouveaux des cotes de France. Annales des Sciences Naturelles cinquieme serie-Zoologie et Paleontologie 17(7): 16 pp., pl. 4.

Hessler, R.R., 1969. Peracarida. Pp. R360-R393. **In** R.C.Moore (ed.). Treatise on Invertebrate Paleontology, part R, Arthropoda 4, Volume 1. New York: The Geological Society of America, Inc. and the University of Kansas. [Amphipoda = pp. R387-392, figs 206-209.]

Hessler, R.R., C.L. Ingram, A.A. Yayanos & B. Burnet, 1978. Scavenging amphipods from the floor of the Philippine Trench. Deep-Sea Research 25: 1029-1047, 11 figs.

Hessler, R.R., J.D. Isaacs & E.L. Mills, 1972. Giant amphipod from the abyssal Pacific Ocean. Science 175: 636-637.

Hewatt, W.G., 1946. Marine ecological studies on Santa Cruz Island, California. Ecological Monographs 16: 185-210, 2 figs.

Hewitt, C.G., 1907. Some Arthrostraca and other invertebrates from St. Kilda. Annals of Scottish Natural History 64: 219-221.

Hill, C.L. & C.A. Kofoid, (ed.), 1927. Marine Borers and Their Relation to Marine Construction on the Pacific Coast. Final Report of the San Francisco Bay Marine Piling Committee: 357 pp., 143 figs.

Hirayama, A., 1978. A new gammaridean Amphipoda, *Cottesloe cyclodactyla* sp. nov., from Amakusa, South Japan. Publications from the Amakusa Marine Biological Laboratroy [sic] 4: 235-243, 4 figs.

Hirayama, A., 1978. A new species of the amphipod genus *Cyproides*[sic] from Amakusa, Kyushu. Publications from the Amakusa Marine Biological Laboratory 4: 245-251, 3

figs.

Hirayama, A., 1980. Gammaridea Amphipoda of the intertidal reef flat of Ishigaki Island, Ryukyu Archipelago. Part I. Genus *Hyale*. Publications of the Seto Marine Biological Laboratory 25: 131-156, 17 figs.

Hirayama, A., 1983. Taxonomic studies on the shallow water gammaridean Amphipoda of West Kyushu, Japan. I. Acanthonotozomatidae, Ampeliscidae, Ampithoidae, Amphilochidae, Anamixidae, Argissidae, Atylidae and Colomastigidae. Publications of the Seto Marine Biological Laboratory 28: 75-150, 42 figs.

Hirayama, A., 1984a. Taxonomic studies on the shallow water gammaridean Amphipoda of West Kyushu, Japan. II. Corophiidae. Publications of the Seto Marine Biological Laboratory 29(1/3): 1-92, figs 43-100.

Hirayama, A., 1984b. Taxonomic studies on the shallow water gammaridean Amphipoda of West Kyushu, Japan III. Dexaminidae (*Polycheria* and *Paradexamine*). Publications of the Seto Marine Biological Laboratory 29(4/6): 187-230, figs 102-123.

Hirayama, A., 1985a. New record and redescription of *Najna consiliorum* Derzavin, 1937 (Crustacea, Amphipoda, Najnidae) from Otsuchi Bay, northeast Japan. Proceedings of the Japanese Society of Systematic Zoology 30: 36-45, 5 figs.

Hirayama, A., 1985b. Taxonomic studies on the shallow water gammaridean Amphipoda of West Kyushu, Japan IV. Dexaminidae (*Guernea*), Eophiliantidae [sic], Eusiridae, Haustoriidae, Hyalidae, Ischyroceridae. Publication of the Seto Marine Biological Laboratory 30: 1-53, figs 124-161.

Hirayama, A., 1985c. Taxonomic studies on the shallow water gammaridean Amphipoda of West Kyushu, Japan V. Leucothoidae, Lysianassidae (*Prachynella, Aristias, Waldeckia, Ensayara, Lepidepecreum, Hippomedon* and *Anonyx*). Publication of the Seto Marine Biological Laboratory 30: 167-212, figs 163-196.

Hirayama, A., 1986a. Two new subspecies of *Synchelidiun* (Crustacea: Amphipoda: Oedicerotidae) from the sea shore of northeast Japan. Zoological Science 3: 357-366, 7 figs.

Hirayama, A., 1986b. Taxonomic studies on the shallow water gammaridean Amphipoda of West Kyushu, Japan VI. Lysianassidae (*Orchomene), Megaluropus* Family Group, Melitides [sic] (*Cottesloe, Jerbarnia, Maera, Ceradocus, Eriopisella, Dulichiella*). Publications of the Seto Marine Biological Laboratory, 31: 1-35, figs 197-220.

Hirayama, A., 1987. Notes on the evolutionary systematics of the genus *Corophium*. Zoological Science 4: 569-574, 3 figs.

Hirayama, A. & T. Kikuch, 1979. The first record of *Melita appendiculata* (Say) 1818, (Crustacea: Amphipoda: Gammaridae) from Japan. Publications from the Amakusa Marine Biological Laboratory, Kyushu University 5: 67-77, 6 figs.

Hirayama, A. & T. Kikuch, 1980a. A new gammaridean Amphipoda, *Colomastix azumai*, sp. nov., living in the sponge, *Tetilla serica*. Publications from the Amakusa Marine Biological Laboratory, Kyushu University 5: 133-141, 3 figs.

Hirayama, A. & T. Kikuch, 1980b. A new gammaridcan [sic] Amphipoda, *Waldeckia elephas* sp. nov., attaching to the set net in Tomioka Bay, Amakusa, Japan. Publications from the Amakusa Marine Biological Laboratory Kyushu University 5: 143-151, 5 figs.

Hiwatari, T. & T. Kajihar, 1981a. Taxonomy of the family Hyalidae (Amphipoda, Crustacea) in Japan. I. Three new species of the genus *Hyale*. Proceedings of the Japanese Society of Systematic Zoology 20: 21-34, 10 figs.

Hiwatari, T. & T. Kajihar, 1981b. Taxonomy of the family Hyalidae (Amphipoda, Crustacea) in Japan II. A new species of the genus *Hyale*. Proceedings of the Japanese Society of Systematic Zoology 21: 35-40, 4 figs.

Hiwatari, T. & T. Kajihar, 1984. Population dynamics and life cycle of *Hyale barbicornis* (Amphipoda, Crustacea) in blue mussel zone. Marine Ecology Progress Series 20: 177-183, 7 figs, 1 table.

Hoberg, M.K., S.G. McGee & H.M. Feder, 1982. Polychaetes and amphipods as commensals with pagurids from the Alaska Shelf. Ophelia 21: 167-179, 1 fig.

Hoek, P.P.C., 1879. Carcinologisches, Grossentheils gearbeitet in der zoologischen Station der niederlandischen zoologischen Gesellschaft. Tijdschrift der Nederlandsche Dierkundige Vereeniging 4: 97-161, pls 5-10.

Hoek, P.P.C., 1882. Die Crustaceen, gesammelt waehrend der Fahrten des "Willem Barents" in den Jahren 1878 und 1879. Niederlandisches Archiv fur Zoologie, Supplementband I, 7: 75 pp., 3 pls.

Hoek, P.P.C., 1889a. Naschrift op Crustacea Neerlandica II. Tijdschrift der Nederlandsche Dierkundige Vereeniging, series 2, 2: 260-262, pl. 12.

Hoek, P.P.C., 1889b. Crustacea Neerlandica. Tijdschrift der Nederlandsche Dierkundige Vereeniging, series 2, 2: 170-234, pls7-10.

Holman, H. & L. Watling, 1981. *Pagetina reducta* sp.n. (Crustacea: Amphipoda) with a review of the family Pagetinidae. Sarsia 66: 213-215, 1 fig.

Holman, H. & L. Watling, 1983a. A revision of the Stilipedidae (Amphipoda), Crustaceana 44: 27-53, 11 figs.

Holman, H. & L. Watling, 1983b. Amphipoda from the southern ocean: families Colomastigidae, Dexaminidae, Leucothoidae, Liljeborgiidae, and Sebidae. Biology of the Antarctic Seas XIII, Antaractic Research Series 38: 215-262, 35 figs.

Holme, N.A., 1950. The bottom fauna of Great West Bay. Journal of the Marine Biological Association of the United Kingdom 29: 163-183, 1 fig.

Holme, N.A., 1983. Some amphipods (Crustacea: Podoceridae) recorded off the south-west coast of Ireland. Irish Naturalist Journal 21: 128-129.

Holmes, S.J., 1903. Synopses of North-American invertebrates. American Naturalist 37: 267-292.

Holmes, S.J., 1904a. Amphipod crustaceans of the expedition. Harriman Alaska Expedition: 233-246, figs 118-128.

Holmes, S.J., 1904b. On some new or imperfectly known species of west American Crustacea. Proceedings of the California Academy of Sciences, series 3, Zoology, 3: 307-324, pls 35-37.

Holmes, S.J., 1905. The Amphipoda of southern New England. Bulletin of the United States Bureau of Fisheries 24: 459-529, numerous unnumbered figs, 13 pls.

Holmes, S.J., 1908. The Amphipoda collected by the United States Bureau of Fisheries Steamer, "Albatross", off the west coast of North America, in 1903 and 1904, with descriptions of a new family and several new genera and species. Proceedings of the United States National Museum 35: 489-543, 46 figs.

Holmquist, C., 1965. The amphipod genus *Pseudalibrotus*. Zeitschrift fur Zoologische Systematik und Evolutionsforschung 3: 19-46, 7 figs.

Holsinger, J.R., 1986. Amphipoda: Sebidae. Stygofauna Mundi: 568-569, 1 fig.

Holthius, L.B., 1975. Rafinesque's amphipod names; reply to Dr. Dupuis. Bulletin of Zoological Nomenclature 32: 5-8.

Hong, J.S., 1983. Three tube-building amphipods from experimental plates in Deukryang Bay in the southern coast of Korea. Korean Journal of Zoology 26: 135-153, 10 figs.

Hope, F.W., 1851. Catalogo dei crostacei Italiani e di moltri altri del Mediterraneo. Napoli Stabilimento Tipografico di Fr. Azzolino Vico Gerolomini 10: 48 pp., 2 figs.

Hope, G.F., 1867. Descrizione di tre nuovi crostacei del Mediterraneo. Fauna del Regno di Napoli 83: 1-12, 3 figs.

Hunt, O.D., 1925. The food of the bottom fauna of the Plymouth fishing grounds. Journal of the Marine Biological Association of the United Kingdom, new series, 13: 560-599, 1 fig., 2 pls.

Hurley, D.E., 1954a. Studies on the New Zealand amphipodan fauna no. 3. The family Phoxocephalidae. Transactions of the Royal Society of New Zealand 81: 579-599, 5 figs.

Hurley, D.E., 1954b. Studies on the New Zealand amphipodan fauna no. 4. The family Gammaridae, including a revision of the freshwater genus *Phreatogammarus* Stebbing. Transactions of the Royal Society of New Zealand 81: 601-618, 4 figs.

Hurley, D.E., 1954c. Studies on the New Zealand amphipodan fauna no. 5. *Pleonexes lessoniae* a new species of the family Amphithoidae. Transactions of the Royal Society of New Zealand 81: 619-626, 2 figs.

Hurley, D.E., 1954d. Studies on the New Zealand amphipodan fauna no. 6. Family Colomastigidae, with descriptions of two new species of *Colomastix*. Transactions of the Royal Society of New Zealand 82: 419-429, 3 figs.

Hurley, D.E., 1954e. Studies on the New Zealand amphipodan fauna no. 7. The family Corophiidae, including a new species of *Paracorophium*. Transactions of the Royal Society of New Zealand 82: 431-460, 7 figs.

Hurley, D.E., 1954f. Studies on the New Zealand amphipodan fauna no. 9. The families Acanthonotozomatidae, Pardaliscidae and Liljeborgiidae. Transactions of the Royal Society of New Zealand 82: 763-802, 14 figs.

Hurley, D.E., 1954g. Studies on the New Zealand amphipodan fauna no. 10. A new species of *Cacao*. Transactions of the Royal Society of New Zealand 82: 803-811, 3 figs.

Hurley, D.E., 1954h. Studies on the New Zealand amphipodan fauna no. 2. The family Talitridae: the fresh-water genus *Chiltonia* Stebbing. Transactions of the Royal Society of New Zealand 81: 563-577, 3 figs.

Hurley, D.E., 1955. Studies on the New Zealand amphipodan fauna no. 12. The marine families Stegocephalidae and Amphilochidae. Transactions of the Royal Society of New Zealand 83: 195-221, 9 figs.

Hurley, D.E., 1956. A new species of *Stegocephalus* (Amphipoda Gammaridea) from California. Bulletin of the Southern California Academy of Sciences 55: 28-34, pls 9-11.

Hurley, D.E., 1957a. Some Amphipoda, Isopoda and Tanaidacea from Cook Strait. Zoology Publications Victoria University Collections 21: 1-20, 10 pls.

Hurley, D.E., 1957b. Studies on the New Zealand amphipodan fauna. no. 14. – The genera *Hyale* and *Allorchestes* (family Taliitridae). Transactions of the Royal Society of New Zealand 84: 903-933, 9 figs.

Hurley, D.E., 1958. A key to the families of New Zealand amphipods. Tuatara 7: 71-83.

Hurley, D.E., 1963. Amphipoda of the family Lysianassidae from the west coast of North and Central America. Allan Hancock Foundation Publications Occasional Paper 25: 1-165, 49 figs.

Hurley, D.E., 1965a. A re-description of some A.O. Walker types of "Southern Cross" Lysianassidae (Crustacea Amphipoda) from the Ross Sea. Transactions of the Royal Society of New Zealand, Zoology 6: 155-181, 15 figs.

Hurley, D.E., 1965b. A re-description of *Orchomenella chilensis* (Heller) (Crustacea Amphipoda: family Lysianassidae) from the original material collected by the "Novara" in Chilean waters. Transactions of the Royal Society of New Zealand 6: 183-188, 2 figs.

Hurley, D.E., 1965c. A common but hitherto undescribed species of *Orchomenella* (Crustacea Amphipoda: family Lysianassidae) from the Ross Sea. Transactions of the Royal Society of New Zealand 6: 107-113, 2 figs.

Hurley, D.E., 1973. An annotated checklist of fossils attributed to the Crustacea Amphipoda. New Zealand Oceanographic Institute Records 1: 211-217.

Hurley, D.E. & R. Cooper, 1974. Preliminary description of a new species of *Parawaldeckia* (Crustacea Amphipoda: Lysianassidae from New Zealand (note)). New Zealand Journal of Marine and Freshwater Research 8: 563-567.

Imbach, M.C., 1969. Gammaridean Amphipoda from the South China Sea. Naga Report 4: 39-167, pls 1-33.

Ingle, R.W., 1963. *Corophium multisetosum* Stock, a crustacean amphipod new to Great Britain, with notes on the distribution of *C. volutator* (Pallas) and *C. arenarium* Crawford. Annals and Magazine of Natural History, series 13, 6: 449-460, 3 figs.

Ingle, R.W., 1969. The crustacean amphipod genus *Corophium* Latreille; a morphological and taxonomic study. A Thesis Submitted for the Degree of Doctor of Philosophy in the University of Reading, Berks. [unpublished microfilm only]

Ingle, R.W., 1972. The proposed suppression of the name *Oniscus bicaudatus* Linnaeus, 1761, the earliest available name for *Corophium volutator* (Pallas, 1766); the selection of neotypes for *C. volutator* and for *C. bonnelii* H. Milne Edwards, 1830 (Amphipoda, Corophiidae). Crustaceana, Supplement 3: 326-328.

Ingolfsson, A., 1977. Distribution and habitat preferences of some intertidal amphipods in Iceland. Acta Naturalia Islandica 25: 1-28, 6 figs.

Ingram, C.L. & R.R. Hessler, 1983. Distribution and behavior of scavenging amphipods from the central North Pacific. Deep-Sea Research 30: 683-706, 6 figs.

Iredale, T., R.A. Johnson & F.A. McNeil, 1932. Destruction of Timber by Marine Organisms in the Port of Sydney. 148 pp., 4 pls, numerous figs. Sydney Harbour Trust, Sydney.

Irie, H., 1957. Tube-building amphipods occurring at the "wakame" (a species of brown algae: *Undaria pinnatifida*) grounds of Simbara, Nagasaki Prefecture. Journal? (in Japanese). pp. 1-6, 6 figs. [Snuffing out of algae by amphipods]

Irie, H., 1959. Studies on pelagic amphipods in the adjacent seas of Japan. Bulletin of the Faculty of Fisheries Nagasaki University 8: 20-42.

Irie, H. & K. Nagata, 1962. A list of the benthic Crustacea known in Ariake Sea. Bulletin of the Faculty of Fisheries, Nagasaki University 13: 19-24.

Ishimaru, S., 1984. Taxonomic studies of the family Pleustidae (Crustacea, Amphipoda, Gammaridea) from coastal waters of northern Japan. I. The genus *Parapleustes*. Journal of the Faculty of Science, Hokkaido University, series 6, Zoology 23: 403-453, 32 figs.

Ishimaru, S., 1985a. Taxonomic studies of the family Pleustidae (Crustacea, Amphipoda, Gammaridea) from coastal waters of northern Japan. II. The genus *Pleusymtes*. Journal of the Faculty of Science, Hokkaido University, series 6, Zoology 24: 43-69, 17 figs.

Ishimaru, S., 1985b. A new species of the genus *Leucothoe* (Amphipoda, Gammaridea, Leucothoidae) from Japan. Proceedings of the Japanese Society of Systematic Zoology

30: 46-52, 2 figs.
Ishimaru, S., 1985c. Taxonomic studies of the family Pleustidae (Crustacea, Amphipoda, Gammaridea) from coastal waters of northern Japan. III. The genus *Pleusirus,* with notes on body aesthetascs. Journal of the Faculty of Science, Hokkaido University, series 6, Zoology 24: 103-112, 5 figs.
Ito, S., Y. Honma & H. Kakimot, 1972. A preliminary report of the amphipod fauna in the waters around Sado Island. Proceeding of the Japanese Society of Systematic Zoology 8: 21-28, 4 figs.
Ivester, M.S. & B.C. Coul, 1975. Comparative study of ultrastructure morphology of some mouthparts of four haustoriid amphipods. Canadian Journal of Zoology 3: 408-417, 21 figs.
Iwasa, M., 1934. A new amphipod (*Parhyale kurilensis,* n.sp.) from Urup. Journal of the Faculty of Science, Hokkaido Imperial University, Zoology, series 6, 3: 1-7, 1 fig., 2 pls.
Iwasa, M., 1939. Japanese Talitridae. Journal of the Faculty of Science, Hokkaido Imperial University, Zoology, series 6, 6: 255-296, 27 figs, pls 9-22.
Jarrett, N.E. & E.L. Bousfield, 1982. Studies on the amphipod family Lysianassidae in the northeastern Pacific region. *Hippomedon* and related genera: Systematics and distributional ecology. Publications in Biological Oceanography 10: 103-128, 9 figs.
Jarzynsky, T., 1870. Praemissus catalogus crustaceorum amphipodum, inventorum in mari albo et in mari glaciali ad litus murmanicum anno 1869 et 1870. Tome i, ii: 315-316. S. Petersburg: Universitat Zoologische Museum.
Jarzynsky, Th., 1885. Catalogus crustaceorum amphipodum inventorum in mari albo et in mari glaciali ad litus Murmanicum anno 1869 et 1870. Pp. 168-169. **In** Nicolas Wagner's Die Wirbellosen des weissen Meeres. Zoologische Forschungen an der Kuste des Solowetzkischen Meerbusens in den Sommermonaten der Jahre 1877, 1878, 1879 und 1882. Erster Band. Leipzig: Wilhelm Engelmann.
Jaschnov, W.A., 1935. Fauna of brackish-water basins of the Wrangel Island. Exploration Mers U.R.S.S. 22: 119-134, 8 figs.
Javed, W., 1983. A description of *Cymadusa filosa* Savigny, 1816 (Gammaridea, Amphipoda) and its occurrence in the northern Arabian Sea. Biologia, Lahore 29: 177-183, 4 figs.
Jazdzewski, K., 1970a. *Gammarus inaequicauda* Stock in the Baltic Sea (Amphipoda, Gammaridea). Crustaceana 19: 216-217.
Jazdzewski, K., 1970b. Biology of Crustacea Malacostraca in the Bay of Puck, Polish Sea. Zoologica Poloniae 20: 440-462, figs 10-16.
Jazdzewski, K., 1971. Ecology of Crustacea Malacostraca in the Bay of Puck. Acta Biologica et Medica Gdansk 16: 32-45, fig. 7.
Jazdzewski, K., 1973. Ecology of gammarids in the Bay of Puck. Oikos Supplementum 15: 121-126, 1 fig.
Jazdzewski, K., 1978. Notes on the occurrence and ecology of *Chaetogammarus stoerensis* (Reid, 1938) and *Corophium multisetosum* Stock, 1952 (Amphipoda) in the Baltic Sea. Crustaceana 30: 33-38, 2 figs.
Jazdzewski, K., 1981. Amphipod crustaceans in the diet of pygoscelid penguins of the King George Island, South Shetland Islands, Antarctica. Polish Polar Research 2: 133-144.
Jensen, K., 1978. Tanglopper illustreret nogle til Danske tanglopper (Amphipoda). 39 pp., 76 figs. Copenhagen: Biokon.
Jensen, K. & K. Bende, 1973. Invertebrates associated with snail shells inhabited by *Pagurus bernhardus* (L.) (Decapoda). Ophelia 10: 185-192, 3 figs.
Jensen, L.A., R.A. Heckmann, M. Moser & M.D. Dailey, 1982. Parasites of bocaccio, *Sebastes paucispinis,* from southern and central California. Proceedings of the Helminthological Society of Washington 49: 314-317, 10 figs.
Jespersen, P., 1923. Dr. Thorild Wulff's plankton-collections in the waters west of Greenland, Metazoa. Meddelelser om Gronland 64: 101-160, 1 map.
Jespersen, P., 1928. Investigations on the food of the herring in Danish waters. Meddelelser fra Kommissionen for Havundersogelser, Series: Plankton, II(2): 149 pp., 12 figs, 240 tables.
Johansen, F., 1926. Fishes and marine invertebrates collected during the cruise of the "Arctic" in 1923. Canadian Field-Naturalist 39: 203-204.
Johansen, F., 1930. Marine Crustacea, Malacostraca and Pantopoda (Pycnogonida), in the Gulf of St. Lawrence, Newfoundland and the Bay of Fundy in 1919, 1922, 1923, 1925 and 1926. Canadian Field-Naturalist 44: 91-94.
John, P.A., 1955. Studies on *Melita zeylanica,* an amphipod destrucive to submerged timber. Bulletin of the Central Research Institute, University of Travancore, Trivandrum, series C, Natural Sciences 4: 117-126, 1 fig.
Johnson II, S.E., 1968. Occurrence and behavior of *Hyale grandicornis,* a gammarid amphipod commensal in the genus *Acmaea.* The Veliger, Supplement 2: 56-60, 4 figs, pls 2-3.
Johnson, R.A., F.A. McNeill & T. Iredale, 1936. Destruction of timber by marine organisms in the Port of Sydney. Supplementary Report No.1, Maritime Services Board of New South Wales, Sydney: 99 pp., several figs.
Johnston, G., 1828. Contributions to the British fauna. Zoological Journal 3: 175-180, 490-491.
Johnston, G., 1829a. Contributions to the British fauna. Zoological Journal 4: 416-421.
Johnston, G., 1829b. Contributions to the British fauna. Zoological Journal 4: 52-57.
Jones, D.A., N. Peacock & O.M.F. Phillip, 1973. Studies on the migration of *Tritaeta gibbosa,* a subtidal benthic amphipod. Netherlands Journal of Sea Research 7: 135-149, 8 figs.
Jones, D.S., 1986. A catalogue of type specimens of Crustacea in the Western Australian Mueseum, Perth. Records of the Western Australian Museum 13(1): 46 pp.
Jones, N.S., 1948. The ecology of the Amphipoda of the south of the Isle of Man. Journal of the Marine Biological Association of the United Kingdom, new series, 27: 400-439, 2 figs.
Jossi, J.W., 1972a. Distribution and abundance of pelagic Amphipoda in the Arabian Sea, Java Sea and Indian Ocean with notes on their contribution to the total zooplankton. Journal of the Marine Biological Association of India 14: 115-138.
Joubin, L., 1907. La Presqu'ile de Quiberon. Bulletin de l'Institut Oceanographique, Monaco, 92: 24 pp., 19 figs, 4 pls.
Just, J., 1970. Amphipoda from Jorgen Bronlund Fjord, North Greenland. Meddelelser om Gronland 184(6): 39 pp., 20 figs.
Just, J., 1976. On the marine genus *Menigratopsis* Dahl, 1945 from North Atlantic and Arctic waters (Crustacea, Amphipoda, Lysianassidae). Astarte 9: 1-12, 9 figs.
Just, J., 1977a. A new genus and species of corophiid Amphipoda from pteropod shells of the bathyal western Atlantic, with notes on related genera (Crustacea). Steenstrupia 4: 131-138, 1 fig.

Just, J., 1977b. *Amphyllodomus incurvaria* gen. et sp.n. (Crustacea, Amphipoda), a remarkable leaf-cutting amphithoid from the marine shallows of Barbados. Zoologica Scripta 6: 229-332, 3 figs.

Just, J., 1978. Taxonomy, biology, and evolution of the circumarctic genus *Acanthonotozoma* (Amphipoda), with notes on *Panoploeopsis*. Acta Arctica 20: 1-140, 69 figs.

Just, J., 1980. Amphipoda (Crustacea) of the Thule area, northwest Greenland: faunistics and taxonomy. Greenland Bioscience 2: 1-61, 58 figs.

Just, J., 1981. *Tiron bellairsi* sp.n. (Amphipoda, Synopiidae) from coral sand in Barbados, with notes on behaviour. Zoologica Scripta 10: 259-263, 4 figs.

Just, J., 1983a. *Anonyx affinis* (Crust., Amphipoda: Lysianassidae), commensal in the bivalve *Musculus laevigatus*, with notes on *Metopa glacialis* (Amphipoda: Stenothoidae). Astarte 12: 69-74, 4 figs.

Just, J., 1983b. Siphonoecetinae subfam. n. (Crustacea, Amphipoda, Corophiidae) 1: Classification. Steenstrupia 9(6): 117-135, 12 figs.

Just, J., 1984a. Siphonoecetinae (Crustacea, Amphipoda, Corophiidae) 3: *Concholestes* Giles, 1888 and *Africoecetes* Just, 1983. Steenstrupia 10: 225-234, 6 figs.

Just, J., 1984b. Siphonoecetinae (Crustacea, Amphipoda, Corophiidae) 2: *Caribboecetes* Just, 1983, with description of new species. Steenstrupia 10: 37-64, 20 figs.

Just, J., 1985. Siphonoecetinae (Crustacea: Amphipoda: Corophiidae) 4: *Australoecetes* Just, 1983, including *Stebbingoecetes* n. subgen. Records of the Australian Museum 37: 325-341, 13 figs.

Kaim-Malka, R.A., 1969a. Contribution a l'etude de quelques especes du genre *Ampelisca* (Crustacea - Amphipoda) en Mediterranee. II. Tethys 1: 927-975, 23 pls.

Kaim-Malka, R.A., 1969b. Biologie et ecologie de quelques *Ampelisca* (Crustacea - Amphipoda) de la region de Marseille. Tethys 1: 977-1022, 17 figs.

Kaim-Malka, R.A., 1969c. Contribution a l'etude de certaines especes du genre *Ampelisca* (Crustacea - Amphipoda) en Mediterranee. Recueil et Travaux de la Station Marine d'Endoume, Bulletin 46, 62: 123-185, 27 pls.

Kaim-Malka, R.A., 1970. Etude des amphipodes recoltes par le navire oceanographique "JEAN CHARCOT" au cours de sa mission a Madere au mois de juillet 1966. Arquivos do Museu Bocage 2: 333-353, 2 figs.

Kaim-Malka, R.A., 1976a. Revision des *Haploops* (Crustacea, Amphipoda) de Mediterranee. Bolletino del Museo Civico di Storia Naturale, Verona 3: 269-308, 16 figs.

Kaim-Malka, R.A., 1976b. Redescription de *Byblis guernei* Chevreux 1887 (Crustacea, Amphipoda) de Mediterranee. (IV. Contribution a l'etude des Ampeliscidae). Bolletino del Museo Civico di Storia Naturale, Verona 2: 239-249, 3 pls.

Kamenskaya, O.E., 1977a. Amphipods in the fouling of hydrotechnical constructions (Sea of Japan). Biologiya Morya, Vladivostok 5: 70-75, 2 figs. [in Russian]

Kamenskaya, O.E., 1977b. Two new species of ultraabyssal amphipods from Yap Trench. Akademija Nauk SSSR, Trudy Instituta Okeanologii 108: 105-114, 4 figs. [in Russian]

Kamenskaya, O.E., 1979a. Nekotorye dannye po biologii *Jassa falcata* (Montagu) (Amphipoda, Gammaridea) v Japonskom More. Pp. 104-107. **In** P.P. Shirshov (ed.). Ecology of the Sea Shelf Benthic Fauna and Flora Akademiija Nauk SSR, Institute of Oceanology. [in Russian]

Kamenskaya, O.E., 1979b. Deep sea Amphipoda (Amphipoda, Gammaridea) collected from drifting station 'North-Pole 22'. Pp. 241-250, figs 1-4. **In** M.E. Vinogradov & I.A. Melnikov (eds)., Biologiya Tsentral'nogo Arktichestogo Bassejna. Nauk Moskva: 180 pp. [in Russian]

Kamenskaya, O.E., 1980. On feeding of Amphipoda. Techniques of analyses. Ecological investigations of the shelf. Academy of Sciences of the USSR P.P. Shirshov Institute of Oceanology 36-38. [in Russian]

Kamenskaya, O.E., 1981a. The amphipods (Crustacea) from deep-sea trenches in the western part of the Pacific Ocean. Trudy Instituta Okeanologii 115: 94-107, 4 figs. [in Russian]

Kamenskaya, O.E., 1981b. Ultraabyssal (hadal) amphipods from the trenches of the Pacific Ocean. Biology of the Pacific Ocean Depths 1: 40-43. [in Russian]

Kamihira, Y., 1977a. Occurrence of a marine gammarid (Amphipoda), genus *Haustorioides* in Japan. Researches on Crustacea 8: 37-45, 5 figs.

Kamihara, Y., 1977b. A new Species of sand-burrowing marine amphipods from Hokkaido, Japan. Bulletin of the Faculty of Fisheries Hokkaido University 28: 1-5, 5 pls.

Kamihara, Y., 1981a. Life history of sand-burrowing amphipod *Haustorioides japonicus* (Crustacea: Dogielinotidae). Bulletin of the Faculty of Fishieries of Hokkaido University 32: 338-348, 10 figs.

Kanakadurga, M.R., K.K. Rao & K. Shyamasundar, 1981. Two species of amphipods (Crustacea) from Waltair Coast sponge *Callyspongia fibrosa*. Indian Journal of Zootomy 22: 71-80, 3 figs.

Kane, J.E., 1962. Amphipoda from waters south of New Zealand. New Zealand Journal of Science 5: 295-315, 5 figs.

Kaneva-Abadzhieva, V., 1964. On the amphipod fauna of the Black Sea along the Bulgarian Coast and in the area near the Bosphorus. Bulletin de l'Institut de Pisciculture et de Pecherie, Varna 4: 73-89, 2 figs.

Kaneva-Abadzhieva, V., 1973. The amphipod fauna of the biocenosis [sic] in algal encrustment off the Bulgarian Black Sea coast. Proceedings of the Institute of Oceanography and Fisheries, Varna 12: 87-96, 6 figs. [in Bulgarian]

Kangas, M.I. & M.C. Geddes, 1984. The effects of salinity on the distribution of amphipods in the Coorong, South Australia, in relation to their salinity tolerance. Transactions of the Royal Society of South Australia 108: 139-145, 3 figs.

Kanneworff, E., 1965. Life cycle, food, and growth of the amphipod *Ampelisca macrocephala* Liljeborg from Oresund. Ophelia 2: 305-318, 5 figs.

Kanneworff, E., 1966. On some amphipod species of the genus *Haploops*, with special reference to *H. tubicola* Liljeborg and *H. tenuis* sp. nov. from the Oresund. Ophelia 3: 183-207, 8 figs, and plate 7.

Karaman, G.S., 1971a. Uber einige neue und schon bekannte Arten der Gattung *Leucothoe* (Fam. Leucothoidae) aus der Adria sowie dem Mittelmeer. Memorie del Museo Civico di Storia Naturale, Verona 19: 57-71, 6 pls.

Karaman, G.S., 1971b. Zum problem der *Seba* Arten: *Seba aloe* n.sp. und *Seba armata* (Chevreux) (Fam. *Sebidae*). Memorie del Museo Civico di Storia Naturale, Verona 19: 73-90, 7 figs.

Karaman, G.S., 1973a. The Phoxocephalidae family of the Adriatic Sea. Glasnik Republickog Zavoda za Zastitu Pirode [=Prirodnjackog Muzeja Titograd] 5: 47-101, 28 figs.

Karaman, G.S., 1973b. On some new or very interesting Amphipoda of the Adriatic Sea. Memorie del Museo Civico di Storia Naturale, Verona 20: 99-147, 19 figs.

Karaman, G.S., 1974a. Revision of the family Pardaliscidae with diagnosis of genera, distribution of species and bibliography. Acta Adriatica, Institut za Oceanografiju i Ribarstvo 15(7): 3-46.

Karaman, G.S., 1974b. Family Stegocephalidae from the Adriatic Sea. Poljoprivreda i Sumarstvo, Titograd 20: 53-65, 5 figs.

Karaman, G.S., 1975a. Two interesting amphipods from the Adriatic Sea, *Iphimedia jugoslavica,* n.sp. and *Idunella pirata* Krapp-Schickel 1975. Poljoprivreda i Sumarstvo, Titograd 21(3): 31-48, 9 figs.

Karaman, G.S., 1975b. *Ampelisca dalmatina,* n.sp., one new ampeliscid from the Adriatic Sea (Fam. Ampeliscidae). Poljoprivreda i Sumarstvo, Titograd 21: 105-112, 4 figs.

Karaman, G.S., 1975c. *Ampithoe helleri* n.sp., a new name for *Ampithoe biscuspis* Heller 1866. Glasnik Republick og Zavod Zastitu Prirode 8: 39-41.

Karaman, G.S., 1975d. The family Ampeliscidae of the Adriatic Sea. Acta Adriatica, Institut Za Oceanografiju I Ribarstvo, Split 17(3): 67 pp., 32 figs.

Karaman, G.S., 1975e. Descriptions of two new species of the genus *Ampelisca* (family Ampeliscidae), along with a redescription of *A. bouvieri* Chevreux, 1913. Beaufortia 24: 37-54, 7 figs.

Karaman, G.S., 1979a. Two new species of the genus *Idunella* Sars, 1895 (Crustacea: Amphipoda) with remarks on the other species. Proceedings of the Biological Society of Washington 92: 75-83, 3 figs.

Karaman, G.S., 1979b. *Stenocorophium bowmani,* a new genus and species of the family Corophiidae from the Palau Islands (Crustacea: Amphipoda). Proceedings of the Biological Society of Washington 92: 580-588, 5 figs.

Karaman, G.S., 1979c. New records of some gammaridean Amphipoda from the Mediterranean Sea. Poljoprivreda I Sumarstvo, Titograd 25: 47-67, 2 figs.

Karaman, G.S., 1979d. Revision of the genus *Paracorophium* Stebb. with description of *P. chelatum,* n.sp. and genus *Chaetocorophium,* n.gen. (fam. Corophiidae). Glasnik Republickog Zavoda za Zastitu Prirode 12: 87-100, 5 figs.

Karaman, G.S., 1980a. Revision of the genus *Gitanopsis* Sars 1895 with description of a new genera [sic] *Afrogitanopsis* and *Rostrogitanopsis* n.gen. (fam. Amphilochidae). Poljoprivreda i Sumarstvo, Titograd 26: 43-69, 4 figs.

Karaman, G.S., 1980b. Revision of the genus *Iphimedia* Rathke 1843 with description of two new genera, *Anisoiphimedia* and *Stegopanoploea,* n.gen. (fam. Acanthonotozomatidae). Poljoprivreda I Sumarstvo, Titograd 26: 47-72, 2 figs.

Karaman, G.S., 1980c. *Cocoharpinia iliffei,* new genus and species from Bermuda, with remarks to other genera and species (fam. Phoxocephalidae). Institute for Biological and Medical Research, Montenegro, Titograd 9-10: 149-175, 10 figs.

Karaman, G.S., 1980d. Revision of genus *Idunella* Sars with description of new species, *I. sketi,* n.sp. (fam. Liljeborgiidae). Acta Adriatica 21: 409-435, 4 figs.

Karaman, G.S., 1981a. Revision of some genera of family Corophiidae with description of three new genera. Poljoprivreda i Sumarstvo, Titograd 26(3): 3-12.

Karaman, G.S., 1981b. Redescription of *Melita planaterga* Kunkel 1910 from Bermuda Islands with revision of genera *Melita* Leach and *Abludomelita* n.gen. Poljoprivreda i Sumarstvo, Titograd 27(1): 29-50, 7 figs.

Karaman, G.S., 1981c. Revision of genus *Maerella* Chevr. 1911 with description of *Coxomaerella pirloti,* n.gen. n.sp. and *Maerella ledoyeri,* n.sp. (fam. Gammaridae). Poljoprivreda i Sumarstvo, Titograd 27(2): 37-50, 4 figs.

Karaman, G.S., 1981d. Genus *Gammarellus* Herbst and the value of its species (fam. Gammaridae). Poljoprivreda i Smarstvo, Titograd 27: 27-43, 4 figs.

Karaman, G.S., 1982a. New freshwater subterranean senus *Relictoseborgia,* n. gen. with remarks to genus *Seborgia* Bousfield (fam. Sebidae). Studia Marina 11-12: 85-94, 3 figs.

Karaman, G.S., 1982b. Gammaridae. Pp. 245-364, figs 166-243. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de l'Institut Oceanographique 13.

Karaman, G.S., 1984a. Revision of *Eriopisa*-complex of genera (Gammaridae). Poljoprivreda i Sumarstvo, Titograd 30: 39-72, 4 figs.

Karaman, G.S., 1984b. On some gammaridean Amphipoda from Sri Lanka and adjacent regions. Studia Marinam 15-16: 109-130, 5 figs.

Karaman, G.S., 1984c. *Quadrus vagabundus,* new genus and species, and revision of genus *Eriopisella* Chevr. (Gammaridea). Studia Marina 15-16: 131-148, 4 figs.

Karaman, G.S., 1985. Two new taxa of suborder Gammaridea from Asia, with remarks to some Sri Lanka's species. Poljoprivreda i Sumarstvo, Titograd 31: 15-40, 8 figs.

Karaman, G.S. & J.L. Barnard, 1979. Classificatory revisions in gammaridean Amphipoda (Crustacea), part 1. Proceedings of the Biological Society of Washington 92: 106-165.

Karaman, G.S. & J.L. Barnard, 1981. The synonymization of *Triodos* K.H. Barnard with *Ampelisca* Krøyer (Crustacea, Amphipoda). Annals of the South African Museum 84: 255-264, 3 figs.

Karaman, G.S. & S. Ruffo, 1972. Sulla presenza di *Halicreion aequicornis* (Norman) (Crustacea Amphipoda, Oedicerotidae) nel Mediterraneo. Memorie del Museo Civico di Storia Naturale, Verona 19: 477-484, 4 figs.

Karaman, G.S. & U. Schiecke, 1971. Neubeschreibung eines interessanten Mediterranen Amphipoden *Carangoliopsis spinulosa* Ledoyer 1970 (*Gammaridea, Haustoriidae*). Memorie del Museo Civico di Storia Naturale, Verona 19: 91-102, 6 figs.

Karaman, G.S. & U. Schiecke, 1973. Some interesting Amphipoda of the Pardaliscidae family (*Amphipoda, Gammaridea*) of the Adriatic and Mediterranean Seas. Memorie del Museo Civico de Storia Naturale, Verona 20: 149-168, 9 figs.

Kemp, P.F., F.A. Cole & R.C. Swart, 1985. Life history and productivity of the phoxocephalid amphipod *Rhepoxynius abronius* (Barnard). Journal of Crustacean Biology 5: 449-464, 7 figs.

Kensley, B., 1971. Amphipoda from southern Angola. The Annals of the South African Museum 57: 149-156, 5 figs.

Kensley, B., 1983. Biogeographic relationships of some southern African benthic Crustacea. Memoirs of the Australian Museum 18: 173-181, 7 figs.

Kinahan, J.R., 1861. Report of the committee appointed for 1860 to dredge Dublin Bay. Report of the Thirtieth Meeting of the British Association for the Advancement of Science: 27-31.

Kirk, T.W., 1879. Notes on some New Zealand crustaceans. Transactions and Proceedings of the New Zealand Institute 11: 401-402.

Klein, G., E. Rachor & S.A. Gerlach, 1975. Dynamics and productivity of two populations of the benthic tube-dwelling amphipod *Ampelisca brevicornis* (Costa) in Helgoland Bight. Ophelia 14: 139-159, 8 figs.

Knott, B., 1975. A new species of freshwater amphipod, *Paracalliope larai,* (family Eusiridae) From Tasmania. The Papers and Proceedings of the Royal Society of Tasmania 109: 39-52, 25 figs.

Kocatas, A., 1976. Note preliminaire sur les amphipodes recueillis dans les horizons superieurs de l'etage infralittoral, rocheux du Golfe D'Izmir (Turquie). Tethys 7: 235-240, 1 fig.

Koehler, R., 1885. Recherches sur la faune marine des Iles Anglo-Normandes. Bulletin de la Societe des Sciences de Nancy, series 2, 7(17): 51-120.

Koelbel, C., 1886. Crustaceen, Pycnogoniden und Arachnoideen von Jan Mayen gesammelt von Dr. F. Fischer.... Die Internationale Polarforschung 1882-1883/Die Osterreichische Polarstation Jan Mayen.... Beobachtungs-Ergebnisse Kaiserlichen Akademie der Wissenschaften, VI. Zoologie, series E, 3: 39-58, pls 3,4.

Koseki, T., S. Yamanouchi & K. Nagata, 1962. The post-mortem injury in the drowned dead body attacked by amphipods. Medicine and Biology 64: 74-76. [in Japanese]

Kossmann, R., 1880. Malacostraca. Zoologische Ergebnisse Auftrage Koniglichen Academie Wissenschaften Berlin Reise Kustengebiete Rothen Meeres 2: 67-140, pls 4-15.

Krapp-Schickel, G., 1968. Uber eine Zweite Mediterrane *Ampithoe* (Crustacea-Amphipoda). Memorie del Museo Civico di Storia Naturale, Verona 15: 337- 347, 4 figs.

Krapp-Schickel, G., 1969a. Drei Vertreter der Gattung *Apherusa* an der Westkuste Istriens (Crustacea-Amphipoda). Memorie del Museo Civico di Storia Naturale, Verona 16: 419-440, 5 figs.

Krapp-Schickel, G., 1969b. Zur Okologie der Amphipoden aus dem Phytal der Nordadria. Zoologische Jahrbucher Systematik 96: 265-448, 32 figs, 8 pls.

Krapp-Schickel, G., 1971. Meeresamphipoden aus Taranto. Memorie del Museo Civico di Storia Naturale di Verona 18: 343-367, 6 figs.

Krapp-Schickel, G., 1972. Ratselhafte *Hyale carinata* (Amphipoda, Crustacea). Memorie del Museo Civico di Storia Naturale, Verona 19: 177-189, 5 figs.

Krapp-Schickel, G., 1974. Camill Hellers Sammlung adriatischer Amphipoden - 1866 und Heute. Annalen der Naturhistorisches Museum, Wien 78: 319-379, 28 pls.

Krapp-Schickel, G., 1975a. Neues uber die Liljeborgiiden des Mittelmeers (Crustacea, Amphipoda). Bolletino del Museo Civico di Storia Naturale, Verona 1: 455-472, 8 figs.

Krapp-Schickel, G., 1975b. Revision of Mediterranean *Leucothoe* species (Crustacea, Amphipoda). Bollettino del Museo Civico di Storia Naturale, Verona 2: 91-118, 15 figs.

Krapp-Schickel, G., 1976a. Die Gattung *Stenothoe* (Crustacea, Amphipoda) im Mittelmeer. Bijdragen Tot de Dierkunde 46: 1-34, 25 figs.

Krapp-Schickel, G., 1976b. Marine amphipods from Pantelleria and Catania (Sicily). Bulletin Zoologisch Museum, Universiteit van Amsterdam 5: 31-45, 9 figs.

Krapp-Schickel, G., 1978. Die Gattung *Amphithoe* (Crustacea, Amphipoda) im Mittelmeer. Bijdragen Tot de Dierkunde 48: 1-15, 8 figs.

Krapp-Schickel, G., 1979. Die Formengruppe um *Apherusa bispinosa* (Bate) (Calliopiidae, Amphipoda). Bollettino de Museo Civico di Storia Naturale, Verona 5: 581-592, 5 figs.

Krapp-Schickel, G., 1982a. Family Amphithoidae. Pp. 94-110, figs 64-73. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de l'Institut Oceanographique 13.

Krapp-Schickel, G., 1982b. Family Calliopiidae. Pp. 164-178, figs 109-119. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de l'Institut Oceanographique 13.

Krapp-Schickel, G., 1982c. Family Amphilochidae. Pp. 70-93, figs 48-63. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de l'Institut Oceanographique 13.

Krapp-Schickel, G. & F. Krapp, 1975. Quelques traits de l'ecologie d'amphipodes et de pycnogonides provenant d'un Ilot Nord-Adriatique. Vie et Milieu 25B: 1-31, 5 figs.

Krapp-Schickel, G. & A.A. Myers, 1979. The Mediterranean species of *Gammaropsis* Liljeborg (Crustacea, Amphipoda). Bollettino del Museo Civico di Storia Naturale, Verona 6: 441-467, 15 figs.

Krapp-Schickel, G. & U. Schiecke, 1975. *Microjassa cumbrensis* Stebb. & Roberts [sic] im Mittelmeer. Bollettino del Museo Civico di Storia Naturale, Verona 1: 401-413, 7 figs.

Kriebohn-de-Paternoster, I. & A. Escofet, 1976. La fauna de anfipodos asociada a los bosques de *Macrocystis pyrifera* en el Chubut: *Amphithoe femorata* (Krøyer) (Ampithoidae) y *Bircenna fulva* Chilton (Eophliantidae). Physis Seccion A 35: 77-91, 2 figs, 5 pls.

Krishnan, L. & P.A. John, 1974a. Observations on the breeding biology of *Melita zeylanica* Stebbing, a brackish water amphipod. Hydrobiologia 44: 413-430, 1 fig.

Krishnan, L. & P.A. John, 1974b. Breeding biology of the amphipod *Melita zeylanica* Stebbing in a tropical monsoonal lake. Zoologischer Anzeiger 194: 328-334, 1 fig.

Krishnan, L. & P.A. John, 1975. Sex ratio of the amphipod *Melita zeylanica* Stebbing in a tropical environment. Zoologischer Anzeiger 195: 279-288, 1 fig.

Krøyer, H., 1838a. Conspectus crustaceorum Groenlandiae. Naturhistorisk Tidsskrift 2: 249-261.

Krøyer, H., 1838b. Gronlands amfipoder beskrevne af Henrik Kröyer. Det Konigelige Danske Videnskabernes Selskabs Naturvidenskabelige og Mathematiske Afhandlinger 7: 229-326, 4 pls.

Krøyer, H., 1842. Une nordiske Slaegter og Arter af Amfipodernes Orden, henhorende til Familien *Gammarina*. (Forelobigt Uddrag af et storre Arbejde). Naturhistorisk Tidsskrift 4: 141-166.

Krøyer, H., 1845. Karcinologiske Bidrag. Naturhistorisk Tidsskrift (NS) 1: 283-345, 3 pls; 403, 453-638, pls 6, 7.

Krøyer, H., 1846a. Atlas voyages de la commission scientifique du nord; en Scandinavie, en Laponie, au Spitzberg et aux Fero, pendant les annees 1838-1840, sur la corvette la Recherche, commandee par M. Fabvre. Pls 10-11, 13-20, 22-23. Paris: M. Paul Gaimard.

Krøyer, H., 1846b. Karcinologiske Bidrag (Fortsaettelse). Naturhistorisk Tidsskrift 2: 1-211, pls 1-2.

Kruger, K., 1939. Amphipodenfunde in der westlichen Ostsee. Kieler Meeresforschungen 3: 263-264.

Kudrjaschov, V.A., 1965a. Novye bidy bokoplavov semejstva Lysianassidae (Amphipoda, Gammaridea) iz Oxotskogo Morja. Zoologicheskii Zhurnal 44: 513-520, 4 figs.

Kudrjaschov, V.A., 1965b. New Gammaridea species (Amphipoda) from the North Okhotsk Sea. Zoologicheskii Zhurnal Akademia Nauk, SSSR 44: 1086-1091, 2 figs. [in Russian]

Kudrjaschov, V.A., 1965c. Novye vidy bokoplavov (Amphipoda Gammaridea) iz vostochnoi chasti Oxotskogo Morja. Zoologicheskii Zhurnal 44: 1776-1789, 10 figs.

Kudrjaschov, V.A., 1972a. Bionomical structure of the fauna of Amphipoda in the littoral zone of the Shantarskii Islands (Sea of Okhotsk). Zoologicheskii Zhurnal 51: 197-207, one unnumbered fig. [in Russian]

Kudrjaschov, V.A., 1972b. K faune i ekologii bokoplavov (Amphipoda-Gammaridea) prilivo-otlivnoi zony Kuril'skikh ostrovov (Litoral'o-vov Iturup, Urup, Simuschir, Paramuschir, [sic no closing parenthesis]. Uchenye Zapiski Dvgu 60: 79-116.

Kudrjaschov, V.A., 1972c. On a new species of *Dogielinotus* (Amphipoda) from the Sea of Okhotsk. Crustaceana, Supplement 3: 246-250, 2 figs.

Kudrjaschov, V.A., 1975. New amphipod species (Gammaridea) from the intertidal zone of Kurile Islands. Zoologicheskii Zhurnal 54: 364-371, 4 figs.

Kudrjaschov, V.A., 1979. Fauna i ekologiya raznonogikh rakoobraznykh litorali severnoi chasti Tatarskogo Proliva. Issledovanija Pelagicheskix i Donnyx Organizmov Dal'nevostochnyx Morei 15: 123-137, 3 figs.

Kudrjaschov, V.A. & N.L. Tzvetkova 1975. New and rare species of Amphipoda (Gammaridea) from the coastal waters of the South Sakhalin. Zoologicheskii Zhurnal 54: 1306-1315, 3 figs. [in Russian]

Kudrjaschov, V. & A. Yu. Zvjagintse, 1975. Amphipods [sic] Crustaceans: Composition and distribution in the fouling of natural substrates in the tidal zone of the Tauysk Gulf, the Okhotsk Sea. Transactions Institute of Marine Biology, Vladivostok 3: 137-166. [in Russian]

Kulmatycki, W.J., 1925. *Corophium curvispinum* G.O. Sars f. *devium* Wundsch dans la riviere Warta pres de Wronki. Archivium Hydrobiologie i Rybactwa Pols 1: 92-98.

Kulmatycki, W.J., 1930. O wystepowaniu *Corophium curvispinum* G.O. Sars f. *devium* Wundsch i *Carinogammarus roeselii* (Gervais) w dorzeczu noteci. Fragmenta Faunistica Muzeum Zoologiczne Polonici 1: 123-134, pl. 3 (map).

Kulmatycki, W.J., 1931a. Dalsze notatki o wystepowaniu *Corophium curvispinum* G.O. Sars f. *devium* Wundsch i *Carinogammarus roeselii* (Gervais) w Noteci. Fragmenta Faunistica Muzeum Zoologiczne Polonici 1: 289-291.

Kulmatycki, W.J., 1931b. Uber das Vorkommen von *Corophium curvispinum* G.O.Sars f. *devium* Wundsch sowie *Carinogammarus roeselii* (Gervais) im Gebiet des Notec-Flusses. Verhandlungen Internationalen Vereinigung Limnologie, Stuttgart 5: 668-675.

Kunkel, B.W., 1910. The Amphipoda of Bermuda. Transactions of the Connecticut Academy of Arts and Sciences 16: 1-116, 43 figs.

Kunkel, B.W., 1918. The Arthrostraca of Connecticut. Connecticut Geological and Natural History Survey, Bulletin, Amphipoda 26(1): 15-181, 55 figs.

Ladle, M., 1975. The Haustoriidae (Amphipoda) of Budle Bay, Northumberland. Crustaceana 28: 37-47.

Lagardere, J.P., 1968. Les crustaces de l'expedition francaise R.C.P. 42 au Spitsberg (ete 1966). Bulletin du Centre d'Etudes et de Recherches Scientifiques Biarritz 7: 155-205, 3 figs, 11 pls.

Lamarck, Le C. de, 1818. Histoire Naturelle des Animaux Sans Vertebres. Section 3: Crustaces Amphipodes; 5: 612 pp. [Amphipods: 176-184]. Paris: Deterville.

Lampitt, R.S., N.R. Merrett & M.H. Thurston, 1983. Interrelations of necrophagous amphipods, a fish predator, and tidal currents in the deep sea. Marine Biology 74: 73-78, 3 figs.

Latreille, M., 1829. Crustaces, arachnides et partie des insectes. **In** Cuvier's Le regne animal distribue d'apres son organisation 4: xxvii + 584 pp.

Latreille, P.A., 1802a. Histoire naturelle, generale et particuliere des crustaces et des insectes. 3: xii + 468 pp. Paris: F. Dufart.

Latreille, P.A., 1802b. Pp. 78. **In** L.A.G. Bosc's, Histoire naturelle des crustaces, contenant leur description et leurs moeurs, 1 and 2, 1: 148-152. Paris. [pls not seen]

Latreille, P.A., 1803. Histoire naturelle, generale et particuliere, des crustaces et des insectes. 6, 391 pp., pls 44-57. Paris: F. Dufart.

Latreille, P.A., 1806. Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimis explicata 1: xviii + 302 pp. and emendanda. Parisiis et Argentorati: Amand Koenig.

Latreille, P.A., 1810. Considerations generales sur l'ordre naturel des animaux composant les classes des crustaces, des arachnides, et des insectes; avec un tableau methodique de leurs genres, disposes en familles. Paris: F. Schoell.

Latreille, P.A., 1818. Crustaces, arachnides et insectes. Tableau Encyclopedique et Methodique des Trois Regnes de la Nature, Paris 24(6): 142 pp. + 38 pp. + 1 unnumbered page, pls 269-397.

Latreille, [P.A.], 1825. Encylopedie methodique. Histoire naturelle. Entomologie, ou histoire naturelle des crustaces, des arachnides et des insectes 10: 833 pp. Paris: Agasse. ["Book E" especially page 236]

Laubitz, D.R., 1977. A revision of the genera *Dulichia* Kroyer and *Paradulichia* Boeck (Amphipoda, Podoceridae). Canadian Journal of Zoology 55: 942-982, 20 figs, 12 maps.

Laubitz, D.R., 1979. Phylogenetic relationships of the Podoceridae (Amphipoda, Gammaridea). Bulletin of the Biological Society of Washington 3: 144-152, 2 figs.

Laubitz, D.R., 1983. A revision of the family Podoceridae (Amphipoda: Gammaridea). Memoirs of the Australian Museum 18: 77-86, 2 figs.

Lazo-Wasem, E., 1985a. Notes on the amphipod genus *Idunella* with special reference to *Idunella bowenae* Karaman, 1979. Crustaceana 50: 111-112, 1 fig.

Lazo-Wasem, E., 1985b. *Idunella smithi,* a new species of marine amphipod (Gammaridea: Liljeborgiidae) from the east coast of the United States. Proceedings of the Biological Society of Washington 98: 705-710, 3 figs.

Leach, W.E., 1814a. Crustaceology. The Edinburgh Encyclopaedia 7: 402-403.

Leach, W.F., 1814b. Crustaceology. Appendix. The Edinburgh Encyclopaedia 7: 429-434.

Leach, W.F., 1815a. The Zoological Miscellany; Being Descriptions of New, or Interesting Animals. 2, Illustrated. London: R.P. Nodder.

Leach, W.F., 1815b. A tabular view of the external characters of four classes of animals, which Linne arranged under Insecta; with the distribution of the genera composing three of these classes into orders, &c. and descriptions of several new genera and species. Transactions of the Linnean Society, London 11: 306-400.

Leach, W.F., 1819a. **In** Samouelle, Ent. Compend. [not seen, see Stebbing, 1906: 476]

Leach, W.F., 1819b. Page lxiii of: A list of invertebrate animals, discovered by his majesty's ship Isabella, in a voyage to the arctic regions. Appendix, No. II. Zoological memoranda. **In** John Ross, A Voyage of Discovery,...Baffin's Bay,...North-West Passage. London: John Murray.

Leach, W.F., 1824. Annulosa. The Encyclopedia Britannica, 6th Edition, Supplement 5: 420-426, pl. 21.

Ledoyer, M., 1967a. Amphipodes gammariens des herbiers de phanerogames marines de la region de Tulear (Republique Malgache) etude systematique et ecologique. Annales de la Faculte des Sciences de l'Universite de Madagascar 5: 121-170, 30 figs.

Ledoyer, M., 1967b. Amphipodes gammariens de quelques biotopes de substrat meuble de la region de Tulear (Republique Malgache [sic]). Etude systematique et ecologique. Annales de l'Universite de Madagascar 6: 17-62, 25 pls.

Ledoyer, M., 1968. Ecologie de la faune vagile des biotopes Mediterraneens accessibles in scaphandre autonome (Region de Marseille principalement). IV. - Synthese de

l'etude ecologique. Recueil des Travaux de la Station Marine d'Endoume Bulletin 44(60): 125-295, 24 pls.
Ledoyer, M., 1969a. Amphipodes tubicoles des feuilles des herbiers de phanerogames marines de la region de Tulear (Madagascar). Recueil des Travaux de la Station Marine Endoume, Fascicule hors Serie Supplement 9: 179-182, 2 pls.
Ledoyer, M., 1969b. Amphipodes gammariens du sediment des herbiers de phanerogames marines et des dunes hydrauliques du grand recif de Tulear (Madagascar). Etude systematique et ecologique. Recueil des Travaux Station Marine Endoume, Fasicule hors Serie Supplement 9: 183-191, 4 pls.
Ledoyer, M., 1970. Contributions a l'etude bionomique de la Mediterranee occidentale (cote du Var et, des Alpes Maritimes-cote occidentale de Corse). Les amphipodes des vases profundes des cotes Corses et Monegasques. Bulletin de l'Institut Oceanographique 69(1406): 32 pp., 5 figs.
Ledoyer, M., 1972a. Etude comparative de *Monoculodes edwardsi* Holmes, 1905, et de *Monoculodes crassirostris* Hansen, 1887 (Crustacea, Amphipoda). Bulletin du Museum National d'Histoire Naturelle Paris, series 3e, 63, Zoologie 49: 767-774, 4 figs.
Ledoyer, M., 1972b. Presence de *Perioculodes aequimanus* (Kossmann) dans les eaux Mediterraneennes (region de Marseille) et comparison avec *P. longimanus* (Bate et Westwood) (Crustacea, Amphipoda). Bulletin du Museum National d'Histoire Naturelle, Paris, series 3e(63), Zoologie 49: 775-781, 3 figs.
Ledoyer, M., 1972c. Amphipodes gammariens vivant dans les alveoles des constructions organogenes recifales intertidales de la region de Tulear (Madagascar). Etude systematique et ecologique. Tethys, Supplement 3: 165-285, 2 figs, 80 pls.
Ledoyer, M., 1973a. Etude des amphipodes gammariens des biotopes de substrats sableux et sablo-vaseux de la region de Tulear et de Nosy-Be (Madagascar). Tethys, Supplement 5: 51-94, 30 pls.
Ledoyer, M., 1973b. Amphipodes gammariens de la frondaison des herbiers d' *Enhalus* de la region de Nosy-Be (Madagascar) (systematique et ecologie) comparaison avec la faune des herbiers de Tulear (*Cymodocea, Thalassia* etc....). Tethys, Supplement 5: 25-36, 5 pls.
Ledoyer, M., 1973c. Amphipodes gammariens nouveaux ou peu connus de la region de Marseille. Tethys 4: 881-898, 13 pls.
Ledoyer, M., 1973d. Etude systematique des amphipodes recueillis a Tulear (Madagascar) lors d'une petite serie de peches a la lumiere. Comparaison avec laes phenomenes observes en Mediterranee. Tethys Supplement 5: 37-50, 6 pls, fig. 1 bis.
Ledoyer, M., 1975. *Megaluropus monasteriensis* (Crustacea, Amphipoda, Gammaridae) espece nouvelle de Mediterranee comparee a *M. agilis massiliensis* n. ssp. et a *M. agilis* Hoek. Bulletin du Museum National D'Histoire Naturelle, series 3, 336: 1305-1316, 4 figs.
Ledoyer, M., 1977. Contribution a l'etude de l'ecologie de la faune vagile profunde de la Mediterranee nord occidentale. 1, les gammariens (Crustacea, Amphipoda). Bolletino del Museo Civico di Storia Naturale, Verona 4: 321-421, 32 figs, 2 maps.
Ledoyer, M., 1978a. Contribution a l'etude des amphipodes gammariens profonds de Madagascar (Crustacea). Tethys 8: 365-382, 12 figs.
Ledoyer, M., 1978b. Amphipodes gammariens (Crustacea) des biotopes cavitaires organogenes recifaux de l'Ile Maurice (Ocean Indien). The Mauritius Institute Bulletin 8: 197-332, 43 figs.
Ledoyer, M., 1979a. Les gammariens de la pente externe du grand recif de Tulear (Madagascar) (Crustacea Amphipoda). Memorie del Museo Civico di Storia Naturale di Verona series 2, Sezione Scienze della Vita, N. 2: 1-150, 91 figs.
Ledoyer, M., 1979b. Expedition Rumphius II (1975) crustaces parasites, commensaux, ets. (Th. Monod et R. Serene, ed.). Crustaces amphipodes gammariens. Bulletin du Museum National d'Histoire Naturelle Paris, series 4, 1: 137-181, 19 figs.
Ledoyer, M., 1982a. Family Eusiridae. Pp. 233-244, figs 158-165. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de L'Institut Oceanographique 13.
Ledoyer, M., 1982b. Crustaces amphipodes gammariens familles des Acanthonotozomatidae a Gammaridae. Faune de Madagascar 59(1): 1-598, 226 figs.
Ledoyer, M., 1983. Les Oedicerotidae (Crustacea, Amphipoda) de la Mer Mediterranee. Bollettino del Museo Civico di Storia Naturale, Verona 9: 45-84, 7 figs.
Ledoyer, M., 1984. Les gammariens (Crustacea, Amphipoda) des herbiers des phanerogames marines de Nouvelle Caledonie (region des Noumea). Memoires du Museum National D'Histoire Naturelle, new series, serie A, zoologie, 129: 113 pp., 48 figs, 4 tables.
Ledoyer, M., 1986. Crustaces amphipodes gammariens. Faune de Madagascar 59(2): 599-1112, figs 227-415.
Ledoyer, M. & M. Menioui, 1983. Considerations sur la repartition du gammarien (Crustacea, Amphipoda) *Jassa falcata* (Montagu, 1808). Bulletin de l'Institut Scientifique, Rabat 7: 93-114, 6 figs, 1 table.
Lee, S.W. & L.B. Trott, 1973. Marine succession of fouling organisms in Hong Kong, with a comparison of woody substrates and common, locally-available antifouling paints. Marine Biology 20): 101-108, 3 figs.
Le Gall, J.-Y., 1969. Etude de l'endofaune des pelouses de zosteracees superficielles de la Baie de Castiglione (cotes d'Algerie). Tethys 1: 395-420.
Legrand, see Charniaux-Legrand
Legueux, M.L., 1924. Sur deux especes de gammarides (crustaces amphipodes) du canal de Caen a la mer. Bulletin de la Societe Linneenne de Normandie, series 7, 7: 41-42.
Legueux, M.L., 1925. *Leptocheirus cornuaurei*. Rectification synonymique. Bulletin de la Societe Linneenne de Normandie, series 7, 7: 50-51.
Legueux, M.L., 1926a. Les corophies (crustaces amphipodes) du canal de Caen a la mer. Bulletin de la Societe Linneenne de Normandie, series 7, 8: 93-94.
Legueux, M.L., 1926b. Etude de la ponte chez un amphipode (*Melita pellucida* G.O. Sars). Variation du nombre et de la taille des oeufs. Bulletin Biologique de la France et de la Belgique 60: 334-342, 1 fig.
Lepechin, I., 1780. Tres oniscorum species descriptae. Acta Academiae Scientiarum Imperialis Petropolitanae, 1778: [pp. unknown] [not seen, see Stebbing, 1888].
Lepehne, O., 1924. *Corophium curvispinum*,.. in Ostpreussen. Schriften der Physikalisch-Okonomischen Gesellschaft zu Konigsberg 64: 61.
LeRoux-Legueux, M., 1927. Crustaces amphipodes de Normandie (formes marines d'eau saumatre et d'eau douce). Ire contribution. Bulletin de la Societe Linneenne de Normandie, series 7, 9: 34-43.
LeRoux-Legueux, M., 1928a. Sur quelques points de la reproduction chez les crustaces amphipodes: les sacs

ovigeres temporaires, leur formation, leur role. Academie des Sciences de Paris, Comptes Rendus 187: 852-854, 2 figs.

LeRoux-Legueux, M., 1928b. Crustaces amphipodes de Normandie (formes marines d'eau saumatre et d'eau douce). 2me liste. Bulletin de la Societe Linneenne de Normandie, series 7, 10: 101-105.

Lessona, M., 1865. Sopra due nuove specie di animali invertebrati raccolte nel Golfo di Genova. Atti della Societa Italiana di Scienze Naturali 8: 423-428.

Lewis, S.M. & B. Kensley, 1982. Notes on the ecology and behaviour of *Pseudamphithoides incurvaria* (Just) (Crustacea, Amphipoda, Ampithoidae). Journal of Natural History 16: 267-274, 4 figs.

L'Hardy, J.-P. & J.-P. Truchot, 1964. Description d'*Uncinotarsus pellucidus* nov. gen., nov. sp., nouvel amphipode gammarien mesopsammique de la famille des Aoridae. Bulletin de la Societe Zoologique de France 89: 125-135, 4 figs.

Lichtenstein, H., 1822. Pp. 31-37. **In** M.W. Mandt, Observationes in historiam naturalem et anatomiam comparatam in itinere Groenlandico factae. Dissertatio inauguralis quam consensu et auctoritate gratiosi micorum ordinis in universitate literaria berolinensi ut summi in medicina et chirurgia honores rite sibi concedantur die XXII. M. Julii A MDCCCXXII H.L.Q.S., publice defendet auctor martinus Guilelmus Mandt Beyenburgensis. (opponentibus: J.th. v. Brandt Med. Cd., J Ollenroth Med. Cd., E. Gabler Med Cd.; Formis Brueschckianis). antecedent pp. + 1-40.

Liljeborg, V. [or W.], 1851a. Bidrag till Norra Rysslands och Norriges fauna, samlade under en vetenskaplig Resa i dessa Lander 1848. Kongliga Svenska Vetenskaps-Akademiens Handlingar, series 3, 2: 233-341, pls 19-20.

Liljeborg, V. [or W.], 1851b. Bidrag till den hognordiska Hafsfaunan. Ofversigt af Kongliga [Svenska] Vetenskaps-Akademiens Forhandlingar 7: 82-88.

Liljeborg, V. [or W.], 1852a. 1. Hafs-Crustaceer vid Kullaberg. Ofversigt af Kongliga Vetenskaps-Akademiens Forhandlingar 9: 1-13.

Liljeborg, V. [or W.], 1852b. Norges Crustaceer. Oversigt af Konglelige Vetenskaps-Akademiens Forhandlingar, Attonde Argangen 8: 19-25.

Liljeborg, V. [or W.], 1856. Om Hafs-Crustaceer vid Kullaberg i Skane. Ofversigt af Kongliga Vetenskaps-Akademien Forhandlingar 12: 117-138.

Liljeborg, V. [or W.], 1865a. Bidrag till kannedomen om underfamiljen *Lysianassina* inom underordningen *Amphipoda* bland kraftdjuren. ["Nova Acta Regiae Societatis Scientiarum Upsaliensis III Serie"] [journal title from Stebbing, 1888, only an unattributed reprint seen]

Liljeborg, V. [or W.], 1865b. On the *Lysianassa magellanica* H. Milne Edwards, and on the Crustacea of the suborder *Amphipoda* and subfamily *Lysianassina* found an [sic] the coast of Sweden and Norway. Nova Acta Regiae Societatis Scientiarum Upsaliensis, series 3, 6: 1-38, 5 pls.

Lincoln, R.J., 1976. A new species of *Amphithoe* (*Pleonexes*) (Amphipoda: Amphithoidae) from the north-east Atlantic with a redescription of *A.* (*P.*) *gammaroides* (Bate). Bulletin of the British Museum Natural History (Zoology) 30: 229-241, 7 figs.

Lincoln, R.J., 1979a. British Marine Amphipoda: Gammaridea, v-vvi + 658 pp., 280 figs, 3 pls. London: British Museum (Natural History).

Lincoln, R.J., 1979b. A new species of *Lysianassa* Milne-Edwards (Amphipoda: Lysianassidae) from the Channel Isles. Journal of Natural History 13: 251-255, 3 figs.

Lincoln, R.J., 1985. Morphology of a calceolus, an antennal receptor of gammaridean Amphipoda (Crustacea). Journal of Natural History 19: 921-927, 3 figs.

Lincoln, R.J. & D.E. Hurley, 1981. The calceolus, a sensory structure of gammaridean amphipods (Amphipoda: Gammaridea). Bulletin of the British Museum of Natural History (Zoology) 40: 103-116, 4 figs.

Lincoln, R.J. & M.H. Thurston, 1983. *Valettietta*, a new genus of deep-sea amphipod Gammaridea, Lysianassidae) with descriptions of two new species from the north Atlantic Ocean. Bulletin of the British Museum of Natural History (Zoology) 44: 85-101, 10 figs.

Lindstrom, G., 1855. Bidrag till kannedomen om Ostersjons Invertebrat-fauna. Kongl. [sic] Vetenskaps-Akademiens Forhandlingar 12: 49-73, pl. 2.

Linnaeus, C., 1758. Systema Naturae. Editio Decima, Tomus I. Holmiae [Stockholm]: Laurentii Salvii.

Linnaeus, C., 1761. Fauna Svecica sistens animalia Sveciae regni: mammalia, aves, amphibia, pisces, insecta, vermes. Edn 2: prefacial pp. plus 1-559, appendix.

Linnaeus, C., 1767. Systema Naturae. Editio Duodecima Reformata, Tomus I. Pars II. Holmiae [Stockholm]: Laurentii Salvii.

Linnaeus, C., 1789. See W.N. Villers, 1789.

Lockington, W.N., 1877. Description of seventeen new species of Crustacea. Proceedings of the California Academy of Sciences 7: 41-48.

Loven, P.-M., 1934. Zur Kenntnis einiger Amphipoden und Isopoden im Oresund. Undersokn. Over Oresund. Kungliga Fysiografiska Sallskapets i Handlingar, new series, 45(2): 14 pp., 4 figs.

Loven, S., 1861. Om nagra i Vetern och Venern funna Crustaceer. Ofversigt af Kongliga Vetenskaps-Akademien Forhandlingar, 1861 18(6): 285-314.

Lowry, J.K., 1972. Taxonomy and distribution of *Microprotopus* along the east coast of the United States (Amphipoda, Isaeidae). Crustaceana, Supplement 3: 277-286, 7 figs.

Lowry, J.K., 1974a. Key and checklist to the gammaridean amphipods of Kaikoura. Mauri Ora 2: 95-130, 14 figs.

Lowry, J.K., 1974b. A new species of the amphipod *Biancolina* from the Sargasso Sea. Transactions of the American Microscopical Society 93: 71-78, 35 figs.

Lowry, J.K., 1976. *Neoxenodice cryophile*, a new podocerid from the Ross Sea, Antarctica (Amphipoda). Crustaceana 30: 98-104, 19 figs.

Lowry, J.K., 1979. New gammariden Amphipoda from Port Pegasus, Stewart Island, New Zealand. New Zealand Journal of Zoology 6: 201-212, 8 figs.

Lowry, J.K., 1981a. A redescription of *Sphaerophthalmus grobbeni* Spandl based on type material from the Red Sea and new material from the Great Barrier Reef (Amphipoda, Dexaminidae). Crustaceana 41: 190-198, 5 figs.

Lowry, J.K., 1981b. The amphipod genus *Cerapus* in New Zealand and Subantarctic waters (Corophioidea, Ischyroceridae). Journal of Natural History 15: 183-211, 17 figs.

Lowry, J.K., 1982. The status of the gammaridean Amphipoda collected by the Australasian Antarctic Expedition 1911-1914. Crustaceana 42: 319-320.

Lowry, J.K., 1984a. *Maxillipius commensalis* a second species in the family Maxillipiidae from Papua New Guinea (Amphipoda, Gammaridea). Crustaceana 46: 195-201, 3 figs.

Lowry, J.K., 1984b. Systematics of the pachynid group of lysianassoid Amphipoda (Crustacea). Records of the Australian Museum 36: 51-105, 42 figs.

Lowry, J.K., 1985. Two new species of *Cerapus* from Samoa and Fiji (Crustacea: Amphipoda: Ischyroceridae). Records of the Australian Museum 36: 157-168, 10 figs.

Lowry, J.K., 1986. The callynophore, a eucaridian/peracaridan sensory organ prevalent among the Amphipoda (Crustacea). Zoolgica Scripta 15: 333-349, 14 figs.

Lowry, J.K. & S. Bullock, 1976. Catalogue of the marine gammaridean Amphipoda of the Southern Ocean. Royal Society of New Zealand, Bulletin 16: iv + 187 pp., 3 figs.

Lowry, J.K. & G.D. Fenwick, 1982. *Rakiroa,* a new amphipod genus from the Snares, New Zealand (Gammaridea, Corophiidae). Journal of Natural History 16: 119-125, 3 figs.

Lowry, J.K. & G.D. Fenwick, 1983. The shallow-water gammaridean Amphipoda of the subantarctic islands of New Zealand and Australia: Melitidae, Hadziidae. Journal of the Royal Society of New Zealand 13: 201-260, 28 figs.

Lowry, J.K. & G.C.B. Poore, 1985. The ampeliscid amphipods of south-eastern Australia (Crustacea). Records of the Australian Museum 36: 259-298, 30 figs.

Lowry, J.K. & S. Ruffo, 1984. The rediscovery of *Lysianassa costae* H. Milne Edwards from the Gulf of Naples. Bolletino Museo Civico Storia Naturale, Verona 2: 205-216, 5 figs.

Lowry, J.K. & H.E. Stoddart, 1983a. The shallow-water Gammaridean Amphipoda of the subantarctic islands of New Zealand and Australia: Lysianassoidea. Journal of the Royal Society of New Zealand 13: 279-394, 78 figs.

Lowry, J.K. & H.E. Stoddart, 1983b. The amphipod genus *Parawaldeckia* in New Zealand waters (Crustacea, Lysianassoidea). Journal of the the Royal Society of New Zealand 13: 261-277, 13 figs.

Lowry, J.K. & H.E. Stoddart, 1984a. Redescriptions of Schellenberg's type of *Lysianopsis subantarctica* and *Paralysianopsis odhneri* (Amphipoda, Lysianassidae). Crustaceana 47: 98-108, 6 figs.

Lowry, J.K. & H.E. Stoddart, 1984b. Taxonomy of the lysianassoid genera *Phoxostoma* K.H. Barnard, *Conicostoma* Lowry & Stoddart, and *Ocosingo* J.L. Barnard (Amphipoda, Gammaridea). Crustaceana 47: 192-208, 11 figs.

Lowry, J.K. & H.E. Stoddart, 1986. Protandrous hermaphrodites among the lysianassoid Amphipoda. Journal of Crustacean Biology 6: 742-748, 3 figs.

Lucas, H., 1842. Histoire naturelle des crustaces des arachnides et des myriapodes,.... 601 pp., pls 1, 1-7, 1-20, 1-13, 1-3, 1, 1. Paris.

Lucas, H., 1846. Les amphipodes. Histoire naturelle des animaux articules, premiere partie crustaces, arachnides, myriapodes et hexapodes. Exploration scientifique de l'Algerie pendant les annees 1840, 1841, 1842, pp. 51-56, pl. 5. Paris.

Lütken, C., 1875. The Crustacea of Greenland. Pp. 146-164. **In** T.R. Jones (ed.). Manual of the Natural History, Geology, and Physics of Greenland and the Neighboring Regions. London: Admiralty.

Maccagno, T.P., 1936. Crostacei di Assab decapodi stomatopodi anfipodi. Spedisione del Barone Raimondo Franchetti in Dancalia (1928-29). Annalia Museo Civico di Storia Naturale, Genova 59: 171-186.

Macdonald, J.D., 1875. On the external anatomy of *Tanais vitatus,* occurring with *Limnoria* and *Chelura terebrans* in excavated pier-wood. Transactions of the Linnean Society of London, Zoology, series 2, 1: 67-71, pl. 15.

MacDonald, R., 1939. The marine Crustacea of Ardglass Harbour. Annals and Magazine of Natural History, series 11, 3: 632-635.

MacDonald, R., 1951a. The Crustacea, Amphipoda, of Belfast nd Strangford Lochs. Annals and Magazine of Natural History, series 12, 4: 280-288.

MacDonald, R., 1951b. The marine fauna. Part III. Arthropoda and plankton. Pp. 86-92. **In** MacDonald and McMillan's, The Natural History of Lough Foyle, North Ireland. Proceedings of the Royal Irish Academy 54B.

MacDonald, R., 1953. The Marine Crustacea, Amphipoda of the counties Antrim and Londonderry. Annals and Magazine of Natural History, series 12, 6: 282-285.

Macnae, W., 1953. On a small collection of amphipods from Tristan da Cunha. Proceedings of the Zoological Society of London 122: 1025-1033, unnumbered fig.

MacQuart-Moulin, C., 1968. Les Amphipodes bentho-planctoniques du Golfe de Marseille analyse des captures faites du cours de peches planctoniques nocturnes regulieres (annees 1963-1964). Recueil des Travaux de la Station Marine d'Endoume 43(59): 311-332.

Maitland, R.T., 1876. Determinatie der Dieren, Beschreven en afgebeeld in de Werken van Job Baster en Martinus Slabber. Tijdschrift der Nederlandsche Dierkundige Vereeniging 2: 7-15.

Malm, A.W., 1871. Om tva for Vetenskapen nya Amfipod-Species fran Bohuslan, af Hvilka det Ena ar Typ for ett nytt Genus inom Pontoporeinernas Grupp. Ofversigt af Kongliga Vetenskaps-Akademien Forhandlingar, 1870, 27: 543-548, pl. 5.

Mann, F.G., 1948. Biologia de la Antartica Suramericana. Estudios realizados durante la Expedicion Antartica Chilena, 1947. Instituto de Geografia de la Universidad de Chile Republica 517, Publicacion N. 2, 364 pp., figs.

Mann, F.G., 1899. Paper cited by Stock, 1968, in reality is Chevreux, 1899; name "E. March" refers to antecedent paper in same journal.

Marcusen, J., 1867. Zur Fauna des Schwarzen Meeres. Vorlausige Mittheilung. Archiv fur Naturgeschichte 33-1: 357-363.

Margulis, R.J., 1963. Additions to the Amphipoda Gammaridea of the Sea of Okhotsk. Crustaceana 5: 161-175, 7 figs.

Margulis, R.J., 1967. Deep-Sea Ampeliscidae (Amphipoda, Gammaridea) from the Pacific Ocean. Crustaceana 13: 299-309, 5 figs.

Margulis, R.J., 1968. Ampeliscidae (Amphipoda, Gammaridea) severozapadnoi chasti yozhno-kitaiskogo morja. Zoologicheskii Zhurnal 47: 1479-1488, 4 figs.

Marine Biological Association of the United Kingdom, 1931. Plymouth Marine Fauna. Second Edn. Being Notes of the Local Distribution of Species Occurring in the Neighbourhood. 371 pp. Plymouth: Marine Biological Association of the United Kingdom.

Marine Biological Association of the United Kingdom, 1957. Plymouth Marine Fauna. Third Edn. 457 pp. Plymouth: Marine Biological Association of the United Kingdom.

Marion, A.F., 1883a. Considerations sur les faunes profondes de la Mediterranee d'apres les dragages operes au large des cotes meridionales de France. Annales du Musee d'Histoire Naturelle de Marseille, Zoologie 1: 1-50.

Marion, A.F., 1883b. Esquisse d'une topographie zoologique du Golfe de Marseille. Annales du Musee d'Histoire Naturelle de Marseille, Zoology, Memoire 1: 1-108.

Marques, J.C. & D. Bellan-Santini, 1985. Contribution a l'etude systematique et ecologique des amphipodes (Crustacea-Amphipoda) des cotes du Portugal. Premier inbentaire des especes (gammariens et caprelliens). Ciencia Biologia Ecologia Systematica, (Portugal) 5: 299-353.

Marshall, N.B., 1948. Continuous plankton records: Zooplankton (other than Copepoda and young fish) in the North Sea, 1938-1939. Hull Bulletins of Marine Ecology 2: 173-213, pls 89-108.

Massey, A.L., 1912. Report of a survey of trawling grounds on the coasts of counties Down, Louth, Meath and Dublin. Part III. Invertebrate Fauna. Fisheries, Ireland, Scientific Investigations, 1911 1: 225 pp., 2 pls.

Mateus, A. & E. Mateus, 1962. Une nouvelle espece d'*Hyale* (Amphipoda) de la Mediterranee. Vie et Milieu 12: 595-603, 5 figs.

Mateus, A. & E. de O. Mateus, 1965. La validite de l'espece *Hyale gulbenkiani* (Amphipoda). Publicacion Instituto de Zoologia "Dr. Augusto Nobre", Faculdade Ciencias do Porto 95: 9-23, 2 figs, 2 pls.

Mateus, A. & E. de O. Mateus, 1966. Amphipodes littoraux de Principe et de Sao Tome. Annales de L'Institut Oceanographique, Paris 44: 173-198, 13 figs.

Mateus, E. de O. & O. Afonso, 1974. Etude d'une collection d'*Amphipoda* des Acores avec la description d'une nouvelle espece. Publicacion Instituto de Zoologia "Dr. Augusto Nobre", Faculdade Ciencias do Porto 126: 1-39, 28 figs.

Mawatari, S., 1950. Biological and industrial study of marine borer problem in Japan. Studies on the Aquatic Animals of Japan 1: 9-12, 45-124, 1 pl., 30 figs.

McCain, J.C., 1969. A new species of deep sea amphipod (Gammaridea) belonging to the genus *Runanga*. New Zealand Journal of Marine and Freshwater Research 3: 17-19, 1 fig.

McCain, J.C., 1971. A new deep-sea species of *Epimeria* (Amphipoda, Paramphithoidae) from Oregon. Crustaceana 20: 159-166, 3 figs.

McCloskey, L.R., 1970. A new species of *Dulichia* (Amphipoda, Podoceridae) commensal with a sea urchin. Pacific Science 24: 90-98, 18 figs.

McDougall, K.D., 1943. Sessile marine invertebrates of Beaufort, North Carolina. A study of settlement, growth, and seasonal fluctuations among pile-dwelling organisms. Ecological Monographs 13: 321-374, 19 figs.

McGrath, D., 1978. *Stenula latipes* (Chevreux and Fage) (Crustacea: Amphipoda) associated with the hermit crab *Pagurus bernhardus* (L.), New to the British Fauna. Irish Naturalists Journal 19: 196-197.

McGrouther, M.A., 1983. Comparison of feeding mechanisms in two intertidal gammarideans, *Hyale rupicola* (Haswell) and *Paracalliope australis* (Haswell) (Crustacea: Amphipoda). Australian Journal of Marine and Freshwater Research 34: 717-726, 12 figs.

McIntosh, W.C., 1874. On the invertebrate marine fauna and fishes of St. Andrews. [continued from page 207]. Annals and Magazine of Natural History, series 4, 14: 258-274.

McIntosh, W.C., 1908. On the perforations of marine animals. The Zoologist, series 4, 12: 41-60.

McKinney, L.D., 1978. Amphilochidae (Crustacea: Amphipoda) from the western Gulf of Mexico and Caribbean Sea. Gulf Research Reports 6: 137-143, 4 figs.

McKinney, L.D., 1979. Liljeborgiid amphipods from the Gulf of Mexico and Caribbean Sea. Bulletin of Marine Science 29: 140-154, 8 figs.

McKinney, L.D., 1980a. Four new and unusual amphipods from the Gulf of Mexico and Caribbean Sea. Proceedings of the Biological Society of Washington 93: 83-103, 9 figs.

McKinney, L.D., 1980b. The genus *Photis* (Crustacea: Amphipoda) from the Texas Coast with the description of a new species, *Photis melanicus*. Contributions in Marine Science 23: 57-61, 1 fig.

McKinney, L.D. & J.L. Barnard, 1977. A new marine genus and species of the *Nuuanu*-group (Crustacea, Amphipoda) from the Yucatan Peninsula. Proceedings of the Biological Society of Washington 90: 161-171, 3 figs.

McKinney, L.D., R.D. Kalke & J.S. Holland, 1978. New species of amphipods from the western Gulf of Mexico. Contributions in Marine Science 21: 133-159, 10 figs.

Meador, J.P. & T.M.C. Present, 1985. *Orchomene limodes*, new species, a scavenging amphipod from Scripps Canyon, California: Species description and analysis of morphological variation. Journal of Crustacean Biology 5: 523-538, 3 figs.

Mednikov, B.M., 1960. Review of the genus *Pseudalibrotus* Della-Valle (Amphipoda) in marine waters of the far east. Biologicheskie Nauki, Moskva 3: 10-13. [in Russian]

Medwedema, 19??. Ueber die Einfluss v. Salzen...*Corophium curvispinum* G.O. Sars, [Arbeiten Biol. Wolga Sta.] Saratovskii Nizhne-Volzhskii Institut Kraevedeniia volzhskanaia Biolochiseskaia Stantsiia Raboty 13: 67-106. [Source: Sexton Library, not seen]

Meek, A., 1901. The Marine Amphipoda of Northumberlnad. Durham, England, University, King's College - Dove Marine Laboratory, Northumberland Sea Fisheries Committee, Report of Scientific Investigation 1901: 54-60.

Meinert, F., 1877. Crustacea Isopoda, Amphipoda et Decapoda Daniae: Fortegnelse over Danmarks isopode, amphipode og decapode krebsdyr. Naturhistorisk Tidsskrift 11: 57-248.

Meinert, F., 1893. Crustacea Malacostraca. Det Videnskabelige Udbytte af Kanonbaaden "Hauchs" Togter i de Danske Have Indenfor Skagen i AArene 1883-86...C.G. Joh. Petersen....Copenhagen, pp. 147-232, 2 pls.

Mercier, M.L., 1920. Variation de place chez *Corophium volutator* (Pall.). Comptes Rendus Academie des Sciences Paris 170: 410-412.

Metzger, A., 1871. Die wirbellosen Meeresthiere der ostfriesischen Kuste. Jahresbericht der Naturhistorischen Gesellschaft zu Hannover 21: 20-34.

Metzger, A., 1875. Crustaceen aus den Ordnungen Edriophthalmata und Podophthalmata. V. Zoologische Ergbnisse der Nordseefahrt vom 21. Juli bis 9. September 1872. Jahresbericht der Commission zur Wissenschaftlichen Untersuchung der Deutschen Meere in Kiel fur die Jahre 1872.1873 [sic] II. und III. Jahrgang. pp. 277-309, figs 7-10, pl. 6.

Meyer, K.O., 1953. Der Flohkrebs *Hyale nilssoni* im Jade-Gebiet. Natur und Volk 83: 319-322, 3 figs.

Miers, E.J., 1875a. Descriptions of three additional species of Crustacea from Kerguelen's Land and Crozet Island, with remarks upon the genus *Paramoera*. Annals and Magazine of Natural History, series 4, 16: 115-118.

Miers, E.J., 1875b. Descriptions of new species of Crustacea collected at Kerguelen's Island by the Rev. A.E. Eaton. Annals and Magazine of Natural History, series 4, 16: 73-76.

Miers, E.J., 1876. Catalogue of the Stalk- and Sessile-Eyed Crustacea of New Zealand. 136 pp., 3 pls. London: Colonial Museum and Geological Survey Department.

Miers, E.J., 1877a. List of the species of Crustacea collected by the Rev. A.E. Eaton at Spitzbergen in the summer of 1873, with their localities and notes. Annals and Magazine of Natural History, series 4, 19: 131-140.

Miers, E.J., 1877b. Report on the Crustacea collected by the naturalists of the Arctic Expedition in 1875-76. Annals and Magazine of Natural History, series 4, 20: 96-110, pls 3-4.

Miers, E.J., 1877c. Report on the Crustacea collected by the naturalists of the Arctic Expedition in 1874-76. Annals and Magazine of Natural History, series 4, 20: 52-66, 96-110 pls 3 and 4.

Miers, E.J., 1878. Crustacea. Appendix 7, Volume II. In H.W Feilden (ed.). Narrative of a Voyage to the Polar Sea During 1875-6 in H.M. Ship 'Alert' and 'Discovery'. viii

+ 378 pp. London: Sampson Low, Marston, Searle and Rivington. [Amphipoda, pp. 240-248, pls 2-3.]

Miers, E.J., 1879. Crustacea. Philosophical Transactions of the Royal Society of London, 168 (extra volume): 200-214, 485-496, pl. 11, figs 1-9.

Miers, E.J., 1880. On a small collection of Crustacea made by Edward Whymper, Esq., chiefly in the N. Greenland seas; with an appendix on additional species collected by the late British Arctic Expedition. Journal of the Linnean Society of London, Zoology 15: 59-73.

Miers, E.J., 1881a. On a small collection of Crustacea and Pycnogonida from Franz-Josef Land, collected by B. Leigh Smith, Esq. Annals and Magazine of Natural History, series 5, 7: 45-51, pl. 7.

Miers, E.J., 1881b. VI. Crustacea, 1. Account of the zoological collection made during the survey of H.M.S. 'Alert' in the Straits of Magellan and on the coast of Patagonia. Proceedings of the Zoological Society of London 1881: 61-79. [Only an incidental allusion to the Amphipoda]

Miers, E.J., 1884. Crustacea. Report on the Zoological Collections Made in the Indo-Pacific Ocean During the Voyage of H.M.S. 'Alert' 1881-2. Pp. 178-322, 513-575, pls 18-34, 46-52. London: British Museum.

Miller, R.C., 1924. Wood-boring Crustacea from Hawaii and Samoa. University of California Publications in Zoology 26: 159-164, pls 12, 13.

Mills, E.L., 1961. Amphipod crustaceans of the Pacific Coast of Canada, I. Family Atylidae. National Museum of Canada Bulletin 172: 13-33, 4 figs.

Mills, E.L., 1962a. A new species of Liljeborgiid amphipod with notes on its biology. Crustaceana 4: 158-162, 2 figs.

Mills, E.L., 1962b. Amphipod crustaceans of the Pacific Coast of Canada. II. Family Oedicerotidae. Natural History Papers National Museum of Canada 15: 1-21, 6 figs.

Mills, E.L., 1963. A new species of *Ampelisca* (Crustacea: Amphipoda) from eastern North America, with notes on other species of the genus. Canadian Journal of Zoology 41: 971-989, 5 figs.

Mills, E.L., 1964a. *Ampelisca abdita,* a new amphipod crustacean from eastern North America. Canadian Journal of Zoology 42: 559-575, 5 figs.

Mills, E.L., 1964b. Noteworthy Amphipoda (Crustacea) in the collection of the Yale Peabody Museum. Postilla, Yale Peabody Museum of Natural History 79: 1-41, 6 figs.

Mills, E.L., 1965. The zoogeography of North Atlantic and North Pacific ampeliscid amphipod crustaceans. Systematic Zoology 14: 119-130, 1 fig.

Mills, E.L., 1967a. A reexamination of some species of *Ampelisca* (Crustacea: Amphipoda) from the east coast of North America. Canadian Journal of Zoology 45: 635-652, 4 figs.

Mills, E.L., 1967b. The biology of an ampeliscid amphipod crustacean sibling species pair. Journal of the Fisheries Research Board of Canada 24: 305-355, 7 figs.

Mills, E.L., 1967c. Deep-sea Amphipoda from the western North Atlantic Ocean I. Ingolfiellidea and an unusual new species in the gammaridean family Pardaliscidae. Canadian Journal of Zoology 45: 347-355, 2 figs.

Mills, E.L., 1971. Deep-sea Amphipoda from the western North Atlantic Ocean. The family Ampeliscidae. Limnology and Oceanography 16: 357-386, 13 figs.

Mills, E.L., 1972a. T.R.R. Stebbing, the *Challenger* and knowledge of deep-sea Amphipoda. Proceedings of the Royal Society of Edinburgh 72: 69-87.

Mills, E.L., 1972b. Amphipods and equipoise. A study of T.R.R. Stebbing. Connecticut Academy of Arts and Sciences. Transactions 44: 239-256.

Mills, E.L., 1976a. T.R.R. Stebbing. A bibliography with biographic notes. Biological Journal of the Linnean Society 8: 57-74, 1 pl.

Mills, E.L., 1976b. Biography on Stebbing, Thomas Roscoe Rede. Dictionary of Scientific Biography 12: 8-9.

Mills, E.L., 1980. One "different kind of gentlemen": Alfred Merle Norman (1831-1918), invertebrate zoologist. Zoological Journal of the Linnean Society 68: 69-98.

Milne, A., 1940a. Some ecological aspects of the intertidal area of the estuary of the Aberdeenshire Dee. Transactions of the Royal Society of Edinburgh 60: 107-139, 7 figs, 2 pls.

Milne, A., 1940b. The ecology of the Tamar Estuary IV. The distribution of the fauna and flora on buoys. Journal of the Marine Biological Association of the United Kingdom 24: 69-87, 2 figs.

Milne Edwards, H., 1830. Extrait de recherches pour servir a l'histoire naturelle des crustaces amphipodes. Annales des Sciences Naturelles 20: 353-399, pls 10, 11 [pls not in Smithsonian volume]

Milne Edwards, H., 1837. Le troisieme ordre des crustaces. Les amphipodes (Amphipoda) In Georges Cuvier's Le Regne Animal distribue d'apres son organisation, pour servir de base a l'histoire naturelle des animaux successeurs de Crochard. Pp. 169-183, pls 58-61. Paris: Fortin, Masson et Cie.

Milne Edwards, H., 1838. Pp. 308-317. **In** J.B.P.A. de Lamarck's Histoire naturelle des animaux sans vertebres Deuxieme Edition. [Revue et augmentee de notes preesentant les faits nouveaux dont la science s'est enrichie jusqu' a ce jour; par MM.G.P. Deshayes et H. Milne-Edwards.] Volume cinquieme. Arachnides, crustaces, annelides, cirrhipedes. Paris: J.B. Bailliere.

Milne Edwards, H., 1840. Histoire naturelle des crustaces, comprenant l'anatomie, la physiologie et la classification de ces animaux. 3: 638 pp., 42 pls [for all volumes], [Gammaridea: 11-70, pls 29, 30]. Paris: Roret.

Milne Edwards, H., 1848. Sur un crustace amphipode, remarquable par sa grande taille. Annales des Sciences Naturelles. Partie Zoologique, series 3, 9: 398.

Mohr, J.L. & J.A. LeVeque, 1948. Occurrence of *Conidophrys pilisuctor* on *Corophium acherusicum* in Californian waters. Journal of Parasitology 34: 253.

Mohr, J.L., D.J. Reish, J.L. Barnard, R.W. Lewis & S.R. Geiger, 1961. The marine nature of Nuwuk Lake and small ponds of the peninsula of Point Barrow Alaska. Arctic [Journal of the Arctic Institute of North America] 14: 210-223, 7 figs.

Molander, A.R., 1930. Animal communities on soft bottom areas in the Gullmar Fjord. Kristinebergs Zoologiska Station 1877-1927, 2: 1-90.

Monod, T., 1923. Notes carcinologiques. (Parasites et commensaux). Bulletin de l'Institut Oceanographique 427: 23, 8 figs.

Monod, T., 1926. Tanaidaces, isopodes et amphipodes. Resultats du Voyage de la Belgica en 1897-99... Rapports Scientifiques... Zoologie: 1-67, 61 figs.

Monod, T., 1931. Faune de l'appontement de l'administration a Port-Etienne (Afrique Occidentale Francaise). Bulletin de la Societe Zoologique de France 55: 489-501, 8 figs.

Monod, T., 1935. Crustaces. II. - Enumeration systematique des especes. Contribution a l'etude faunistique de la reserve naturelle du Manampetsa (Madagascar). Annales des Sciences Naturelles, Zoologie series 10, 18: 449-466, figs 9-20.

Monod, T., 1937. I Crustaces. Missions A. Gruvel dans le Canal de Suez. Memoires a L'Institut D'Egypte 34: 1-19.

11 figs.
Monod, T., 1938. Sur une localite nouvelle d'*Eriopisa seurati* H., Gauthier, 1936. Bulletin de la Societe Zoologique de France 63: 244-247, 3 figs.
Monod, T., 1939. Sur quelques crustaces de la Guadeloupe (Mission P. Allorge, 1936). Bulletin du Museum d'Histoire Naturelle, series 2, 11: 557-568, 11 figs.
Monod, T., 1951. Sur quatre crustaces de la Lagune Ebrie (Cote d'Ivoire). Ministerio das Colonias Junta de Investigacoes Coloniais, Lisboa, Conferencia Internacional dos Africanistas Occidentais em Bissau, 1947, 3(2.a): 149-164, 39 figs.
Monod, T., 1955. Sur un nouveau *Corophium* constructeur de masses spongiomorphes aux Philippines. Bulletin du Museum National d'Histoire Naturelle, Paris 28: 196-206, 17 figs.
Monod, T., 1970. Sur quelques crustaces malacostraces des Iles Galapagos recoltes par N. et J. Leleup (1964-1965). Mission Zoologique Belge aux iles Galapagos et en Ecuador (N. et J. Leleup, 1964-1965) 2: 11-53, 104 figs.
Monod, T., 1971. Sur quelques crustaces de Tulear (Madagascar). Tethys, Supplement 1: 165-192, 103 figs.
Monod, T., 1975. Sur quelques crustaces malacostraces de l'Ile de la Reunion. Bulletin du Museum National d'Histoire Naturelle Paris, series 3, 319: 1005-1033, 118 figs.
Montagu, G., 1804. Description of several marine animals found on the south coast of Devonshire. Transactions of the Linnean Society of London 7: 61-85, pls 6-7.
Montagu, G., 1808. Description of several marine animals found on the south coast of Devonshire. Transactions of the Linnean Society of London 9: 81-114, pls 2-8.
Montagu, G., 1813. Descriptions of several new or rare animals, principally marine, discovered on the south coast of Devonshire. Transactions of the Linnean Society of London 11: 1-26, 5 pls.
Moon, H.P., 1970. *Corophium curvispinum* (Amphipoda) recorded again in the British Isles. Nature 226: 976.
Moore, H.B., 1937. Marine fauna of the Isle of Man. Proceedings and Transactions of the Liverpool Biological Society 50: 1-293.
Moore, P.G., 1977. Organization in simple communities: observations on the natural history of *Hyale nilssoni* (Amphipoda) in high littoral seaweeds. Pp. 443-451, figs 1-2. **In** Biology of Benthic Organisms. Pergamon Press, New York.
Moore, P.G., 1980. *Corophium sextonae* in Scottish waters. Journal of the Marine Biological Association of the United Kingdom 60: 1075.
Moore, P.G., 1981a. The life histories of the amphipods *Lembos websteri* Bate and *Corophium bonnellii* [sic] Milne Edwards in kelp holdfasts. Journal of Experimental Marine Biology and Ecology 49: 1-50, 11 figs.
Moore, P.G., 1981b. Marine Amphipoda (Crustacea) new to science from the Tasmanian phytal fauna. Journal of Natural History 15: 939-964, 15 figs.
Moore, P.G., 1981c. A functional interpretation of coxal morphology in *Epimeria cornigera* (Crustacea: Amphipoda: Paramphithoidae). Journal of the Marine Biological Association of the United Kingdom 61: 749-757, 6 figs.
Moore, P.G., 1982a. Little known Amphipoda from the Clyde Deeps. Journal of the Marine Biological Association of the United Kingdom 62: 237.
Moore, P.G., 1982b. A new species in the aberrant genus *Yulumara* (Amphipoda, Colomastigidae) from Tasmania. Crustaceana 43: 60-64, 2 figs.
Moore, P.G., 1983a. On the shape and posterior ornamentation of the third epimeral plates of gammaridean amphipods (Crustacea): decorative flamboyance or plain adaptation? Sarsia 68: 221-228, 3 figs.
Moore, P.G., 1983b. *Pagurisaea schembrii* gen. et sp.n. (Crustacea, Amphipoda) associated with New Zealand hermit crabs, with notes on *Isaea elmhirsti* Patience. Zoologica Scripta 12: 47-56, 7 figs.
Moore, P.G., 1983c. On the male of *Sophrosyne robertsoni* Stebbing & Robertson (Crustacea, Amphipoda). Zoological Journal of the Linnean Society 77: 103-109, 3 figs.
Moore, P.G., 1983d. The apparent role of temperature in breeding initiation and winter population structure in *Hyale nilssoni* Rathke (Amphipoda): field observations 1972-83. Journal of Experimental Biology and Ecology 71: 237-248, 6 figs.
Moore, P.G., 1984a. Gammaridean Amphipoda (Crustacea) collected by the yacht Tulip from surface waters of the Arabian Sea. Journal of Natural History 18: 369-380, 9 figs.
Moore, P.G., 1984b. The amphipod *Monoculodes gibbosus* (Crustacea) in British waters. Journal of the Marine Biological Association of the United Kingdom 64: 271-278, 4 figs.
Moore, P.G., 1984c. The fauna of the Clyde Sea area. Crustacea: Amphipoda. Occasional Publication of the Marine Biological Station, Millport, Isle of Man 2: 84 pp.
Moore, P.G., 1984d. *Acanthonotozoma serratum* an arctic amphipod new to Britain. Journal of the Marine Biological Association of the United Kingdom 64: 231-232.
Moore, P.G., 1985. A new deep water species of Amphipoda (Crustacea) discovered off Otago, New Zealand and a note on another little known species. Zoological Journal of the Linnean Society 83: 229-240, 5 figs.
Moore, P.G., 1986. A new species in the genus *Grandidierella* Coutiere (Crustacea: Amphipoda) from an Australian solar salt work. Journal of Natural History 20: 1091-1099, 4 figs.
Moore, P.G., 1987. Taxonomic studies on Tasmanian phytal amphipods (Crustacea): the families Anamixidae, Leucothoidae and Sebidae. Journal of Natural History 21: 239-262, 15 figs.
Moore, P.G. & A.A. Myers, 1983. A revision of the *Haplocheira* group of genera (Amphipoda: Aoridae). Zoological Journal of the Linnean Society 79: 179-221, 31 figs.
Mordukhai-Boltovskoi, F.D., 1947. O sistematicheskom polozhenij *Corophium devium* Wundsch. Akademiia Nauk SSSR, Doklady 56: 437-440, 6 unnumbered figs.
Morgan, M.A. & P.M.J. Woodhead, 1984. The life history and sexual biology of *Pseudunciola obliquua* (Crustacea: Amphipoda) in the New York Bight. Estuarine Coastal and Shelf Science 18: 639-650, 9 figs.
Morino, H., 1976. On two forms of *Cerapus tubularis*, a tube dwelling Amphipoda [sic], from shallow waters of Japan. Publications of the Seto Marine Biological Laboratory 23: 179-189, 8 figs.
Morino, H., 1979. Preliminary report on the gammaridean Amphipoda around Sesoko Island. Sesoko Marine Science Laboratory Technical Report 6: 33-36.
Mukai, H., 1979. A new giant amphipod belonging to a new genus, *Megaceradocus*, found in the Japan Sea. Bulletin of the National Science Museum (A)(Zoology) 5: 175-181, 20 figs.
Muller, F., 1864. Fur Darwin. 91 pp, 68 figs. Leipzig: Wilhelm Engelmann.
Muller, F., 1865. Description of a new genus of amphipod Crustacea. Annals and Natural History, series 3, 15: 276-277, pl. 10.
Muller, G.I., 1964. Contribution a l'etude de la dynamique des amphipodes *Bathyporeia guilliamsoniana* (Bate) et *Perioculodes longimanus* (Bate & Westw.) dans les

sables a *Aloidis maeotica* Mil. pres des cotes Roumaines de la Mer Noire. Revue Roumaine de Biologie 9: 203-210, 4 figs.

Muller, O.F., 1776. Zoologiae Danicae prodromus, seu animalium Daniae e Norvegiae indigenarum. xxxii + 282 pp. Havniae: Typis Hallageriis.

Muller, P.L. St., 1775. Footnote, pp. 53. **In** Slabber, M., 1775 [see].

Mulot, M., 1967. Description d'*Haustorius algeriensis* n. sp. (Amphipoda, Haustoriidae). Bulletin de la Societe Zoologique de France 92: 815-826, 4 figs.

Munkemuller, K. & K.F. Herhaus, 1978. Beobachtungen an drei Brackwasserkrebsen im Mittellandkanal: *Neomysis integer* (Leach, 1814), *Gammarus tigrinus* Sexton, 1939, und *Corophium lacustre* Vanhoffen, 1911 (Crustacea, Peracarida). Natur und Heimat 38: 109-113.

Murdoch, J., 1885a. Marine invertebrates. Pp. 136-176, pls I, II. **In** Lt. P.H. Ray's, Report of the International Polar Expedition to Point Barrow, Alaska. Washington.

Murdoch, J., 1885b. Description of seven new species of Crustacea and one worm from arctic Alaska. Proceedings of the United States National Museum 7: 518-522.

Myers, A.A., 1968a. Some Aoridae (Amphipoda: Gammaridea) collected by the Hancock Expeditions to the eastern Pacific, 1931-1941. Pacific Science 22: 497-506, 6 figs.

Myers, A.A., 1968b. A new genus and two new species of gammaridean Amphipoda from Central America. Journal of the Linnean Society of London, Zoology 47: 527-531, 2 figs.

Myers, A.A., 1968c. Two Aoridae (Amphipoda, Gammaridea) including a new species of *Amphideutopus* Barnard from Venezuelan waters. Crustaceana 14: 127-130, 2 figs.

Myers, A.A., 1969a. A revision of the amphipod genus *Microdeutopus* Costa (Gammaridea: Aoridae). Bulletin of the British Museum (Natural History) Zoology 17: 93-148, 22 figs, 1 pl.

Myers, A.A., 1969b. The ecology and systematics of gammaridean Amphipoda of the Island of Khios. Biologia Gallo-Hellenica 2(1): 34 pp., 3 figs.

Myers, A.A., 1970. Taxonomic studies on the genus *Grandidierella* Coutiere (Crustacea: Amphipoda), with a description of *G. dentimera*, sp. nov. Bulletin of Marine Science 20: 135-147, 4 figs.

Myers, A.A., 1971. Breeding and growth in laboratory-reared *Microdeutopus gryllotalpa* Costa (Amphipoda: Gammaridea). Journal of Natural History 5: 271-277, 4 figs.

Myers, A.A., 1972. Taxonomic studies on the genus *Grandidierella* Coutiere (Crustacea, Amphipoda) II. The Malagasy species. Bulletin du Museum D'Histoire Naturelle, Zoologie 50: 789-796, 3 figs.

Myers, A.A., 1973a. A new species of amphipod (*Microdeutopus obtusatus* sp. nov.) from the Aegean Sea. Memorie del Museo Civico di Storia Naturale, Verona 20: 303-312, 7 figs.

Myers, A.A., 1973b. The genus *Aora* Krøyer 1845 (Amphipoda-Gammaridea) in the Mediterranean. Memorie del Museo Civico di Storia Naturale, Verona 20: 283-301, 14 figs.

Myers, A.A., 1973c. *Neomegamphopus kunduchii* sp.nov. (Crust: Amphipoda) from east Africa, with a discussion of gnathopodal dominance in isaeid amphipods. Zoological Journal of the Linnean Society 52: 263-267, fig. 1 (on erratum sheet).

Myers, A.A., 1974a. A first record of the genus *Pseudomegamphopus* Myers (Crustacea, Amphipoda) from the Indo-West Pacific with a redescription of *P. jassopsis* (K.H. Barnard) comb. nov. Transactions of the Royal Society of South Africa 41: 195-202, 4 figs.

Myers, A.A., 1974b. *Amphitholina cuniculus* (Stebbing), a little-known marine amphipod crustacean new to Ireland. Proceedings of the Royal Irish Academy 74: 463-469, 3 figs.

Myers, A.A., 1974c. Studies on the genus *Lembos* Bate. I. Mediterranean endemics: *L. spiniventris* (Della Valle), *L. angularis* Ledoyer, *L. viguieri* Chevreux, *L. rubromaculatus* Ledoyer, *L. viduarum* sp. nov. Bollettino del Museo Civico di Storia Naturale, Verona 1: 11-52, 32 figs.

Myers, A.A., 1974d. A new species of commensal amphipod from East Africa. Crustaceana 26: 33-36, 2 figs.

Myers, A.A., 1975a. Studies on the genus *Lembos* Bate. III. Indo-Pacific species: *L. kidoli* sp.nov., *L. ruffoi* sp.nov., *L. excavatus* sp. nov., *L. leptocheirus* Walker. Bollettino del Museo Civico di Storia Naturale, Verona 2: 13-50, figs 61-89.

Myers, A.A., 1975b. Studies on the genus *Lembos* Bate. II. Indo-Pacific species: *L. quadrimanus* Sivaprakasam, *L. punctatus* sp. nov.; *L. parahastatus* sp. nov., *L. palmatus* (Ledoyer). Bollettino del Museo Civico di Storia Naturale, Verona 1: 359-395, figs 33-60.

Myers, A.A., 1976a. The genera *Megamphopus* Norman and *Microprotopus* Norman (Amphipoda - Gammaridea) in the Mediterranean. Bulletin du Museum National d'Histoire Naturelle, series 3, 357, Zoologie 250: 121-132, 8 figs.

Myers, A.A., 1976b. Studies on the genus *Lembos* Bate. IV. *L. megacheir* (Sars), *L. borealis* sp. nov., *L. hirsutipes* Stebbing, *L. karamani* sp. nov., *L. setimerus* sp. nov. Bollettino del Museo Civico di Storia Naturale, Verona 3: 445-477, figs 90-111.

Myers, A.A., 1977a. Studies on the genus *Lembos* Bate. VI. Atlantic species: *L. dentischium* sp.nov., *L. kunkelae* sp. nov., *L. rectangulatus* sp.nov., *L. unicornis* Bynum & Fox. Bollettino del Museo Civico di Storia Naturale, Verona 4: 125-154, figs 133-152.

Myers, A.A., 1977b. Two new species of the amphipod genus *Microdeutopus* Costa from the Mediterranean Sea. Bolletino del Museo Civico di Storia Naturale, Verona 4: 475-478, 2 figs.

Myers, A.A., 1977c. Studies on the genus *Lembos* Bate. V. Atlantic species: *L. smithi* (Holmes). *L. brunneomaculatus* sp.nov., *L. minimus* sp.nov., *L. unifasciatus* sp.nov. Bollettino del Museo Civico di Storia Naturale, Verona 4: 95-124, figs 112-132.

Myers, A.A., 1978. Studies on the genus *Lembos* Bate. VII. Bollettino del Museo Civico di Storia Naturale, Verona 5: 183-209, figs 153-170.

Myers, A.A., 1979a. Studies on the genus *Lembos* Bate VIII. Bollettino del Museo Civico di Storia Naturale, Verona 6: 221-248, figs 171-186.

Myers, A.A., 1979b. Studies on the genus *Lembos* Bate IX. Bollettino del Museo Civico di Storia Naturale, Verona 6: 249-275, figs 187-202.

Myers, A.A., 1981a. *Aorella multiplex* gen. et sp.n., a new aorid (Crustacea, Amphipoda) from Fiji. Zoologica Scripta 10: 57-59, 2 figs.

Myers, A.A., 1981b. Taxonomic studies on the genus *Grandidierella* Coutiere (Crustacea, Amphipoda) III. Fijian, Australian and Saudi Arabian species. Bulletin du Museum National d'Histoire Naturelle, Paris, series 4, 3(A1): 213-226, 8 figs.

Myers, A.A., 1981c. Studies on the genus *Lembos* Bate X. Antiboreal species. *L. pertinax* sp. nov., *L. acherontis* sp. nov., *L. hippocrenes* sp. nov., *L. chiltoni* sp. nov. Bollettino del Museo Civico di Storia Naturale, Verona 8: 85-111, figs 203-219.

Myers, A.A., 1981d. Amphipod Crustacea I. Family Aoridae. Memoirs of the Hourglass Cruises 5(5): 1-73, 34 figs, 1 pl.

Myers, A.A., 1982a. Family Aoridae. Pp. 111-158, figs 74-105. **In** S. Ruffo (ed.). The amphipods of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de l'Institut Oceanographique 13.

Myers, A.A., 1982b. Family Corophiidae. Pp. 185-208, figs 124-142. **In** S. Ruffo (ed.). The amphipods of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de l'Institut Oceanographique 13.

Myers, A.A., 1983a. A new species of *Cheiriphotis* Walker from the Mediterranean Sea (Amphipoda: Isaeidae). Bolletin Museo Civico Storia Naturale Verona 10: 541-542, 1 fig.

Myers, A.A., 1983b. Probable polyphyly in the amphipod genus *Microdeutpous* Costa, with an analysis of phenetic relationships in some related genera. Selected Papers On Crustacea, The Aquarium, Trivandrum, 163-172, 3 figs.

Myers, A.A., 1985a. Studies on the genus *Lembos* Bate XI *Globosolembos* sub-gen. nov. *L. (G.) francanni* Reid, *L. (G.) inducus* Ledoyer, *L. (G.) ovatus* sp. nov. *L. (G.) tiafaui* sp. nov., *L. (G.) excavatus* Myers. Bollettino del Museo Civico di Storia Naturale, Verona 30: 341-367, figs 220-235.

Myers, A.A., 1985b. Studies of the genus *Lembos* Bate XII. Tropical Pacific islands. *L. dentischium* Myers ssp. *taparum* nov., *L. saloteae* sp. nov. *L. waipio* Barnard, *L. aequimanus* Schellenberg, *L. virgus* sp. nov., *L. regius* sp. nov., *L. tui* sp. nov. Bullettino del Museo Civico di Storia Naturale, Verona 30: 369-406, figs 236-258.

Myers, A.A., 1985c. Shallow-water, coral reef and mangrove Amphipoda (Gammaridea) of Fiji. Records of the Australian Museum supplement 5: 144 pp., 109 figs.

Myers, A.A., 1986a. Amphipoda from the South Pacific: Niue Island. Journal of Natural History 20: 1381-1392, 10 figs.

Myers, A.A., 1986b. Amphipoda from the South Pacific: Tonga. Records of the Australian Museum 38: 271-289, 12 figs.

Myers, A.A., 1988. A cladistic and biogeographic analysis of the Aorinae subfamily nov. Crustaceana, Supplement 13: 167-192.

Myers, A.A. & M.J. Costello, 1984. The amphipod genus *Aora* in British and Irish waters. Journal of the Marine Biological Association of the United Kingdom 64: 279-283, 2 figs.

Myers, A.A. & M.J. Costello, 1986. The amphipod sibling pair *Leucothoe lilljeborgi* and *L. incisa* in British and Irish waters. Journal of the Marine Biological Association of the United Kingdom 66: 75-82, 3 figs.

Myers, A.A. & D. McGrath, 1978. Littoral and benthic investigations on the west coast of Ireland - VIII (Section A: Faunistic and ecological studies) a new species of amphipod, *Lembos denticarpus* sp. nov. (Aoridae), from Galway Bay. Proceedings of the Royal Irish Academy 78 B: 125-131, 3 figs.

Myers, A.A. & D. McGrath, 1979. The British and Irish species of *Siphonoectes* Krøyer (Amphipoda-Gammaridea). Journal of Natural History 13: 211-220, 16 figs.

Myers, A.A. & D. McGrath, 1980. A new species of *Stenothoe* Dana (Amphipoda, Gammaridea) from maerl deposits in Kilkieran Bay. Journal of Life Sciences, Royal Dublin Society 2: 15-18, 2 figs.

Myers, A.A. & D. McGrath, 1981. Taxonomic studies on British and Irish Amphipoda. The genus *Photis* with the re-establishment of *P. pollex* (= *P. macrocoxa*). Journal of the Marine Biological Association of the United Kingdom 61: 759-768, 5 figs.

Myers, A.A. & D. McGrath, 1983a. Taxonomic studies on British and Irish Amphipoda: the genus *Gammaropsis*. Journal of the Marine Biological Association of the United Kingdom 63: 93-100, 5 figs.

Myers, A.A. & D. McGrath, 1983b. Taxonomic studies on British and Irish Amphipoda. Re-establishment of *Leucothoe procera*. Journal of the Marine Biological Association of the United Kingdom 63: 675-[illegible], [illegible] figs.

Myers, A.A. & D. McGrath, 1983c. The genus *Listriella* (Crustacea: Amphipoda) in British and Irish waters, with the description of a new species. Journal of the Marine Biological Association of the United Kingdom 63: 347-353, 3 figs.

Myers, A.A. & D. McGrath, 1984. A revision of the north-east Atlantic species of *Ericthonius* (Crustacea: Amphipoda). Journal of the Marine Biological Association of the United Kingdom 64: 379-400, 11 figs.

Myers, A.A., D. McGrath & M.J. Costello, 1987. The Irish species of *Iphimedia* Rathke (Amphipoda: Acanthonotozomatidae). Journal of the Marine Biological Association of the United Kingdom 67: 407-421, 8 figs.

Myers, A.A. & J. Lyons, 1987. A re-evaluation of the South African species of *Lemboides* Stebbing and *Lembos* Bate (Amphipoda, Aoridae) described by K.H. Barnard (1916). Annals of the South African Museum 97: 267-282, 9 figs.

Myers, A.A. & P.G. Moore, 1983. The New Zealand and south-east Australian species of *Aora* Krøyer (Amphipoda, Gammaridea). Records of the Australian Museum 35: 167-180, 13 figs.

Nagata, K., 1959. Notes on five species of the amphipod genus *Ampelisca* from the stomach contents of the triglid fishes. Publications of the Seto Marine Biological Laboratory 7(2): 67-82, pls 2-11.

Nagata, K., 1960. Preliminary notes on benthic gammaridean Amphipoda from the *Zostera* region of Mihara Bay, Seto Inland Sea, Japan. Publications of the Seto Marine Biological Laboratory 8: 163-182, 3 figs, pls 13-17.

Nagata, K., 1961a. A new atylid amphipod from Japan. Annotationes Zoologicae Japonenses 34: 216-218, 2 figs.

Nagata, K., 1961b. Two new amphipods of the genus *Eurystheus* from Japan. Publications of the Seto Marine Biological Laboratory 9: 41-46, 2 figs.

Nagata, K., 1963. Two new gammaridean amphipods (Crustacea) collected by the second cruise of the Japanese Expedition of Deep Sea (JEDS-2). Publications of the Seto Marine Biological Laboratory 11: 1-5, 2 figs.

Nagata, K., 1964. A list of gammaridean Amphipoda from the sea around the Amakusa Marine Biological Laboratory. Fauna and Flora of the Sea Around Amakusa Marine Biological Laboratory, V. Amphipod Crustacea, 10 pp., 3 unnumbered figs.

Nagata, K., 1965a. Studies on marine gammaridean Amphipoda of the Seto Inland Sea. I. Publications of the Seto Marine Biological Laboratory 13: 131-170, 15 figs.

Nagata, K., 1965b. Studies on marine gammaridean Amphipoda of the Seto Inland Sea. II. Publications of the Seto Marine Biological Laboratory 13: 171-186, figs 16-26.

Nagata, K., 1965c. Studies on marine gammaridean Amphipoda of the Seto Inland Sea. III. Publications of the Seto Marine Biological Laboratory 13: 291-326, figs 27-44.

Nagata, K., 1965d. Amphipoda Gammaridea. In M. Iwasa & K. Nagata's Illustrated Encyclopedia of the Fauna of Japan: 559-572. [in Japanese]

Nagata, K., 1966. Studies on marine gammaridean Amphipoda of the Seto Inland Sea. IV. Publications of the Seto Marine Biological Laboratory 13: 327-348, figs 45-48.

Nagata, K., H. Utinomi & H. Irie, 1964. Fauna and Flora of the Sea Around the Amakusa Marine Biological Laboratory. Amphipod Crustacea. [Title varies on cover with Part V. before "amphipod".] 27 pp. Amakusa Marine Biological Laboratory, Kyushu University.

Naomi, T.S., 1979. On a swarm of amphipods *Atylus minikoi* (Walker) in the shallow waters of the Harwar Bay. Indian Journal of Fisheries 26: 227-228.

Nardo, G.D., 1847. Sinonimia moderna delle specie registrate nell'opera intitolata: descrizione de'crostacei, de'testacei e de'pesci che abitano le lagune e Golfo Veneto rapresentati in figure, a chiaro-scuro ed a colori dall'abate Stefano Chiereghini ven. clodiense applicata per commissione governativa. xi and 28 pp. Venezia: Antonelli.

Nardo, G.D., 1869. Annotazioni illustranti cinquantaquattrospecie di crostacei podottalmi, endottalmi e succhiatori del mare Adriatico, alcune delle quali nuove o male conosciute, accompagnate da trentatre figure litografate, e precedute dalla storia della carcinologia Adriatica Antica e recente. Memorie del Reale Istituto Veneto di Scienze, Lettere ed Arti 14: 217-343, pls 12-15.

Nayar, K.N., 1950. Description of a new species of amphipod of the genus *Corophium* from Adyar, Madras India. Journal of the Washington Academy of Sciences 40: 225-228, 1 fig.

Nayar, K.N., 1956. The life-history of a brackish water amphipod *Grandidierella bonnieri* Stebbing. Proceedings of the Indian Academy of Science, Section B, 43: 178-189, 16 figs.

Nayar, K.N., 1959. The Amphipoda of the Madras Coast. Bulletin of the Madras Government Museum, Natural History Section 6(3): 59 pp., 16 pls.

Nayar, K.N., 1967. On the gammaridean Amphipoda of the Gulf of Mannar [sic], with special reference to those of the pearl and chank beds. Proceedings of the Symposium on Crustacea, Ernakulam 1: 133-168, 17 figs.

Nebeski, O., 1881. Beitrage zur Kenntniss der Amphipoden der Adria. Arbeiten aus dem Zoologischen Institute der Universitat Wien und der Zoologischen Station in Triest 3: 111-162 [or 1-52], 4 pls.

Nelson, W.G., 1978. An occurrence of *Heterophlias seclusus* Shoemaker, 1933 (Amphipoda, Phliantidae) at Beaufort, North Carolina, USA. Crustaceana 35: 103.

Nelson, W.G., 1979. Additions to the amphipod crustaceans of North Carolina. Estuaries 2: 66.

Nelson, W.G., 1980a. The biology of eelgrass (*Zostera marina* L.) amphipods. Crustaceana 39: 59-89, 15 figs.

Nelson, W.G., 1980b. Reproductive patterns of gammaridean amphipods. Sarsia 65: 61-71.

Nelson, W.G., 1980c. Amphipods. Little-known crustaceans. Sea Frontiers 26: 138-144, 4 figs, 5 photographs.

Nelson, W.G., 1981. A new species of the marine amphipod genus *Gammaropsis* from the southeastern United States (Photidae). Proceedings of the Biological Society of Washington 93: 1223-1229, 3 figs.

Nelson, W.G., K.D. Cairns & R.W. Virnstein, 1982. Seasonality and spatial patterns of seagrass-associated amphipods of the Indian River Lagoon, Florida. Bulletin of Marine Science 32: 121-129, 3 figs.

Newell, G.E., 1954. The marine fauna of Whitstable. Annals and Magazine of Natural History, series 12, 7: 321-350.

Ngok, Tkhan; Dang; See Dang.

Nicholls, G.E., 1938. Amphipoda Gammaridea. Australasian Antarctic Expedition 1911-14. Scientific Reports, C.-Zoology and Botany 2(4): 145 pp., 67 figs.

Nicholls, G.E., 1939. The Prophliantidae. A proposed new family of Amphipoda, with description of a new genus and four new species. Records of the Southern Australian Museum 6: 309-334, 10 figs.

Nicol, E.A.T., 1933. A preliminary note on the fauna of some salt marshes on the Northumberland Coast. Dove Marine Laboratory, Report (Durham University), series 3, 1: 51-53.

Nicol, E.A.T., 1935. The ecology of a salt-marsh. Journal of the Marine Biological Association of the United Kingdom 20: 203-261, 17 figs.

Nicolet, H., 1849. Historia fisica y politica de Chile segun documentos adquiridos en esta republica durante doce anos de residencia en ella y publicada bajo los auspicios del supremo gobierno por Claudio Gay....Zoologia 3: 115-318. [Atlas not seen, = 1854 in Stebbing 1888: 275.]

Ninni, A.P., 1889. "L Adriatico" giornale del nattino anno 14 N: 9 [not seen, from Ruffo, 1952].

Noodt, W., 1959. Estudios sobre crustaceos Chileonos de aguas subterraneas. I. *Ingolfiella chilensis* n.sp. de la playa marina de Chile Central (Crustacea, Amphipoda). Investigaciones Zoologicas Chilenas 5: 199-209, 30 figs.

Noodt, W., 1965. Interstitiella Amphipodem der konvergenten Gattungen *Ingolfiella* Hansen und *Pseudingolfiella* n. gen. aus Sudamerika. Crustaceana 9: 17-30, 19 figs.

Nordgaard, O., 1907. Mofjordens Naturforhold. Det Kungliga Norske Videnskabers Selskabs Skrifter 1906, 9: 40 pp., 1 pl.

Nordgaard, O., 1912. Faunistiske og biologiske Iakttagelser ved den biologiske Station i Bergen. Det Kungliga Norske Videnskabers Selskabs Skrifter 1911, 6: 58 pp., 8 figs.

Norman, A.M., 1867a. Report on the Crustacea. Natural History Transactions of Northumberland and Durham 1: 12-29, pl. 7, part.

Norman, A.M., 1867b. Report of the committee appointed for the purpose of exploring the coasts of the Hebrides by means of the dredge. - Part II. On the Crustacea, Echinodermata, Polyzoa, Actinozoa, and Hydrozoa. British Association for the Advancement of Science, Report for 1866: 193-206.

Norman, A.M., 1868. On Crustacea Amphipoda new to science or to Britain. Annals and Magazine of Natural History, series 4, 2: 411-421, pls 21, 22 and figs 1-11 of pl. 23.

Norman, A.M., 1869a. Shetland final dredging report. - Part II. On the Crustacea, Tunicata, Polyzoa, Echinodermata, Actinozoa, Hydrozoa, and Porifera. Report of the Thirty-eighth Meeting of the British Association for the Advancement of Science 1868: 247-336.

Norman, A.M., 1869b. Pp. 358-361, pl. 22, figs 7-12. **In** G.S. Brady & D. Robertson's, Notes of a Week's Dredging in the West of Ireland. Annals and Magazine of Natural History, series 4, 3.

Norman, A.M., 1875. Part II. Crustacea &c. in J.G. Jeffreys & A.M. Norman's "Submarine-cable Fauna". Annals and Magazine of Natural History, series 4, 15: 169-176, pl. 12.

Norman, A.M., 1882. Report on the Crustacea. Proceedings of the Royal Society of Edinburgh 11: 683-689.

Norman, A.M., 1889a. Notes on British Amphipoda. - II. Families *Leucothoidae, Pardaliscidae,* and *Gammaridae* (Marine). Annals and Magazine of Natural History, series 6, 4: 113-141, pls 10-12.

Norman, A.M., 1889b. Notes on British Amphipoda. - I. *Megaluropus,* n.g., and some *Oediceridae*. Annals and Magazine of Natural History, series 6, 3: 445-460, pls 18-20.

Norman, A.M., 1895. A month on the Trondhjem Fiord.

Annals and Magazine of Natural History, series 6, 15: 476-494.

Norman, A.M., 1900a. British Amphipoda: Fam. *Lysianassidae* (concluded). Annals and Magazine of Natural History, series 7, 5: 196-214, pl. 6.

Norman, A.M., 1900b. British Amphipoda of the tribe *Hyperiidea* and the families *Orchestiidae* and some *Lysianassidae*. Annals and Magazine of Natural History, series 7, 5: 126-144.

Norman, A.M., 1900c. British Amphipoda: Families *Pontoporeidae* to *Ampeliscidae*. Annals and Magazine of Natural History, series 7, 5: 326-346, 1 fig.

Norman, A.M., 1900d. British Amphipoda. - IV. Families *Stegocephalidae* to *Oediceridae* (part). Annals and Magazine of Natural History, series 7, 6: 32-51, pl. 3.

Norman, A.M., 1902. Notes on the natural history of East Finmark. Annals and Magazine of Natural History, series 7, 10: 472-486.

Norman, A.M., 1905. Revised nomenclature of the species described in Bate and Westwood's 'British Sessile-eyed Crustacea'. Annals and Magazine of Natural History, series 7, 16: 78-95.

Norman, A.M., 1907. Notes on the Crustacea of the Channel Islands. Annals and Magazine of Natural History, series 7, 20: 356-371, pls 16-17.

Norman, A.M., 1908. Some species of *Leptocheirus,* a genus of Amphipoda. Annals and Magazine of Natural History, series 8, 1: 307-311, pls 12, 13.

Norman, A.M., 1981. Bibliography of, **In** Mills, E.L., 1980 [two dates here]. "One Different Kind of Gentleman": Alfred Merle Norman (1831-1918), Invertebrate Zoologist. Zoological Journal of the Linnean Society 68: 69-98.

Norman, A.M. & G.S. Brady, 1909. The Crustacea of Northumberland and Durham. Transactions of the Natural History Society of Northumberland, Durham, Newcastle-upon-Tyne, new series, 3: 252-417, pls 8-9.

Norman, A.M. & T. Scott, 1906. The Crustacea of Devon and Cornwall. xv + 232 pp., 24 pls. London.

Oakden, J.M., 1984. Feeding and substrate preference in five species of phoxocephalid amphipods from central California. Journal of Crustacean Biology 4: 233-247, 7 figs.

Ohlin, A., 1895a. Additional notes to my paper: "Bidrag till kannedomen om malakostrakfauna i Baffin Bay och Smith Sound". Zoologischer Anzeiger 18: 485-487.

Ohlin, A., 1895b. Bidrag till Kannedomen om Malakostrakfaunan I Baffin Bay och Smith Sound. Acta Universitatis Lundensis, Lunds Universitet Ars-Skrifter 31(6): xxii + 70 pp., 1 pl.

Oldevig, H., 1917. Die Amphipoden, Isopoden und Cumaceen des Eisfjords. Zoologische Ergebnisse der Schwedischen Expedition nach Spitzbergen 1908.... Kunglia Svenska Vetenskapskademiens Handlingar 54(8): 56 pp.

Oldevig, H., 1933. Sveriges Amphipoder. Goteborgs Kunglia Vetenskaps- och Vitterhets-Samhalles Handlingar, series B, 3(4): 282 pp., [all copied figs after Sars, 1985].

Oldevig, H., 1959. Arctic, subarctic and Scandinavian amphipods in the collections of the Swedish Natural History Museum in Stockholm. Goteborgs Kunglia Vetenskaps-Vitterhets-Samhalles Handlingar, (6B)8(2): 132 pp., 4 pls.

Oldevig, H., 1960. A new amphipod from the South Sandwich Islands. Arkiv for Zoologi 13: 73-75, 2 figs.

Olerod, R., 1970. Littoral gammaridean Amphipoda from Mindoro, the Philippines. Zoologischer Anzeiger 184: 359-396, 101 figs.

Olerod, R., 1975. The mouthparts in some North Atlantic species of the genus *Orchomene* Boeck (Crustacea, Amphipoda). Zoologica Scripta 4: 205-216, 63 figs.

Olerod, R., 1980. A taxonomic study of the lysianassid genus *Centromedon* G.O. Sars (Crustacea, Amphipoda). Zoologica Scripta 9: 35-52, 124 figs.

Oliveira, L.P.H., 1953. Crustacea Amphipoda do Rio de Janeiro. Memorias do Instituto Oswaldo Cruz 51: 289-376, 27 pls.

Oliveira, L.P.H., 1955a. Descricao e analise geometrica de *Autonoe comiteaensis* nova especie de crustaceo (Amphipoda, Aoridae). Memorias do Instituto Oswaldo Cruz 53: 345-352, 2 pls.

Oliveira, L.P.H., 1955b. Nova especie de crustaceo *Amphipoda* da Baia de Guanabara *Ampelisca* [illegible]. Memorias do Instituto Oswaldo Cruz 52: 603-618, 3 pls.

Oliveira, L.P.H., 1955c. *Phoxocephalus* [illegible] nova especie de Crustacea Amphipoda, Phoxocephalidae Rio de Janeiro, Memorias do Instituto Oswaldo Cruz 53: 413-419, 2 pls.

Oliver, J.S. & R.G. Kvitek, 1984. Side-scan sonar records and diver observations of the gray whale (*Eschrichtius robustus*) feeding grounds. Biological Bulletin 167: 264-269, 2 figs.

Oliver, J.S., J.M. Oakden & P.N. Slattery, 1982. Phoxocephalid amphipod crustaceans as predators on larvae and juveniles in marine soft-bottom communities. Marine Ecology Progress Series, 7: 179-184, 1 fig.

Oliver, J.S., P.N. Slattery, L.W. Hulberg & J.W. Nybakken, 1980. Relationships between wave disturbance and zonation of benthic invertebrate communities along a subtidal high energy beach in Monterey Bay, California. Fishery Bulletin 78: 437-454, 15 figs.

Oliver, J.S., P.N. Slattery, M.S. Silberstein & E. O'Connor, 1983. A comparison of gray whale, *Eschrichtius robustus*, feeding in the Bering Sea and Baja California. Fishery Bulletin 81: 513-522, 6 figs.

Oliver, J.S., P.N. Slattery, M.S. Silberstein & E. O'Connor, 1984. Gray whale feeding on dense ampeliscid amphipod communities near Bamfield, British Columbia. Canadian Journal of Zoology 62: 41-49, 9 figs.

Oliver, J.S. & P.N. Slattery, 1985. Destruction and opportunity on the sea floor: Effects of gray whale feeding. Ecology 66: 1965-1975, 5 figs.

Olivier, M., 1791. Encyclopedie Methodique. Histoire Naturelle Insectes, 6. Paris.

Onbe, T., 1966. Observations on the tubicolous amphipod *Corophium acherusicum* Costa, in Fukuyama Harbour area. Journal of the Faculty of Fisheries and Animal Husbandry, Hiroshima University 6: 323-338, 8 figs, 1 pl.

Ortiz, M., 1974. Contribucion al estudio de los anfipodos (Gammaridea) litorales de Cuba. Revue Roumaine de Biologie, (D, Zoologie) 19: 83-87.

Ortiz, M., 1975. Algunos datos ecologicos de *Leucothoe spinicarpa* Abildgaard, (Amphipoda, Gammaridea), en aguas cubanas. Investigaciones Marinas Ciencias, series 8, 16: 1-12, 5 figs.

Ortiz, M., 1976a. A new crustacean amphipod, *Mallacoota carausui*, from the Cuban waters. Revue Roumaine de Biologie, Serie de Biologie Animale 21: 93-98, 1 fig.

Ortiz, M., 1976b. Un nuevo anfipodo de aguas cubanas (Amphipoda, Gammaridea, Philiantidae). Investigaciones Marinas Ciencias, series 8, 25: 21-35, 3 figs.

Ortiz, M., 1976c. Un nuevo genero y una nueva especie de anfipodo de aguas Cubanas (Amphipoda, Gammaridea, Ampithoidae). Investigaciones Marinas Ciencias, series 8, 27: 1-12, 2 figs.

Ortiz, M., 1976d. Un nuevo anfipodo (Amphipoda, Gammaridea, Gammaridae) colectado del contenido estomacal del ronco amarillo *Haemulon sciurus*, de aguas Cubanas. Investigaciones Marinas Ciencias, series 8, 27: 13-20, 3

figs.

Ortiz, M., 1976e. Contributii la cunoasterea amfipodelor (Gammaridea) din apele litorale Vest-CubanezeResumatul tezei de doctorat. Institut Central de Biologie Bucuresti: 20 pp., 5 figs.

Ortiz, M., 1976f. Un nuevo anfipodo perfordor de madera (Amphipoda Gammaridea, Cheluridae) de aguas Cubanas. Investigaciones Marinas Ciencias, series 8, 27: 21-26, 2 figs.

Ortiz, M., 1978. Invertebrados marinos bentosicos de Cuba. I. Crustacea Amphipoda, Gammaridea. Investigaciones Marinas Ciencias, series 8, 38: 3-10.

Ortiz, M., 1979a. Contribucion al estudio de los anfipodos (Gammaridea) del Mediterraneo Americano. Investigaciones Marinas Ciencias, series 8, 45: 1-16, 1 fig.

Ortiz, M., 1979b. Lista de especes y bibliografia de los anfipodos (Crustacea: Amphipoda) del Mediterraneo Americano. Investigaciones Marinas Ciencias, series 8, 43: 1-40.

Ortiz, M., 1980. Una nueva especie de anfipodo bentosico (Amphipoda, Gammaridea) de aguas Cubanas. Revista de Investigaciones Marinas, Universidad de la Habana 1: 91-103, 5 figs.

Ortiz, M., 1983. Los anfipodos (Gammaridea) de las costas del Mar Caribe de la Republica de Colombia. Revista Investigaciones Marinas, Universidad de Habana 4: 23-31, 1 figs.

Ortiz, M. & O. Gomez, 1979. Una nueva especie de anfipodo (Amphipoda, Gammaridea) de aguas profundas del sur de Cuba. Investigaciones Marinas Ciencias, series 8, 40: 23-30, 4 figs.

Ortiz, M. & R.R. Lalana, 1981. Un nuevo anfipodo del genero *Leptocheirus* (Amphipoda, Gammaridea) de aguas Cubanas. Revista de Investigaciones Marinas, Universidad de la Habana 1: 58-73, 10 figs.

Ortiz, M. & J. Nazabal, 1984a. *Corocubanus*, un nuevo genero de anfipodo (Amphipoda Gammaridea, Corophiidae), de aguas Cubanas. Revista Investigaciones Marinas, Universidad de Habana 5: 3-21, 11 figs.

Ortiz, M. & J. Nazabal, 1984b. A new amphipod crustacean of the genus *Lembos* (Gammaridea, Aoridae) from the Cuban marine waters. Travaux lu Museum d'Histoire Naturelle Grigore Antipa 26: 11-13, 1 fig.

Ortmann, A.E., 1901. Crustacea and Pycnogonida collected during the Princeton Expedition to North Greenland. Proceedings of the Academy of Natural Science Philadelphia 53: 144-168, 1 fig.

Osadchikh, V.F., 1973. Godovyi i sezonnye izmeneniia kolechestva korofiid v severnom Kaspii. Trudy Vsesoioznogo Nauchno-isslebovatel'skogo Instituta Morskogo Rybnogo Khoziaistba i Okeanografii 80: 104-128, 10 figs.

Oshel, P.E. & D.H. Steele, 1985. Amphipod *Paramphithoe hystrix*: a micropredator on the sponge *Haliclona ventilabrum*. Marine Ecology- Progress Series 23: 307-309, 1 fig.

Ozorio, B., 1892. Appendice ao catalogo dos crustaceos de Portugal existentes no Museu Nacional de Lisboa. Journal de Sciencias Mathematicas, Physicas e Naturaes, series 2, 8: 233-241.

Packard, A.S., 1867. Observations on the glacial phenomena of Labrador and Maine, with a view of the recent invertebrate fauna of Labrador. Memoirs of the Boston Society of Natural History 1: 210-303, pls 7,8.

Packard, A.S., 1883. A list of animals dredged near Caribou Island, southern Labrador. Canadian Naturalist and Geologist 8: 401-429, 2 pls.

Pallas, P.S., 1766. Miscellanea zoologica. Quibus novae imprimis atque obscurae animalium species describuntur et observationibus iconibusque illustrantur. xii + 224 pp., 14 pls. Hague Comitum.

Pallas, P.S., 1767. Spicilegia zoologica quibus novae imprimis et obscurae animalium species iconibus, descriptionibus atque commentariis illustrantur 1: 52-60, pls 3, 4. Berolini: Gottl. August. Lange.

Pallas, P.S., 1771. Reise durch verschiedene Provinzen des russischen Reichs, St. Petersburg, Kaiserlichen Academie der Wissenschaften 1: 504 pp.

Pallas, P.S., 1776. Reise durch versehiedene Provinzen des Russischen Reichs, St. Petersburg, Kaiserlichen Academie der Wissenschaften 3: 709 [not seen, from Stebbing 1888].

Parker, G.H., 1936. An inquiline gammarid on the sea-urchin *Lytechinus*. Ecology 17: 185-186.

Patience, A., 1908. Some notes concerning the male of *Dexamine thea*, Boeck. Annals and Magazine of Natural History, series 8, 1: 117-122, pl. 5.

Patience, A., 1909a. On the genus *Phoxocephalus*. Journal of the Natural History Society, Glasgow 1: 116-134, 4 pls.

Patience, A., 1909b. On a new British marine amphipod. Journal of the Natural History Society, Glasgow 2: 16-19, 2 pls.

Patience, A., 1909c. Preliminary description of a new British amphipod, *Isaea elmhirsti*, sp.n. Glasgow Naturalist 1: 134-135.

Paul, A.Z., 1973. Trapping and recovery of living deep-sea amphipods from the arctic ocean floor. Deep-Sea Research 20: 289-290, 1 fig.

Pavlyuchkov, V.A., 1976?. [Some data on composition and distribution of amphipods (Gammaridae) in the sublittoral of the Bay Petra Velikogo (Sea of Japan)]. Izv. Tikho-ok. Inst. ryb khoz. okeanogr., 98: ??-??. [Not seen, from Amphipod Newsletter 9]

Pearse, A.S., 1908. Descriptions of four new species of amphipodous Crustacea from the Gulf of Mexico. Proceedings of the United States National Museum 34(1594): 27-32, 4 figs.

Pearse, A.S., 1912. Notes on certain amphipods from the Gulf of Mexico, with descriptions of new genera and new species. Proceedings of the United States National Museum 43(1936): 369-379, 8 figs.

Pearse, A.S., 1913a. Notes on Crustacea recently acquired by the museum. Occasional Papers of the Museum of Zoology, University of Michigan 1: 1-4.

Pearse, A.S., 1913b. Notes on a small collection of amphipods from the Pribilof Islands, with descriptions of new species. Proceedings of the United States National Museum 45: 571-573, 2 figs.

Pennant, T., 1777. British Zoology. A New Edition in Four Volumes. IV. Crustacea Mollusca. viii + 154 pp., pl. index pp., 92 pls. London: Wilkie & Robinson.

Pennant, T., 1812. British Zoology. A New Edition in Four Volumes. IV. Class V. Crustacea. Class VI. Vermes. xvi + 379 pp., 95 pls. London: Wilkie & Robinson.

Percival, E., 1929. A report on the fauna of the estuaries of the River Tamar and the River Lynher. Journal of the Marine Biological Association of the United Kingdom, new series, 16: 81-108.

Pesta, O., 1918. Notiz uber einige fur die Fauna der Adria neue und bisher noch wenig bekannte Amphipodenarten. Anzeiger Akademie der Wissenschaften in Wein Mathematisch-naturwissenschaftliche Klasse 55: 181-183.

Pesta, O., 1920. Uber einige fur die Fauna der Adria neue oder seltene Amphipodenarten. Zoologischer Anzeiger 51: 25-36, 8 figs.

Petit, G., 1950. *Corophium insidiosum* Crawford, dans les etangs du Roussillon. Vie et Milieu 1: 476-477.

Pfeffer, G., 1888. Die Krebse von Sud-Georgian nach der Ausbeute der Deutschen Station 1882-83. 2. Tiel. Die Amphipoden. Jahrbuch der Wissenschaftlichen Anstalten zu Hamburg 5: 76-142, 3 pls.

Pfeffer, G., 1890. Die Fauna der Insel Jeretik, Port Wladimir, an der Murman-Kuste, Nach den Sammlungen des Herrn Kapitan Horn. I. Teil: Die Reptilien, Amphibien, Fische, Mollusken, Brachiopoden, Krebse, Pantopoden und Echinodermen. Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten 7: 63-96.

Philippi, A., 1839. Einige zoologische Notizen. Archiv fur Naturgeschichte 5: 113-134, pls 3, 4.

Philippi, A., 1840. Zoological notes. Annals and Magazine of Natural History, series 1, 4: 88-96, pl. 3.

Philippi, R.A., 1860. Reise durch die wueste Atacama auf Befehl der Chilenischen Regierung im Sommer 1853-54 Unternommen und Beschrieben. xii and 192 pp., 7 pls (for Zoology). Halle: Eduard Anton.

Phipps, C.J., 1774. [Appendix, pp. 189-193, pl. 12] of: A Voyage Towards the North Pole, Undertaken by His Majesty's Command, 1773. London: J.Nourse.

Picard, C., 1972. Les peuplements de vase au large du Golfe de Fos. Tethys 3: 569-618, 14 figs.

Pillai, N.K., 1954. On the occurrence of *Palinnotus natalensis* (Amphipoda) in Travancore. Bulletin Central Research Institute, University Travancore, series C, 3: 27-29, 8 figs.

Pillai, N.K., 1957. Pelagic Crustacea of Travancore. III. Amphipoda. Bulletin Central Research Institute, University Travancore 5: 29-68, 18 figs.

Pillai, N.K., 1961. Wood-boring Crustacea of India. 61 pp., 27 figs, 2 pls. Government of India Press.

Pinhey, K.F., 1926. Entomostraca of the Belle Isle Strait Expedition, 1923, with notes on other planktonic species part I. Contributions to Canadian Biology and Fisheries, new series, 3: 179-233, 8 figs.

Pirlot, J.M., 1929. Resultats zoologiques de la croisiere Atlantique de l' "Armauer Hansen" (Mai-Juin 1922) II.- Les amphipodes gammarides. Travaux de l'Institut Edouard Van Beneden, Universite de Liege 2: 18 pp., 3 figs.

Pirlot, J.M., 1932a. Sur quelques amphipodes associes aux colonies de tubulaires sans la region de Bergen. Bulletin de la Societe Royal Sciences de Liege 1: 21-27.

Pirlot, J.M., 1932b. Les amphipodes de l'expedition du Siboga. Deuxieme partie. Les amphipodes gammarides. I. - Les amphipodes fouisseurs. Phoxocephalidae, Oediceroidae. Siboga-Expedition, Monographie 33b: 57-113, figs 12-34.

Pirlot, J.M., 1933a. Les Amphipodes de l'expedition du Siboga. Deuxieme partie. Les amphipodes gammmarides II. - Les amphipodes de la mer profonde. 1 (Lysianassidae, Stegocephalidae, Stenothoidae, Pleustidae, Lepechinellidae). Siboga-Expedition, Monographie 33c: 115-167, figs 35- 60.

Pirlot, J.M., 1933b. Un nouvel amphipode ascidicole. Bulletin del'Institut Oceanographique 633: 6 pp., 1 fig.

Pirlot, J.M., 1934. Les amphipodes de l'expedition du Siboga. Deuxieme partie. ...II. - Les amphipodes de la mer profonde. 2 Hyperiopsidae...Jassidae. Siboga-Expeditie 33d: 167-235, figs 61-100.

Pirlot, J.M., 1936a. *Urothoe* Dana and Phoxocephalidae Sars. Opinion 133 ICZN. Smithsonian Miscellaneous Collections 73: 41-44.

Pirlot, J.M., 1936b. Les amphipodes de l'expedition du Siboga. Deuxieme partie. ...II. - Les amphipodes de la mer profonde. III. Les amphipodes littoraux. 1. Lysianassidae...Gammaridae. Siboga-Expeditie 33e: 237-328, figs 102-146.

Pirlot, J.M., 1938. Les amphipodes de l'expedition du Siboga. Deuxieme partie. Les amphipodes gammarides. III. - Les amphipodes littoraux. 2. Familles des Dexaminidae, Talitridae, Aoridae, Photidae, Ampithoidae, Corophiidae, Jassidae, Cheluridae et Podoceridae. Siboga Expedition, Monographie 33f: 329-359, figs 147-161.

Pirlot, J.M., 1939. Resultats scientifiques des croisieres du Navire-Ecole Belge "Mercator". III. Amphipoda. Memoir du Museum Royal d'Histoire Naturelle Belgique, series 2, 15: 47-80, 7 figs.

Pirrie, M.E., J.R. Bruce & H.B. Moore, 1932. A quantitative study of the fauna of the sandy beach at Port Erin. Journal of the Marine Biological Association of the United Kingdom, new series, 18: 279-296, 8 figs.

Poda, N., 1761. Insecta Musei Graecensis, quae in ordines, genera et species juxta systema naturae Caroli Linnaei degessit Nicolaus Poda. Graecii. [p. 127]

Poisson, R. & M.L. Legueux, 1926. Notes sur les crustaces amphipodes. I. Crustaces amphipodes marins littoraux de la zone dite du "trottoir" des environs de Banyuls-sur-mer. II. Etude comparee du *Corophium acutum* Chevreux et d'un *Corophium* d'eau saumatre du canal de Caen. Bulletin de la Societe Zoologique de France 51: 314-325, 6 figs.

Popov, A.M., 1931. Hydrobiological explorations in the Nordenskiold Sea (Sea of the Brothers Laptev). International Review of Hydrobiology and Hydrogeography 25: 462-467.

Potts, F.A., 1915. The fauna associated with the crinoids of a tropical coral reef: with especial reference to its colour variations. Papers of the Department of Marine Biology, Carnegie Institute Washington 8: 71-96, 7 figs.

Puttick, G.M., 1978. The diet of the curlew sandpiper at Langebaan Lagoon, South Africa. The Ostrich 49: 158-167, 13 figs.

Rabindranath, P., 1971a. A new liljeborgiid amphipod (Crustacea) from Kerala, India. The Biological Bulletin 140: 482-488, 3 figs.

Rabindranath, P., 1971b. On a collection of Isaeidae (Crustacea, Amphipoda) from the southern Indian region. Bijdragen Tot de Dierkunde 41: 67-93, 14 figs.

Rabindranath, P., 1971c. Two new gammaridean amphipods (Crustacea) from the Gulf of Mannar, S. India. Hydrobiologia 37: 157-172, 52 figs.

Rabindranath, P., 1971d. Haustoriid amphipods (Crustacea) from India. Hydrobiologia 38: 521-539, 7 figs.

Rabindranath, P., 1972a. Marine Gammaridea (Crustacea: Amphipoda) from the Indian region. Family Amphilochidae. Hydrobiologia 39: 509-528, 6 figs.

Rabindranath, P., 1972b. A redescription of *Pereionotus testudo* (Montagu) (Crustacea: Amphipoda) with observations on the genera *Pereionotus* Bate & Westwood and *Palinnotus* Stebbing. Vie et Milieu, Serie A. Biologie Marine 23: 33-44, 2 figs.

Rabindranath, P., 1972c. Marine Gammaridea (Crustacea: Amphipoda) from the Indian region. Family Ampithoidae. Marine Biology 14: 161-178, 9 figs.

Rabindranath, P., 1972d. A new species of *Podocerus* Leach (Amphipoda) with a redescription of *Podocerus brasiliensis* (Dana, 1853). Crustaceana, Supplement 3: 299-307, 2 figs.

Rabindranath, P., 1972e. Three species of gammaridean Amphipoda (Crustacea) from the Trivandrum Coast, India. Zoologischer Anzeiger 188: 84-97, 5 figs.

Rabindranath, P., 1972f. Studies on gammaridean Amphipoda (Crustacea) from India. Bulletin Zoologisch Museum, Universiteit van Amsterdam 2: 155-172, 7 figs.

Rabindranath, P., 1974. *Eurystheus dubius* nom. nov. pro *E.*

anomalus Rabindranath, 1971, preocc. (Amphipoda Isaeidae). Crustaceana 27: 112.

Rabindranath, P., 1975. Marine Gammaridea (Crustacea: Amphipoda) from the Indian region; Family-Ampeliscidae. Hydrobiologia 46: 241-262, 7 figs.

Rabindranath, P., 1983a. A new blind gammarid amphipod (Crustacea) from the Indian region. Pp. 189-194, figs 1-11 and figs 1-8. **In** P.A. John (ed.). Selected Papers on Crustacea. Trivandrum: The Aquarium.

Rafinesque, C.S. [-Schmaltz], 1815. Analyse de la nature outableau de l'universitet des corps organises par C.S. Rafinesque. Palerme. [not seen, source: Stebbing 1888: 88.]

Rafinesque, C.S. [-Schmaltz], 1817. Synopsis of four new genera and ten new species of Crustacea, found in the United States. The American Monthly Magazine and Critical Review 2: 40-43.

Rafinesque, C.S. [-Schmaltz], 1820. Annals of Nature or Annual Synopsis of New Genera and Species of Animals, Plants &c. Discovered in North America, 16 pp. Lexington, Kentucky: Thomas Smith.

Raitt, D.S., 1929. Cod roe attacked by amphipod crustaceans. Scottish Naturalist 176: 57-58.

Raitt, D.S., 1937. The Benthic Amphipoda of the north-western North Sea and adjacent waters. Proceedings of the Royal Society of Edinburgh 57: 241-254, 1 fig.

Raitt, D.S., 1938. A collection of benthic Amphipoda from Icelandic waters, and its relation to similar material from the North Sea. Proceedings of the Linnean Society, 150th Session, 2: 95-98.

Rakusa-Suszczewski, S., 1972. The biology of *Paramoera walkeri* Stebbing (Amphipoda) and the Antarctic sub-fast ice community. Polskie Archiwum Hydrobiologii 19: 11-36, 16 figs.

Rakusa-Suszczewski, S. & R.Z. Rakusa-Suszczewski, 1973. Biology and respiration of the Antarctic Amphipoda (*Paramoera walkeri* Stebbing) in the summer. Polskie Archiwum Hydrobiologii 20: 475-488, 7 figs.

Rancurel, P., 1949. Notes sur les amphipodes marins de la region de Marseille. Bulletin du Museum d'Histoire Naturelle Marseille 9: 165-172, 11 figs.

Ranson, G., 1926. Les termites (*Corophium volutator* Pallas) de certains fonds ostreicoles de la region de Marennes. Comptes Rendus Congres Societes Savantes 1926: 413-418, 1 fig.

Ranson, G., 1972. Intertidal amphipods from the Indian Coast. Proceedings of the Indian National Academy, 38(Part B, Nos. 3 and 4): 190-205, 2 figs.

Rao, K.V.S., 1972. Intertidal amphipods from the Indian coast. Proceedings of the Indian National Academy 38(Part B, Nos 3 & 4): 190-205, 2 figs.

Rao, G.C. & A. Misra, 1983. Meiofauna from Ladshadweep, Indian Ocean. Cahiers de Biologie Marine 24: 51-68, 5 figs.

Rao, M.V.L. & K. Shyamasundari, 1963. Tube-building habits of the fouling amphipod *Corophium triaenonyx* Stebbing at Visakhapatnam Harbour. Journal of the Zoological Society of India 15: 134-140, 2 figs.

Rasmussen, E., 1973. Systematics and ecology of the Isefjord marine fauna (Denmark). Ophelia 11: v-xvi and 495 pp., 119 figs.

Rathbun, M.J., 1905. Fauna of New England 5. List of the Crustacea. Occasional Papers of the Boston Society of Natural History 7: 1-117 + Addenda 1-11.

Rathbun, R., 1880. The littoral marine fauna of Provincetown, Cape Cod, Massachusetts. Proceedings of the U.S. National Museum 3: 116-133.

Rathke, H., 1837. Zur Fauna der Krym. Ein Beitrag. Memoires Presentes a l'Academie Imperiale des Sciences de Saint-Petersbourg 3: 291-454, 10 pls.

Rathke, H., 1843. Beitrage zur Fauna Norwegens. Verhandlungen Kaiserlichen Leopoldinisch-Carolinischen Akademie Naturforscher, Breslau 20(1): 1-264, 264b,264c, 12 pls. [Amphipoda: 63-98, pls 3,4.]

Rauschert, M., 1985. *Eurythenes gryllus* (Lichtenstein) (Crustacea, Amphipoda) in der marinen Fauna von King George (Sudshetlandinseln, Antarktis). Milu, Berlin 6: 319-324.

Reed, E.C., 1897. Catalogo de los crustaceos amfipodos i lemodipodos de Chile. Revista Chilena de Historia Natural 1: 9-11.

Rees, C.B., 1940. A preliminary study of the ecology of a mud-flat. Journal of the Marine Biological Association of the United Kingdom 24: 185-199, 4 figs.

Reibisch, J., 1905. Faunistisch-biologische Untersuchungen uber Amphipoden der Nordsee. I. Teil. Wissenschaftliche Meeresuntersuchungen Kommission Kiel, new series, 8: 145-188, pls 4-5.

Reibisch, J., 1906. Faunistisch-biologische Untersuchungen uber Amphipoden der Nordsee. II. Teil. Wissenschaftliche Meeresuntersuchungen Kommission Wissenschaftlichen Untersuchung Kiel, new series, 9: 187-237, pls 8-9, fig. 2.

Reid, D.M., 1939a. *Hyale ramalhoi* sp.n. (Crustacea, Amphipoda). Annals and Magazine of Natural History, series 11, 3: 29-32, 2 figs.

Reid, D.M., 1939b. *Melita hergensis,* sp. n. (Crustacea, Amphipoda). Annals and Magazine of Natural History, series 11, 4: 278-281, 1 fig.

Reid, D.M., 1939c. The amphipod *Melita pellucida* new to Ireland and the Isle of Man. Annals and Magazine of Natural History, series 11, 3: 530-531.

Reid, D.M., 1940. Three species of Amphipoda (Crustacea) new to Britain. Annals and Magazine of Natural History, series 11, 6: 335-337.

Reid, D.M., 1941. The amphipod fauna of Oldany Harbour, Sutherland. Journal of Animal Ecology 10: 296-305, 1 fig.

Reid, D.M., 1944. Gammaridae (Amphipoda); with key to the families of British Gammaridea. Linnean Society of London, Synopses of the British Fauna 3: 33 pp., 32 figs.

Reid, D.M., 1951. Report on the Amphipoda (Gammaridea and Caprellidea) of the coast of tropical West Africa. Atlantide Report 2: 189-291, 58 figs.

Reinhardt, J., 1857. Fortegnelse over Gronlands Krebsdyr, Annelider og Indvoldsorme. Naturhistoriske Bidrag til En beskrivesse af Gronland, Kjobenhavn, pp. 28-49. [See Stebbing, 1888: 301 for different version, not seen by us.]

Reish, D.J. & J.L. Barnard, 1967. The benthic Polychaeta and Amphipoda of Morro Bay, California. Proceedings of the U.S. National Museum 120(3565): 26 pp., 1 fig.

Remy, P., 1928. Materiaux zoologiques recoltes par le *Pourquoi-pas*? dans les mers arctiques en 1926. Annales des Sciences Naturelle, Zoologie, series 10, 11: 209-245.

Renon, J.P., 1977. Zooplancton du lagon de l'Atoll de Takapoto (Polynesie Francaise). Annales de l'Institut Oceanographique de Paris 53: 217-236, 4 figs.

Risso, A., 1816. Histoire naturelle des crustaces des environs de Nice. 175 pp., 3 pls. Paris: Libraire Grecque-Latine-Allemande.

Risso, A., 1826. Histoire naturelle des principales productions de l'Europe meridionale et principalement de celles des environs de Nice et des Alpes Maritimes. 5, 402 pp., 62 figs on several pls. Paris: F.-G. Levrault.

Ritchie, J., 1927. An account of the destruction of Methil dock gates by marine organisms. Scottish Naturalist 164: 37-

44, 1 fig.

Robertson, D., 1886. Jottings from my note-book. Proceedings and Transactions of the Natural History Society of Glasgow, new series, 1: 130-133.

Robertson, D., 1888. A contribution towards a catalogue of the Amphipoda and Isopoda of the Firth of Clyde. Proceedings and Transactions of the Natural History Society of Glasgow, new series, 2: 9-99.

Robertson, D., 1892. A second contribution towards a catalogue of the Amphipoda and Isopoda of the Firth of Clyde and west of Scotland. Proceedings and Transactions of the Natural History Society of Glasgow 3: 199-223.

Robertson, P.B. & C.R. Shelton, 1978. Two new species of haustoriid amphipods (Crustacea: Amphipoda) from the northwestern Gulf of Mexico. Contributions in Marine Science 21: 47-62, 5 figs.

Robertson, P.B. & C.R. Shelton, 1980. *Lepidactylus triarticulatus* n. sp., a new haustoriid amphipod from the northern Gulf of Mexico. Gulf Research Reports 6: 415-420, 22 figs.

Ross, J.C., 1826. Zoology. Pp. 91-120, Journal of a Third Voyage for the Discovery of a North-West Passage from the Atlantic to the Pacific....Captain William Edward Parry. London.

Ross, J.C., 1828. Zoology. Pp. 189-206, Narrative of an Attempt to Reach the North Pole,....Captain William Edward Parry. London.

Ross, J.C., 1835. Zoology. Pls vii-c, Pls A-C, Appendix to the Narrative of a Second Voyage in Search of a North-West Passage, and of a Residence in the Arctic Regions During the Years 1829, 1830, 1831, 1832, 1833. By Sir John Ross, C.B., K.S.A., K.C.S., &c.&c. Captain in the Royal Navy. Including the Reports of Commander, now Captain, James Clark Ross, R.N., F.R.S., F.L.S., &c. and the Discovery of the Northern Magnetic Pole. London: A.W. Webster.

Rudwick, M.J.S., 1951. Notes on some Crustacea (Amphipoda) from Aden. Annals and Magazine of Natural History, series 12, 4: 149-156, 3 figs.

Rueda, R.L., M. Ortiz & O. Gomez, 1980. Lista de invertebrados bentosicos de las lagunas costeras "Tolete" y "El Basto" de la zona de tunas de Zaza. Revista Investigaciones Marinas, Universidad de Habana 1: 20-45, 2 figs.

Ruffo, S., 1936. Studi sui crostacei anfipodi I. Contributo alla conoscenza anfipodi dell'Adriatico. Bollettino dell'Instituto di Entomologia della Reale Universita di Bologna 9: 23-32, 1 fig.

Ruffo, S., 1937. Gammaridi delle acque superficiali del Veneto, della Venezia Tridentina e delle Lombardia. Memorie Museo Civico di Storia Naturale di Venezia Tridentina (Trento) 4: 35-61, 1 fig., 5 pls.

Ruffo, S., 1938a. Gli anfipodi marini del Museo Civico di Storia Naturale di Genova a) Gli anfipodi del Mediterranea. Annali del Museo Civico di Storia Naturale, Genova 60: 127-151, 1 fig.

Ruffo, S., 1938b. Studi sui crostacei anfipodi IX. Gli anfipodi marini del Museo Civico di Storia Naturale di Genova b) Gli anfipodi del Mar Rosso. Annali del Museo Civico di Storia Naturale di Genova 55: 152-180, 5 figs.

Ruffo, S., 1941. Studi sui crostacei anfipodi X. Contributo alla conoscenza degli anfipodi marini Italiani. Bollettino dell'Istituto di Entomologia della Reale, Universita di Bologna 11: 112-126.

Ruffo, S., 1946. Studi sui crostacei anfipodi XI. Gli anfipodi bentonici di Rovigno d'Istria (nota preventiva). Bollettino Societa Entomologia Italiana 76(7-8): 49-56, 1 fig.

Ruffo, S., 1947a. Studi sui crostacei anfipodi XII. Gli anfipodi del Museo Civico di Storia Naturale di Genova C. Su alcuni anfipodi Mediterranei e descrizione di una nuova specie del gen. [illegible]. Annali del Museo Civico di Storia Naturale, Genova [illegible]: 79-89, 2 figs.

Ruffo, S., 1947b. Studi sui crostacei anfipodi XIV. Su alcune specie di anfipodi dell'Atlantico Orientale (Isole Azorre, Canarie, del Capoverde, Annobon, Guinea Portoghese, Africa Australe). Memorie Museo Civico Storia Naturale, Verona 1: 113-130, 8 figs.

Ruffo, S., 1947c. Studi sui crostacei anfipodi XIII. Sulle specie mediterranee del gen. *Corophium* Latr. Atti della Societa Italiana di Scienze Naturali e del Museo Civico di Storia Naturale in Milano 86: [illegible], 6 figs.

Ruffo, S., 1947d. Studi sui crostacei anfipodi XV. Su alcune specie di anfipodi dell'Argentina e della Terra del Fuoco. Bolletino Laboratoria di Entomologia Agraria Portici 7: 326-332.

Ruffo, S., 1948. Studi sui crostacei anfipodi XVII. Gli anfipodi del Museo Civico di Storia Naturale di Genova. Anfipodi di Sumatra, Celebes, Nuova Guinea, Australia e Tasmania. Annali del Museo Civico di Storia Naturale di Genova 63: 205-217, 3 figs.

Ruffo, S., 1949. Amphipodes (II). Resultats du Voyage de la Belgica en 1897-99. Rapports Scientifiques, Zoologie, 58 pp., 18 figs.

Ruffo, S., 1950. Studi sui crostacei anfipodi XXII. Anfipodi del Venezuela raccolti dal Dott. G. Marcuzzi. Memorie del Museo Civico di Storia Naturale, Verona 2: 49-65, 5 figs.

Ruffo, S., 1952. *Microphotis blachei* n. gen. n. sp. (Amphipoda Photidae) delle acque del fiume Mekong (Cambogia). Memorie del Museo Civico di Storia Naturale, Verona 3: 35-40, 3 figs.

Ruffo, S., 1953a. Studi sui crostacei anfipodi XXXVI. Nota critica su *Biancolina algicola* D. Val. (Amphipoda Prophliantidae). Atti dell'Accademia di Agricoltura Scienze e Lettere di Verona, series 6, 3: 1-9, 2 figs.

Ruffo, S., 1953b. Studi sui crostacei anfipodi XXXIII. Anfipodi raccolti sulle coste dell'Angola e del Congo Belga dal Dr E. Dartevelle. Revue de la Zoologique et de la Botanique de L'Afrique 47(1-2): 120-136, 5 figs.

Ruffo, S., 1954. Nuovi anfipodi raccolti nel Venezuela dal Prof. G. Marcuzzi. Memorie del Museo Civico di Storia Naturale, Verona 4: 117-125, 2 figs.

Ruffo, S., 1955. Etudes sur les crustaces amphipodes XLIII. Une nouvelle espece de *Photis* de Madagascar amphipodes Photidae. Le Naturaliste Malagache 7: 195-200, 2 figs.

Ruffo, S., 1956a. Nota su alcuni anfipodi raccolti sulle coste dell'India dal Dr. K. Lindberg. Memorie del Museo Civico di Storia Naturale, Verona 5: 211-216.

Ruffo, S., 1956b. Su alcuni anfipodi raccolti sulle coste atlantiche del Brasile. Memorie del Museo Civico di Storia Naturale, Verona 5: 115-124, 4 figs.

Ruffo, S., 1958. Studi sui crostacei anfipodi XLIX. Osservazioni sopra alcune specie de anfipodi trovate a banyuls su echinodermi. Vie et Milieu 8: 312-318.

Ruffo, S., 1959. Contributions to the knowledge of the Red Sea No. 13. Contributo alla conoscenze degli anfipodi del Mar Rosso (1). Sea Fisheries Research Station, Haifa, Bulletin 20: 36 pp., 6 figs.

Ruffo, S., 1969. Terzo contributo alla conoscenza degli anfipodi del Mar Rosso. Memorie del Museo Civico di Storia Naturale, Verona 17: 1-77, 24 figs.

Ruffo, S., 1971. Un nuovo genere de *Lysianassidae* del Golfo di Napoli e osservazioni su *Lysianella dellavallei* Stebbing (Crustacea Amphipoda). Memorie del Museo Civico di Storia Naturale, Verona 19: 103-112, 4 figs.

Ruffo, S., 1974a. Due cambiamenti di nome di generi di crostacei anfipodi. Bollettino del Museo Civico Storia Naturale, Verona 1: 507.

Ruffo, S., 1974b. Nuovi anfipodi interstiziali delle coste del Sud Africa. Atti dell'Istituto Veneto di Scienze, Lettere ed Arti 132: 399-419, 8 figs.

Ruffo, S., 1975a. *Hyachelia tortugae* J.L. Barnard (Amphipoda, Hyalidae) nell'Oceano Atlantico, Bollettino del Museo Civico Storia Naturale, Verona 2: 482.

Ruffo, S., 1975b. Studi sui crostacei anfipodi. Nuovi Lisianassidi e Stegocefalidi del Mediterraneo. Bolettino del Museo Civico di Storia Naturale, Verona 1: 441-453, 8 figs.

Ruffo, S., 1979. Studi sui crostacei anfipodi. (Crustacea Amphipoda, Cressidae). Il Genere *Cressa* nel Mediterraneo. Bollettin del Museo Civico di Storia Naturale, Verona 5: 555-566, 5 figs.

Ruffo, S., 1982a. Une nouvelle espece de *Metacrangonyx* Chevreux (Amphipoda: Gammaridae) du desert du Sinai. Israel Journal of Zoology 31: 151-156, 2 figs.

Ruffo, S., 1982b (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de L'Institut Oceanographique 13: 1-364, figs 1-243.

Ruffo, S., 1982c. Family Argissidae. Pp. 159-161, figs 106-107. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridae (Acanthonotozomatidae to Gammaridae). Memoires de L'Institut Oceanographique 13.

Ruffo, S., 1982d. Family Biancolinidae. Pp. 162-163, fig. 108. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de L'Institut Oceanographique 13.

Ruffo, S., 1982e. Family Colomastigidae. Pp. 183-184, fig. 123. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de L'Institut Oceanographique 13.

Ruffo, S., 1982f. Family Cressidae. Pp. 209-211, figs 143-144. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de L'Institut Oceanographique 13.

Ruffo, S., 1985. Le specie Mediterranee dei generi *Tmetonyx* Stebbing e *Tryphosella* Bonnier (Crustacea, Amphipoda, Lysianassidae). Annali del Museo Civico di Storia Naturale, Genova 85: 273-297, 13 figs.

Ruffo, S., 1986. Contributo alla conoscenza dei Podoceridae Mediterranei. Bolletino Museo Civico Storia Naturale, Verona 13: 1-12, 4 figs.

Ruffo, S. & G. Krapp-Schickel, 1967. Nota su tre interessanti specie di crostacei anfipodi Mediterranei. Memorie del Museo Civico di Storia Naturale, Verona 15: 85-95, 3 figs.

Ruffo, S. & U. Schiecke, 1977. Le specie Mediterranee del genere *Lepidepecreum* Bate & Westwood (Amphipoda, Lysianassidae). Bollettino del Museo Civico di Storia Naturale, Verona 4: 429-447, 10 figs.

Ruffo, S. & U. Schiecke, 1979. Contributo alla conoscenza degli acantonotozomatidi del Mediterraneo (Crustacea, Amphipoda). Bollettino del Museo Civico di Storia Naturale, Verona 5: 401-429, 8 figs.

Ruffo, S. & U. Schiecke, 1982. Family Acanthonotozomatidae. Pp. 1-18, 12 figs. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridae (Acanthonotozomatidae to Gammaridae). Memoires de L'Institut Oceanographique 13.

Ruffo, S. & G. Vesentini-Paiotta, 1972. Etudes hydrobiologiques en Nouvelle-Caledonie (Mission 1965 du Premier Institut de Zoologie de l'Universite de Vienne) anfipodi (Crust.) della Nuova Caledonia. Cahiers O.R.S.T.O.M., Serie Hydrobiologia 6: 247-260, 8 figs.

Ruffo, S. & W. Wieser, 1952. Untersuchungen uber die Algenbewohnende Mikrofauna mariner Hartboden II Osservazioni sistematiche ed ecologiche su alcuni anfipodi delle coste Mediterranee Italiane. Memorie del Museo Civico di Storia Naturale di Verona 3: 11-30, 1 fig.

Runnstrom, S., 1928. Amphipoda, Isopoda and Pycnogonida from the Siberian Arctic Ocean. The Norwegian North Polar Expedition with the "Maud" 1918-1925, Scientific Results 5(8): 18 pp.

Runnstrom, S., 1932. Eine Uebersicht uber das Zooplankton des Herdlaund Hjeltefjordes. Bergens Museums Arbok 7: 67 pp., 4 figs.

Russell, F.S., 1925. The vertical distribution of marine macroplankton. An observation on diurnal changes. Journal of Marine Biology of the United Kingdom 13: 769-809, 6 figs, 1 pl.

Sabine, E., 1824. Invertebrate animals. [Marine invertebrate animals] pp. ccxix-ccxxxix, pls 1-2. **In** A Supplement to the Appendix of Captain Parry's Voyage for the Discovery of a North-West Passage, in the Years 1819-20..." Appendix X. Natural History. London: John Murray.

Sagar, P.M., 1980. Life cycle and growth of the Antarctic gammarid amphipod *Paramoera walkeri* (Stebbing, 1906). Journal of the Royal Society of New Zealand 10: 259-270, 3 figs.

Sainte-Marie, B. & P. Brunel, 1983. Differences in life history and success between suprabenthic shelf populations of *Arrhis phyllonyx* (Amphipoda Gammaridea) in two ecosystems of the Gulf of St. Lawrence. Journal of Crustacean Biology 3: 45-69, 9 figs.

Salfi, M., 1939. Ricerche etologiche ed ecologiche sugli anfipodi tubicoli del canale delle saline di Cagliari. Archiva Zoologico Italiano (Torino) 27: 31-62, 7 figs, pl. 2.

Salman, S.D., 1985. *Stenothoe irakiensis,* a new species of stenothoid amphipod from the Arabian Gulf. Crustaceana 49: 244-250, 4 figs.

Salman, S.D., 1986. *Parhyale basrensis,* a new species of talitrid amphipod from the Shutt Al-Arab region, Iraq. Crustaceana 50(3): 287-294, 4 figs.

Salvat, B., 1967. La macrofaune carcinologique endogee des sediments meubles intertidaus (tanaidaces, isopodes et amphipodes), ethologie, binomie et cycle biologique. Memoires du Museum National d'Histoire Naturelle, series A, 45(1): 265 pp.

Sameoto, D.D., 1969a. Some aspects of the ecology and life cycle of three species of subtidal sand-burrowing amphipods (Crustacea: Haustoriidae). Journal of the Fisheries Research Board of Canada 26: 1321-1345, 9 figs.

Sameoto, D.D., 1969b. Comparative ecology, life histories, and behavior of intertidal sandburrowing amphipods (Crustacea: Haustoriidae) at Cape Cod. Journal of the Fisheries Research Board of Canada 26: 361-388, 8 figs.

Samouelle, G., 1819. The Entomologist's Useful Compendium; or an Introduction to the Knowledge of British Insects, Comprising the Best Means of Obtaining and Preserving Them, and a Description of the Apparatus Generally Used; Together with the Genera of Linne, and the Modern Method of Arranging the Classes Crustacea, Myriapoda, Spiders, Mites and Insects...According to the Views of Dr. Leach. Pp. 101-106. London: No Publisher.

Sanderson, J.M., 1973. A catalogue of the Amphipoda (Crustacea) in the collection of the late D.M. Reid, now in the Royal Scottish Museum, Edinburgh. Information

Series of the Royal Scotish Museum, Natural History 1: i-vi, 1-79.

Sanger, G.A., 1973. Epipelagic amphipods (Crustacea) off Washington and British Columbia, October-November 1971. Northwest Fisheries Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration. Survey I, Report 8: 1-29. [Mimeographed.]

Sanger, G.A., 1974. Pelagic amphipod crustaceans from the southeastern Bering Sea, June 1971. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, SSRF-680: 8 pp., 3 figs.

Sarma, A.L.N. & D.G. Rao, 1981. Occurrence of a species of *Palinnotus* (Amphipoda) on Port Blair shore (Andaman Islands). Journal of the Bombay Natural History Society 78: 397-399, 15 figs.

Sars, G.O., 1863. Beretning om en i Sommeren 1862 foretagen zoologisk Reise i Christianias og Trondhjems Stifter. Nyt Magazin for Naturvidenskaberne, Christiania 12: 193-252.

Sars, G.O., 1876. Prodromus descriptionis crustaceorum ft [sic] pycnogonidarum, qvae in expeditione Norvegica anno 1876, observavit. Archiv for Mathematik og Naturvidenskab 2: 337-271 [sic] [=227-271].

Sars, G.O., 1879. Crustacea et Pycnogonida nova in itinere 2do et 3tio expeditionis Norvegicae anno 1877 & 78 collecta. (Prodromus descriptionis). Archiv for Mathmatik og Naturvidenskab 4: 427-476.

Sars, G.O., 1883. Oversigt af Norges Crustaceer med forelobige Bemaerkninger over de nye eller Mindre bekjendte Arter. I. (Podophthalmata-Cumacea-Isopoda-Amphipoda). Forhandlinger Vidensk-absselskabs i Christiania 18: 124 pp., 6 pls.

Sars, G.O., 1885. Zoology. Crustacea, I. Norwegian North-Atlantic Expedition 1876-1878, 6: 280 pp., 21 pls.

Sars, G.O., 1886. Zoology, Crustacea, II. Norwegian North-Atlantic Expedition 1876-1878, 6: 96 pp.

Sars, G.O., 1895. Amphipoda. An Account of the Crustacea of Norway With Short Descriptions and Figures of All the Species, 1: viii + 711 pp., 240 pls, 8 supplementary pls.

Sars, G.O., 1900. Crustacea. The Norwegian North Polar Expedition 1893-1896, Scientific Research 1(5): 137 pp., 36 pls.

Sars, G.O., 1904. On a new (planktonic) species of the genus *Apherusa*. International Council for the Exploration of the Sea, Publications de Circonstance 10: 3-5, 1 pl.

Sars, G.O., 1909. Crustacea. Report of the Second Norwegian Arctic Expedition in the "Fram" 1898-1902, 18: 47 pp., 12 pls.

Sars, M., 1858. Oversigt over de i den norsk-arctiske Region forekommende Krebsdyr. Forhandlingar i Videnskabs-Selskabet i Christiania, for 1858: 122-163.

Sasidharan, K.K., 1983a. *Anamixis barnardi* sp. nov. – A littoral amphipod (Crustacea) from South India. Pp. 195-199, 14 figs. **In** P.A. John (ed.). Selected Papers on Crustacea. Trivandrum: The Aquarium.

Sasidharan, K.K., 1983b. Redescription of *Palinnotus alaniphlias* J.L. Barnard (Crustacea, Amphipoda). Pp. 201-207, 9 figs and 8 figs. **In** P.A. John (ed.). Papers on Crustacea. Trivandrum: The Aquarium.

Saudray, Y. & J. Marchand, 1972. Observations sur la pars molaris des mandibules de quelques gammarides (Crustacea, Amphipoda) etudiees a l'aide du microscope electronique a balayage. Comptes Rendus Academie Sciences de Paris, series D, 274: 2061-2064, 11 figs.

Saussure, H., 1858. Memoire sur divers crustaces nouveaux des Antilles et du Mexique. Memoire de la Societe Physique du Histoire Naturelle 14P.2: 417-496, 6 pls.

Savigny, J.-C., 1816. Observations generales sur la bouche des arachnides, des crustaces et des entomostraces. Second Memorie. Pp. 39-117, pls 1-8 of Memories sur les Animaux sans Vertebres, Premiere partie, Paris: Deterville.

Say, T., 1817. On a new genus of the Crustacea, and the species on which it was established. Journal of the Academy of Natural Sciences of Philadelphia 1: 49-52.

Say, T., 1818. An account of the Crustacea of the United States. Journal of the Academy of Natural Sciences of Philadelphia 1: 374-401.

Schaferna, K., 1908. Uber Gammariden von Tripolis und Barka. Zoologische Jahrbucher, Systematik 26: 447-452, pl. 30.

Schellenberg, A., 1925a. Crustacea VIII. Amphipoda, volume 3. Pp. 111-204, 27 figs. **In** W. Michaelsen (ed.). Beitrage zur Kenntnis der Meeresfauna Westafrikas. Hamburg: L. Friedrichsohn & Co.

Schellenberg, A., 1925b. Die Gammariden Spitzbergens nebst einer Uebersicht der von Romer & Schaudinn 1898 im nordlichen Eismeer gesammelten Arten. Mittheilungen aus dem Zoologischen Zoologischen Museum en Berlin 11: 195-231, 10 figs.

Schellenberg, A., 1925c. Die Amphipodengattung *Ampelisca* und das Bipolaritatsprobleme. Zoologischer Anzeiger 62: 125-129, 2 figs.

Schellenberg, A., 1926a. Die Gammariden der deutschen Sudpolar-Expedition 1901-1903. Deutsch Sudpolar-Expedition 18: 235-414, 68 figs.

Schellenberg, A., 1926b. Die Caprelliden und *Neoxenodice caprellinoides* n.g. n.sp. der Deutschen Sudpolar Expeditions 1901-1903. Deutsch Sudpolar Expeditions 18: 465-476, 3 figs.

Schellenberg, A., 1926c. Amphipoda 3. Die Gammariden der Deutschen Tiefsee-Expedition. Wissenschaften Ergebnisse Deutschen Tiefsee-Expedition "Valdivia" 1898-1899, 23: 195-243, 28 figs, pl. 5.

Schellenberg, A., 1927. Amphipoda des nordischen Plankton. Nordisches Plankton 20: 589-722, 104 figs.

Schellenberg, A., 1928a. *Stephensenia haematopus* n.g. n.sp., eine grabende Lysianasside. Zoologischer Anzeiger 79: 285-289, 2 figs.

Schellenberg, A., 1928b. Report on the Amphipoda. Zoological results of the Cambridge Expedition to Suez Canal, 1924. Transactions of the Zoological Society of London 22: 633-692, figs 198-209.

Schellenberg, A., 1929a. Malacostraken aus Ebbetumpeln des Langeooger Sandstrandes. Zoologischer Anzeiger 85: 176-178.

Schellenberg, A., 1929b. Die abyssale und pelagische Gammariden. Reports on the Scientific Results of the Expedition to the Eastern Tropical Pacific..."Albatross"..1904-1905. Bulletin of the Museum of Comparative Zoology 69: 191-201, 1 pl.

Schellenberg, A., 1929c. Revision der Amphipoden-Familie Pontogeneiidae. Zoologischer Anzeiger 85: 273-282.

Schellenberg, A., 1931. Gammariden und Caprelliden des Magellangebietes, Sudgeorgiens und der Westantarktis. Further Zoological Results of the Swedish Antarctic Expedition 1901-1903, 2(6): 290 pp., 1 pl., 136 figs.

Schellenberg, A., 1932. Neue Crustaceen der deutschen Kuste. Zoologischer Anzeiger 101: 61-65, 1 fig.

Schellenberg, A., 1934. Zur Amphipodenfauna der Kieler Bucht. Naturwissenschaftlichen Vereins Schleswig-Holstein, Schriften 20: 129-144, 2 figs.

Schellenberg, A., 1935a. Amphipoden von Chile und Juan Fernandez, gesammelt von Prof. W. Goetsch. Zoologische Jahrbucher Abteilung fur Systematik 67: 225-234, 3 figs.

Schellenberg, A., 1935b. Die Amphipoden der norwegischen

Expeditionen nach Ost- Gronland in den Jahren 1929, 1930, 1931 und 1932. Skrifter om Svalbard og Ishavet (Norges Svalbard-og Ishavs-Undersokelser) 66: 9-39, 3 figs.
Schellenberg, A., 1936a. Zwei neu Amphipoden des Stillen Ozeans und zwei Berichtigungen. Zoologischer Anzeiger 116: 153-156, 1 fig.
Schellenberg, A., 1936b. Amphipoda Benthonica. The Fishery Grounds Near Alexandria. Ministry of Commerce and Industry, Egypt, Fisheries Research Directorate, Notes and Memoirs 18: 27 pp., 1 fig.
Schellenberg, A., 1938a. Litorale Amphipoden des tropischen Pazifiks. Kunglia Svenska Vetenskapsakademiens Handlingar (3)16(6): 105 pp., 48 figs.
Schellenberg, A., 1938b. Brasilianische Amphipoden, mit biologischen Bemerkungen. Zoologische Jahrbucher Abteilung fur Systematik 71: 203-218, 5 figs.
Schellenberg, A., 1939. Amphipoden des Kongo-Mundungsgebietes. Revue de Zoologie et de Botanique Africaines 32: 122-138, 29 figs.
Schellenberg, A., 1942. Krebstiere oder Crustacea IV: Flohkrebse oder Amphipoda. Die Tierwelt Deutschlands, Jena 40: 252 pp., 204 figs.
Schellenberg, A., 1953. Erganzkungen zur Amphipodenfauna Sudwest-Afrikas nebst Bemerkungen uber Brutraumbildung. Mitteilungen aus dem Zoologischen Museum in Berlin 29: 107-126, 7 figs.
Schellenberg, A., 1955. Amphipoda. Reports of the Swedish Deep-Sea Expedition 1947-1948, 2: Zoologii, 2: 181-195, 4 figs.
Schickel, G., see Krapp-Schickel, G.
Schiecke, U., 1973. Ein Beitrag zur Kenntnis der Systematik, Biologie und Autokologie mariner Peracarida (Amphipoda, Isopoda, Tanadaicea) des Golfes von Neapel. Inaugural Dissertation Mathematik Naturwissenschaften Fakulte Christian-Albrechts Universite Kiel: 1-408, 91 figs. [not seen]
Schiecke, U., 1976a. Eine Zweite Art der Gattung *Amphithopsis* Boeck (Amphipoda): *A. depressa* n.sp. aus dem Golf von Neapel (Italien). Bollettino del Museo Civico di Storia Naturale, Verona 3: 421-434, 6 figs.
Schiecke, U., 1976b. *Xenodice macrophthalma* n.sp. (Amphipoda: Podoceridae) from the Bay of Naples (Italy), with corrections of the genus diagnosis. Bollettino del Museo Civico di Storia Naturale, Verona 3: 435-443, 3 pls.
Schiecke, U., 1977. Zwei Neue Vertreter der Cyproideinae (Amphipoda: Amphilochidae) aus dem Mittelmeer: *Pseudopeltocoxa gibbosa* n.g., n.sp. und *Peltocoxa mediterranea* n.sp. Bollettino Museo Civico di Storia Naturale di Verona 4: 525-542, 7 figs.
Schiecke, U., 1978. Neue Amphipoda (Crustacea) vom Golf von Neapel (Italia). Bollettino del Museo Civico di Storia Naturale, Verona 5: 355-368, 11 figs.
Schiecke, U., 1982. Family Cheluridae. Pp. 179-182, figs 120-122. **In** S. Ruffo (ed.). The Amphipoda of the Mediterranean, Part 1, Gammaridea (Acanthonotozomatidae to Gammaridae). Memoires de L'Institut Oceanographique 13.
Schijfsma, K., 1931a. Amphipoda van de Zuiderzee. De Biologie van de Zuiderzee Tijdens Haar Drooglegging Mededeelingen van de Zuiderzee. Commissie Uitgegeven Door de Nederlandsche Dierkundige Vereeniging Afl 3: 7-27.
Schijfsma, K., 1931b. Komt *Corophium crassicorne* Bruz. in Nederland voor? Nederlandsche Dierkundige Vereeniging, Tijdschrift series 3, 2: 168-170.
Schijfsma, K., 1936. Amphipoda. Flora en Fauna der Zuiderzee. Monografie van een Brakwatergebied, Supplement: 121-125.
Schneider, J.S., 1883. Bidrag til en noiere Karakteristik af de ved Norges Kyster forekommende Arter af Familien Oediceridae. Tromso Museum Aarshefter 6: 1-44, 3 pls.
Schneider, J.S., 1884. Undersogelser af dyrelivet i de arktiske fjorde. II. Crustacea og Pycnogonida indsamlede i Kvaenangsfjorden 1881. Tromso Museum Aarshefter 7: 47-134, 5 pls.
Schneider, J.S., 1885. *Pontocrates norvegicus,* Boeck und *Dexamine thea,* Boeck, Ein Beitrag zur Kentniss der Amphipoden des arktischen Norwegens. Det Kongelige Norske Videnskabers Selskabs Skrifter 1884: 13-26, 2 pls.
Schneider, J.S., 1891. Undersogelser af drylivet i de arktiske fjord. IV. Mollusca og Crustacea indsamlede i Malangenfjord 1887. Tromso Museum Aarshefter 14: 75-122.
Schuster, O., 1954. Zwei neue Crustaceen von der pazifischen Kuste Mittel-Amerikas (Amphipoda und Isopoda). Senckenbergiana Biologica 35: 103-105, 2 figs.
Scoresby, W., 1820. An Account of the Arctic Regions, with a History and Description of the Northern Whale-Fishery. In Two Volumes, 1: xx + 551 pp., appendix of 82 pp., pls. Edinburgh: Archibald Constable & Co.
Scott, A., 1907. Report on the tow-nettings. Report on the investigations carried on during 1906 in connection with the Lancashire Sea-Fisheries Laboratory at the University of Liverpool, and the Sea-Fish Hatchery at Piel, Near Barrow. Proceedings and Transactions of the Liverpool Biological Society 21: 137-190.
Scott, K.J. & R.A. Croker, 1976. Macroinfauna of Northern New England marine sand. III. The ecology of *Psammonyx nobilis* (Stimpson), 1853 (Crustacea: Amphipoda). Canadian Journal of Zoology 54: 1519-1529, 8 figs.
Scott, T., 1890. Additions to the fauna of the Firth of Forth. Annual Report of the Fishery Board for Scotland 8: 312-333, pls 12, 13.
Scott, T., 1893. Additions to the fauna of the Firth of Forth. Annual Report of the Fishery Board for Scotland 11: 197-219, 5 pls.
Scott, T., 1894. On some rare and interesting Crustacea from the Dogger Bank collected by Ernest W.L. Holst, Esq. Annals and Magazine of Natural History, series 6, 13: 412-420.
Scott, T., 1896a. Report on a collection of marine dredgings and other natural history materials made off the west coast of Scotland by the late George Brook, F.L.S. Proceedings of the Royal Physical Society of Glasgow 13: 166-193, pl. 5.
Scott, T., 1896b. Additions to the fauna of the Firth of Forth.-Part VIII. Annual Report of the Fishery Board for Scotland 14: 158-166, pls 3, 4.
Scott, T., 1899a. Notes on recent gatherings of micro-Crustacea from the Clyde and the Moray Firth. Annual Report of the Fishery Board for Scotland 17: 248-271, pls 10-13.
Scott, T., 1899b. Report on the marine and freshwater Crustacea from Franz-Josef Land, collected by Mr. William S. Bruce, of the Jackson-Harmsworth Expedition. Journal of the Linnean Society of London, Zoology 27: 60-126, pls 3-9.
Scott, T., 1901. Notes on the gatherings of Crustacea, collected for the most part by the Fishery Steamer "Garland" and the Steam Trawler "St. Andrew" of Aberdeen, and examined during the year 1900. Part III of the 19th Annual Report of the Fishery Board for Scotland, pp. 235-281, pls 17-18.
Scott, T., 1902. Notes on gatherings of Crustacea collected

by the Fishery Steamer "Garland", and the Steam Trawlers "Star of Peace" and "Star of Hope", of Aberdeen, during the year 1901. Part III of 20th Annual Report of the Fishery Board for Scotland, pp. 449-485, pls 22-25.

Scott, T., 1906a. A catalogue of land, fresh-water, and marine Crustacea in the basin of the River Forth and its estuary. Proceedings of the Royal Physical Society, Edinburgh, part II, 16: 267-386. Appendix.

Scott, T., 1906b. A catalogue of land, fresh-water, and marine Crustacea found in the basin of the River Forth and its estuary. Proceedings of the Royal Physical Society, Edinburgh, part I, 16: 97-190, pl. 6.

Scott, T., 1907. Observations on some Copepoda that live as messmates or commensals with ascidians. Transactions of the Edinburgh Field Naturalists' and Microscopical Society 5: 357-372.

Scott, T., 1909. On new and rare Crustacea from Scottish waters. Annals and Magazine of Natural History, series 8, 4: 31-36, pls 2-3.

Scott, T., 1910a. Notes on Crustacea found in the gizzard of a deep-sea cephalopod. Annals and Magazine of Natural History, series 8, 5: 51-54, pls 2-3.

Scott, T., 1910b. Notes on the distribution of pelagic Crustacea in Lower and Upper Loch Fyne. Annual Report of the Fishery Board for Scotland 27: 74-99.

Scott, T. & A. Scott, 1893. On some new or rare Crustacea from Scotland. Annals and Magazine of Natural History, series 6, 12: 237-246, pls 11-13.

Seba, A., 1760. Locupletissimi rerum naturalium thesauri..., 3: 54-57, pl. 21. Amstelaedami: Janssonio-Waesbergios.

Sebestyen, O., 1935. Appearance and rapid increase of *Dreissensia polymorpha* Pall. and *Corophium curvispinum* G.O. Sars forma *devium* Wundsch in Lake Balaton. Arbeiten des Ungarischen Biologischen Forschungs-Institutes 7: 190-204, 5 figs.

Sebestyen, O., 1937a. Colonization of two new fauna-elements of Pontus - Origin (*Dreissenia polymorpha* Pall. and *Corophium curvispinum* G.O. Sars forma *devium* Wundsch) in Lake Balaton. Verhandlungen der Internationalen Vereinigung fur Theoretische und Angewandt Limnologie Stuttgart 8: 169-181, 10 figs.

Sebestyen, O., 1937b. Studien uber die Bodentierwelt in sudfinnlandischen Kustengewassern. IV. Bestandesschwankungen beim Amphipoden *Corophium volutator*. Acta Societatis pro Fauna et Flora Fennica 60: 245-255, 2 figs.

Sebestyen, O., 1940. Studien uber die Bodentierwelt in sudfinnlandischen Kustengewassern VI. Zur Biologie des Amphipoden *Corophium volutator*, nebst Angaben uber die Entwicklung und Ruckbildung der Oostegitenborsten bei dieser Art. Societas Scientiarum Fennica Commentationes Biologicae 7(16): 40 pp., 3 figs.

Sebestyen, O., 1941. Einige Amphipodenfunde aus dem baltischen Meeresgebiet Finnlands. Memoranda Societatis pro Fauna et Flora Fennica 17: 145-149.

Sebestyen, O., 1942. Weitere Beobachtungen uber das Vorkommen der Amphipoden *Leptocheirus pilosus* Zaddach und *Corophium lacustre* Vanhoffen an der Sudkuste Finnlands. Memoranda Societatis Faunaet Flora Fennica 19: 20-22.

Sebestyen, O., 1944a. Weitere Studies uber die Tierwelt der Fucus-Vegetation an der Sudkuste Finnlands. Societas Scientiarum Fennica Commentationes Biologicae 9(4): 28 pp., 2 pls, 4 figs.

Sebestyen, O., 1944b. Neue Funde der Amphipoden *Calliopius laeviusculus* Krøyer und *Bathyporeia pilosa* Lindstrom aus dem baltischen Meeresgebiet Finnlands. Societas Scientiarum Fennica Commentationes Biologicae 9(5): 4 pp., 1 fig.

Sebestyen, O., 1949. The brackish-water fauna of Finnland. Oikos 1: 127-141, 2 figs.

Sebestyen, O., 1950. The amphipods on the coasts of Finland - Some facts and problems. Societas Scientiarum Fennica, Commentationes Biologicae 10(13): 28 pp., 16 figs.

Sebestyen, O., 1953. Further notes on the increase in salinity of the inner Baltic and its influence on the fauna. Societas Scientiarum Fennica Commentationes Biologicae 13(15): 7 pp.

Sebestyen, O., 1959. Synopsis of data on the crustaceans *Gammarus locusta, Gammarus oceanicus, Pontoporeia affinis*, and *Corophium volutator* (Amphipoda Gammaridea). Societas Scientiarum Fennica, Commentationes Biologicae 20(5): 23 pp., 5 figs.

Sekiguchi, H., 1982. Scavenging amphipods and isopods attacking the spiny lobster caught in a gill net. Reports of the Fisheries Research Laboratory, Mie University 3: 21-30, 3 figs.

Sekiguchi, H. & Y. Yamaguchi, 1983. Scavenging gammaridean amphipods from the deepsea floor. Bulletin of the Faculty of Fisheries, Mie University 10: 1-14, 6 figs.

Sexton, E.W., 1908. On the amphipod genus *Trischizostoma*. Proceedings of the Zoological Society of London 1908, 1: 370-402, pls 14-21.

Sexton, E.W., 1909. Notes on some Amphipoda from the north side of the Bay of Biscay. Families Pleustidae and Eusiridae. Proceedings of the Zoological Society of London 1909: 848-879, figs 278-279, pls 80, 81.

Sexton, E.W., 1911a. On the amphipod genus *Leptocheirus*. Proceedings of the Society of London 1911, 2: 561-594, pls 17-19, 1 fig.

Sexton, E.W., 1911b. A new amphipod species, *Tryphosites alleni*. Annals and Magazine of Natural History, series 8, 7: 510-513, pl. 14.

Sexton, E.W., 1911c. The Amphipoda collected by the "Huxley" from the north side of the Bay of Biscay in August, 1906. Journal of the Marine Biological Association of the United Kingdom, new series 9: 199-227, pl. 3.

Sexton, E.W., 1912. Some brackish-water Amphipoda from the mouths of the Weser and the Elbe, and from the Baltic. Proceedings of the Zoological Society of London 2: 656-665, pls 73, 74.

Sexton, E.W. & D.M. Reid, 1951. The life-history of the multiform species *Jassa falcata* (Montagu) (Crustacea Amphipoda) with a review of the bibliography of the species. Journal of the Linnean Society of London, Zoology 42: 29-91, pls 4-30.

Sheard, K., 1936a. Amphipods from a South Australian reef. Part 2. Transactions and Proceedings of the Royal Society of South Australia 60: 173-179, 4 figs, pl. 17.

Sheard, K., 1936b. Amphipods of the phliantid group in the South Australian Museum, with a suggested division of the family. Records of the South Australian Museum 5: 456-468, 6 figs.

Sheard, K., 1936c. Amphipoda from a South Australian reef. Part I. Records of the South Australian Museum 5: 445-455, 4 figs.

Sheard, K., 1937. A catalogue of Australian Gammaridea. Transactions and Proceedings of the Royal Society of South Australia 61: 17-29.

Sheard, K., 1938. The amphipod genera *Euonyx, Syndexamine* and *Paradexamine*. Records of the South Australian Museum 6: 169-186, 9 figs.

Shen, C.J., 1936. Description of a new tube-dwelling amphipod collected on the coast of Shantung Peninsula. Bulletin of the Fan Memorial Institute of Biology (Zoology) 6: 265-273, 5 figs.

Shen, C.J., 1954. On two species of amphipod Crustacea from Yunnan, China. Acta Zoologica Sinica 6: 15-22, 4 pls.

Shen, C.J., 1955. On some marine crustaceans from the coastal water of Fenghsien, Kiangsu Province. Acta Zoologica Sinica 7: 75-100, 66 figs.

Shih, C.-T. & D.R. Laubitz, 1978. Zooplankton distribution in the eastern Beaufort Sea and the Northwest Passage. Astarte 11: 45-54, 2 figs.

Shiino, S., 1948. Studies on marine crustaceans III. On a new boring amphipod, *Chelura brevicauda* sp.n. Miscellaneous Reports of the Research Institute of Natural Resources 12: 25-28, 3 figs.

Shiino, S., 1957. The marine wood-boring crustaceans of Japan. II. (Sphaeromidae and Cheluridae). Wasmann Journal of Biology 15:161-197, 15 figs.

Shillaker, R.O. & P.G. Moore, 1978. Tube building by the amphipods *Lembos websteri* Bate and *Corophium bonnellii* Milne Edwards. Journal of Experimental Marine Biology and Ecology 33: 169-185, 4 figs.

Shoemaker, C.R., 1914. Amphipods of the South Georgia Expedition. Museum of Brooklyn Institute of Arts and Sciences, Science Bulletin 2: 73-77.

Shoemaker, C.R., 1916. Descriptions of three new species of amphipods from southern California. Proceedings of the Biological Society of Washington 29: 157-160.

Shoemaker, C.R., 1919. A new amphipod parasitic on a crinoid. Proceedings of the Biological Society of Washington 32: 245-246.

Shoemker, C.R., 1920a. The amphipods of the Canadian Arctic Expediton, 1913-1918. Report of the Canadian Arctic Expediton 1913-1918, 7E: 30 pp., 6 figs, with appendix.

Shoemaker, C.R., 1920b. Amphipods collected by the American Museum Expedition 1909-1915. Bulletin of the American Museum of Natural History 43: 371-378, 6 figs.

Shoemaker, C.R., 1921. Report on the amphipods collected by the Barbados-Antigua Expedition from the University of Iowa in 1918. University of Iowa Studies in Natural History 9: 99-102.

Shoemaker, C.R., 1925. The Amphipoda collected by the United States Fisheries Steamer 'Albatross' in 1911, chiefly in the Gulf of California. Bulletin of the American Museum of Natural History 52: 21-61, 26 figs.

Shoemaker, C.R., 1926a. Results of the Hudson Bay Expedition in 1920 V Report on the marine amphipods collected in Hudson and James Bays, by Frits Johansen in the summer of 1920. Contributions to Canadian Biology and Fisheries, Studies from the Biological Stations of Canada, new series, 3(1): 11 pp.

Shoemaker, C.R., 1926b. Amphipods of the family Bateidae in the collection of the United States Museum. Proceedings of the United States National Museum 68(2626): 26 pp., 16 figs.

Shoemaker, C.R., 1929. A new genus and species of amphipod from the Grand Manan, N.B. Proceedings of the Biological Society of Washington 42: 167-170.

Shoemaker, C.R., 1930a. The Amphipoda of the Cheticamp Expedition of 1917. Contributions to Canadian Biology and Fisheries, new series, 5(10): 221-359, 54 figs. [Also in reprint of 141 pp.]

Shoemaker, C.R., 1930b. The lysianassid amphipod crustaceans of Newfoundland, Nova Scotia, and New Brunswick in the United States National Museum. Proceedings of the United States National Museum 77(2827): 19 pp., 10 figs.

Shoemaker, C.R., 1931a. A new species of amphipod crustacean (Acanthonotozomatidae) from California, and notes on *Eurystheus tenuicornis*. Proceedings of the United States National Museum 78(2861): 8 pp., 4 figs.

Shoemaker, C.R., 1931b. The stegocephalid and ampeliscid amphipod crustaceans of Newfoundland Nova Scotia, and New Brunswick in the United States National Museum. Proceedings of the United States National Museum 79(2888): 18 pp., 6 figs.

Shoemaker, C.R., 1932a. A new amphipod of the genus *Leptocheirus* from Chesapeake Bay. Journal of the Washington Academy of Sciences 22: 548-551, 2 figs.

Shoemaker, C.R., 1932b. The amphipod *Nototropis minikoi* on the east coast of the United States. Proceedings of the Biological Society of Washington 45: 199-200.

Shoemaker, C.R., 1933a. Two new genera and six new species of Amphipoda from Tortugas. Papers of the Tortugas Laboratory. Carnegie Institute of Washington 28(Publ. 435): 245-256, 8 figs.

Shoemaker, C.R., 1933b. A new amphipod of the genus *Amphiporeia* from Virginia. Journal of the Washington Academy of Sciences 23: 212-216, 2 figs.

Shoemaker, C.R., 1933c. Amphipoda from Florida and the West Indies. American Museum Novitates 598: 24 pp., 13 figs.

Shoemaker, C.R., 1934a. Two new species of *Corophium* from the west coast of America. Journal of the Washington Academy of Sciences 24: 356-360, 2 figs.

Shoemaker, C.R., 1934b. Three new amphipods. Reports on the collections obtained by the First Johnson-Smithsonian Deep-Sea Expedition to the Puerto Rican Deep. Smithsonian Miscellaneous Collections 91(12): 6 pp., 3 figs.

Shoemaker, C.R., 1934c. The amphipod genus *Corophium* on the east coast of America. Proceedings of the Biological Society of Washington 47: 23-32.

Shoemaker, C.R., 1935a. The amphipods of Porto Rico [sic] and the Virgin Islands. Science Survey of Porto Rico [sic] and the Virgin Islands. (New York Academy of Science) 15: 229-253, 5 figs.

Shoemaker, C.R., 1935b. A new species of amphipod of the genus *Grandidierella* and a new record for *Melita nitida* from Sinaloa, Mexico. Journal of the Washington Academy of Sciences 25: 65-71, 2 figs.

Shoemaker, C.R., 1938a. Two new species of amphipod crustaceans from the east coast of the United States. Journal of the Washington Academy of Sciences 28: 326-332.

Shoemaker, C.R., 1938b. Three new species of the amphipod genus *Ampithoe* from the west coast of America. Journal of the Washington Academy of Sciences 28: 15-25, 4 figs.

Shoemaker, C.R., 1941a. On the names of certain California amphipods. Proceedings of the Biological Society of Washington 54: 187-188.

Shoemaker, C.R., 1941b. A new genus and a new species of Amphipoda from the Pacific Coast of North America. Proceedings of the Biological Society of Washington 54: 183-186.

Shoemaker, C.R., 1942. Amphipod crustaceans collected on the Presidential Cruise of 1938. Smithsonian Miscellaneous Collections 101(11): 52 pp., 17 figs.

Shoemaker, C.R., 1943. A new amphipod of the genus *Corophium* from Florida. Charleston Museum Leaflet 18 6 pp., 1 fig.

Shoemaker, C.R., 1945a. The Amphipoda of the Bermuda Oceanographic Expeditions, 1929-1931. Zoologica, Scientific Contributions to the New York Zoological Society 30: 185-266, 48 figs.

Shoemaker, C.R., 1945b. The amphipod genus *Photis* on the east coast of North America. Charleston Museum Leaflet 22: 17 pp., 5 figs.

Shoemaker, C.R., 1945c. The amphipod genus *Unicola* on the east coast of America. American Midland Naturalist 34: 446-465, 9 figs.

Shoemaker, C.R., 1945d. Amphipoda of the United States Antarctic Service Expedition 1939-1941. Proceedings of the American Philatelic Society 89: 289-293, 2 figs.

Shoemaker, C.R., 1947. Further notes on the amphipod genus *Corophium* from the east coast of America. Journal of the Washington Academy of Sciences 37: 47-63, 12 figs.

Shoemaker, C.R., 1948. The Amphipoda of the Smithsonian-Roebling Expedition to Cuba in 1937. Smithsonian Miscellaneous Collections 110(3): 15 pp., 3 figs.

Shoemaker, C.R., 1949a. The amphipod genus *Corophium* on the west coast of America. Journal of the Washington Academy of Sciences 39: 68-82, 8 figs.

Shoemaker, C.R., 1949b. Three new species and one new variety of amphipods from the Bay of Fundy. Journal of the Washington Academy of Sciences 39: 389-398, 5 figs.

Shoemaker, C.R., 1952. A new species of commensal amphipod from a spiny lobster. Proceedings of the United States National Museum 102(3299): 231-233, fig. 83.

Shoemaker, C.R., 1955a. Amphipoda collected at the Arctic Laboratory, Office of Naval Research, Point Barrow, Alaska, by G.E. MacGinitie. Smithsonian Miscellaneous Collections 128(1): 1-78, 20 figs.

Shoemaker, C.R., 1955b. Notes on the amphipod crustacean *Maeroides thompsoni* Walker. Journal of the Washington Academy of Sciences 45: 59.

Shoemaker, C.R., 1956a. Observations on the amphipod genus *Parhyale*. Proceedings of the United States National Museum 106: 345-358, 4 figs.

Shoemaker, C.R., 1956b. Notes on the amphipods *Eurythenes gryllus* (Lichtenstein) and *Katius obesus* Chevreux. Proceedings of the Biological Society of Washington 69: 177-178.

Shoemaker, C.R., 1964. Seven new amphipods from the west coast of North America with notes on some unusual species. Proceedings of the United States National Museum 115: 391-430, 15 figs.

Shulenberger, E. & J.L. Barnard, 1976. Amphipods from an abyssal trap set in the North Pacific Gyre. Crustaceana 31: 241-258, 7 figs.

Shulenberger, E. & R.R. Hessler, 1974. Scavenging abyssal benthic amphipods trapped under oligotrophic central North Pacific Gyre waters. Marine Biology 28: 185-187, 1 fig.

Shyamasundari, K., 1972. Studies on the tube building amphipod *Corophium triaenonyx* Stebbing from Visakhapatnam Harbour. Annual life cycle. Rivista di Biologia 65: 203-216, 7 figs.

Shyamasundari, K., 1974. Studies on the tube building amphipod *Corophium triaenonyx* Stebbing from Visakhapatnam Harbour. Seasonal distribution. Rivista di Biologia 68: 347-355, 3 figs.

Shyamasundari, K., 1976. Studies on the tube building amphipod *Corophium triaenonyx* Stebbing from Visakhapatnam Harbour. Oxygen consumption in relation to salinity and temperature. Marathwada University Journal of Science (Biological Science) 15(8): 23-29, 2 figs.

Shyamasundari, K. & K. Hanumartha Rao, 1974. Effect of temperature on embryonic and post embryonic stages of *Corophium triaenonyx* Stebbing (Crustacea, Amphipoda). Broteria 43: 187-194, 3 figs.

Sinel, J., 1907. A contribution to our knowledge of the Crustacea of the Channel Islands. Transactions of the Guernsey Society of Natural Science and Local Research 5: 212-225.

Sivaprakasam, T.E., 1968a. Amphipoda from the east coast of India part I. Gammaridea. Journal of the Marine Biological Association of India 8: 82-122, 14 figs.

Sivaprakasam, T.E., 1968b. A new species of *Paranamixis* Schellenberg (Crustacea: Amphipoda: Anamixidae) from the Gulf of Manaar, India. Proceedings of the Zoological Society of Calcutta 21: 131-136, 3 figs.

Sivaprakasam, T.E., 1968c. *Eurystheus togoensis* Schellenberg, a new record of Amphipoda from the Madras Coast. Journal of the Marine Biological Association of India 10: 283-285, 1 fig.

Sivaprakasam, T.E., 1969a. Notes on some amphipods from the south east Coast of India. Journal of the Marine Biological Association of India 9: 372-383, 4 figs.

Sivaprakasam, T.E., 1969b. Leucothoid Amphipoda from the Madras Coast. Journal of the Marine Biological Association of India 9: 384-391, 4 figs.

Sivaprakasam, T.E., 1969c. Two new amphipod records from the Gulf of Mannar [sic], India. Science and Culture 35: 71-72, 2 figs.

Sivaprakasam, T.E., 1969d. Amphipoda from the east coast of India - 2 Gammaridea and Caprellidea. Journal of the Bombay Natural History Society 66: 297-309, 4 figs.

Sivaprakasam, T.E., 1970a. Amphipoda from the east coast of India - 2 Gammaridea and Caprellidea. Journal of the Bombay Natural History Society 66: 560-576, figs 5-12.

Sivaprakasam, T.E., 1970b. Amphipoda from the east coast of India - 2 Gammaridea and Caprellidea. Journal of the Bombay Natural History Society 66: 153-170, figs 13-18.

Sivaprakasam, T.E., 1970c. Description of *Atylus (Kamehatylus) processicer* sp.nov. (Amphipoda: Dexaminidae) from the Gulf of Mannar [sic], India. Journal of the Marine Biological Association of India 12: 93-96, 1 fig.

Sivaprakasam, T.E., 1970d. A new species and a new record of Amphipoda from the Madras Coast. Journal of the Marine Biological Association of India 10: 274-282, 5 figs.

Sivaprakasam, T.E., 1970e. Amphipods of the genera *Maera* Leach and *Elasmopus* Costa from the east coast of India. Journal of the Marine Biological Association of India 10: 34-51, 8 figs.

Sivaprakasam, T.E., 1970f. Amphipods of the genus *Lembos* Bate from the south-east coast of India. Journal of the Marine Biological Association of India 12: 81-92, 4 figs.

Sivaprakasam, T.E., 1970g. Amphipods of the family Ampithoidae from the Madras Coast. Journal of the Marine Biological Association of India 12: 64-80, 6 figs.

Sivaprakasam, T.E., 1972a. A new species of *Idunella* Sars (Amphipoda, Liljeborgiidae) from India. Crustaceana, Supplement 3: 308-312, 2 figs.

Sivaprakasam, T.E., 1972b. The organization and classification of amphipod Crustacea. Proceedings of the Zoological Society, Calcutta 25: 69-81, 3 figs.

Sket, B. & T.M. Iliffe, 1980. Cave fauna of Bermuda. Internationale Revue der Gesamten Hydrobiologie 65: 871-882, 1 fig.

Skogsberg, T. & G.H. Vansell, 1928. Structure and behavior of the amphipod, *Polycheria osborni*. Proceedings of the California Academy of Sciences, series 4, 17: 267-295, 26 figs.

Skutch, A.F., 1926. On the habits and ecology of the tube-building amphipod *Amphithoe rubricata* Montagu. Ecology, Brooklyn 7: 481-502, 2 figs.

Slabber, M., 1769. Natuurkundige Verlustigingen, Behelzende Microscopise Waarneemingen van In- en Uitlandse Water-en Land- Dieren. Unnumbered and 166 pp., 18 pls. Haarlem: J. Bosch.

Slabber, M., 1775. Pp. 48-53, pl. 11. **In** Physicalische Belustigungen oder Microscopische Wahrneh-mungen ins und auslandischer Wasser- und Landthierchen. Nurnberg: Adam Wolfgang Winterschmidt.

Slattery, P.N., 1985. Life histories of infaunal amphipods from subtidal sands of Monterey Bay, California. Journal of Crustacean Biology, 5: 635-649, 8 figs.

Smith, S.I., 1871. Pp. 448-454. **In** S.I. Smith & A.E. Verrill's "Notice of the invertebrata dredged in Lake Superior in 1871, by the U.S. Lake Survey, under the direction of Gen. C.B. Comstock, S.I. Smith, naturalist". The American Journal of Science and Arts, series 3, 2.

Smith, S.I., 1873. Crustacea, ex. Isopoda. **In** A.E. Verrill's "Report upon the invertebrate animals of Vineyard Sound...." U.S. Commission of Fish and Fisheries. Pt. 1. Report on the Condition of the Sea Fisheries of the South Coast of New England in 1871 and 1872, pp. 295-778, 4 figs, 38 pls.

Smith, S.I., 1874. Notes on some of the species enumerated. Pp. 27-57. **In** S.I. Smith & O. Harger (eds). I. Report on the dredgings in the region of St. George's Banks, 1872. Transactions of the Connecticut Academy of Arts and Sciences 3: 1-57, pls 1-8.

Smith, S.I., 1875. Report on the amphipod crustaceans. Annual Report of the United States Geological and Geographical Survey of the Territories, Embracing Colorado. The Exploration for the Year 1873, by F.V. Hayden, Washington, Government Printing Office, 1874: 608-611, 2 pls.

Smith, S.I., 1876. Crustaceans. Pp. 57-64. **In** J.H. Kidder (ed.). Contributions to the natural history of Kerguelen Island, made in connection with the United States Transit-of-Venus Expedition, 1874-75. United States National Museum Bulletin 3.

Smith, S.I., 1879. Occurrence of *Chelura terebrans,* a crustacean destructive to the timber of submarine structures, on the coast of the United States. Proceedings of the United States National Museum 2: 232-234, 2 figs.

Smith, S.I., 1881a. Recent dredging by the United-States Fish Commission off the south coast of New England, with some notice of the Crustacea obtained. Annals and Magazine of Natural History, series 5, 7: 143-146.

Smith, S.I., 1881b. Preliminary notice of the Crustacea dredged, in 64 to 325 fathoms, off the south coast of New England, by the United States Fish Commission in 1880. Proceedings of the United States National Museum 3: 413-452.

Smith, S.I., 1882. On the amphipodus [sic] genera, *Cerapus, Unicola,* and *Lepidactylis,* described by Thomas Say. Transactions of the Connecticut Academy of Arts and Sciences 4: 268-284, pl. IIa.

Smith, S.I., 1883a. Review of the marine Crustacea of Labrador. Proceedings of the United States National Museum 7: 223-232.

Smith, S.I., 1883b. List of the Crustacea dredged on the coast of Labrador by the expedition under the direction of W.A. Stearns, in 1882. Proceedings of the United States National Museum 7: 218-222.

Smith, S.I., 1884a. Crustacea of the Albatross dredgings in 1883. American Journal of Science, series 3, 28: 53-56.

Smith, S.I., 1884b. Crustacea of the 'Albatross' dredgings in 1883. Annals and Magazine of Natural History, series 5, 14: 179-183.

Smith, S.I., 1888. See Packard, 1888.

Snow, C.H., 1898. Marine wood-borers. Transactions of the American Society of Civil Engineers 40(837): 178-214, several figs, pls 13-23.

Soika, A.G., 1947. Sull 'etologia del *Corophium sextoni* Crawf. nella Laguna di Venezia (Crust. Amphip.). Atti della Societa dei Naturalisti e Matematici di Modena 78 (series 6, 25): 204-205.

Soika, A.G., 1949. Gli anfipodi gammarini della Laguna di Venezia. Archivio di Oceanografia e Limnologia 6: 165-212, 7 figs.

Somme, S., 1936. Contributions to the biology of Norweigian fish food animals. II. Some small collections of Amphipoda and *Mysis relicta* from Norwegian lakes. Avhandlinger Utgitt Av Det Norske Videnskaps-Akademi I Oslo 1935, 9: 12 pp.

Sorbe, J.-C., 1978. Inventaire faunistique des amphipodes de l'estuaire de la Gironde. Bulletin, Centre de Etudes Recherches Scientifiques, Sciences de Biarritz 12: 369-381.

Sorbe, J.-C., 1979. Systematique et ecologie des amphipodes gammarides de l'estuaire de la Gironde. Cahiers de Biologie Marine 20: 43-58, 5 figs.

Sowinsky, V.K., 1896. O geograficheskom' rasprostranenie roda *Corophium* vy Jevropeiskixy Morjax'. Zapiski Kievskago Obshchestva Jestestvoispytatelei 15: 373-390, pl. 7 (map).

Sowinsky, V.K., 1898. Vysshiia rakoobraznyia (Malacostraca) Bosfora, po materialam" sobrannym" d-rom" A.A. Ostroumovym" v" 1892 i 93 gg. I. Amphipoda i Isopoda. Zapiski Kievskago Obshchestva Estestvoispytatelei 15: 447-518, pls 8-13.

Spandl, H., 1923a. Beobachtungen an Gammariden. (Vorlaufige Mitteilung). Verhandlungen des Naturforschenden Vereines in Brunn 58: 67-72.

Spandl, H., 1923b. Amphipoden der 'Pola'-Expeditionen in das Rote Meer. Akademie Wissenschaftlichen Wien, Anzeiger, 60 Jahrgang, 1923 [in 3 parts]: 17-20, 87-89, 111-112.

Spandl, H., 1924a. Die Amphipoden des Roten Meeres. Expeditionen S.M. Schiff "Pola" in das Rote Meer nordliche und sudliche Halfte 1895/96-1897/98. Zoologische Ergebnisse XXXV. Denkschriften Akademie der Wissenschaften Mathematisch-Naturwissenschaftliche Klasse 99: 19-73, 23 figs.

Spandl, H., 1924b. Das Amphipoden-Genus *Gallea* (Walker). Zoologischer Anzeiger 61: 243-246, 2 figs.

Sparre Schneider, J., 1926. Tromsosundets amphipoder, isopoder og cumaceer. Tromso Museum Arshefter 47(8): 73 pp.

Spooner, G.M., 1950. Notes on the Plymouth marine fauna. Amphipoda. Journal of the Marine Biological Association of the United Kingdom 29: 247-253.

Spooner, G.M. & H.B. Moore, 1940. The ecology of the Tamar Estuary VI. An account of the macrofauna of the intertidal muds. Journal of the Marine Biological Association of the United Kingdom 24: 283-330, 12 figs.

Stalio, L., 1877. Legione II. Edriophthalmia. Catalogo metodico e descrittivo dei crostacei dell'Adriatico. Atti del Reale Istituto Veneto di Scienze, Lettere ed Arti, series 5, 3: 987-1008, 1110-1127.

Stalio, L., 1887. Catalogo metodico e descrittivo dei crostacei podottalmi et edrioftalmi dell'... [incomplete].

Stappers, L., 1911. Crustaces malacostraces. Campagne Arctique de 1907, Duc d'Orleans, Bruxelles 7: vi + 152 + XII pp., 7 pls.

Stasek, C.R., 1958. A new species of *Allogaussia* (Amphipoda Lysianassidae) found living within the gastrovascular cavity of the sea-anemone *Anthopleura elegantissima.* Journal of the Washington Academy of Sciences 48: 119-

126, 2 figs.

Staude, C.P., J.E. Armstrong, R.M. Thom & K.K. Chew, 1977. An illustrated key to the intertidal gammaridean Amphipoda of central Puget Sound. College of Fisheries, University of Washington. Seattle, Contribution 466: 27 pp., 4 figs.

Stebbing, T.R.R., 1874a. Amphipodous Crustacea. A new species, and some items of description and nomenclature. Annals and Magazine of Natural History, series 4, 14: 10-15, 2 pls.

Stebbing, T.R.R., 1874b. On some species of *Amphithoe* and *Sunamphithoe*. Annals and Magazine of Natural History, series 4, 14: 111-118, pls 11, 12.

Stebbing, T.R.R., 1875a. On the genus *Bathyporeia*. Annals and Magazine of Natural History, series 4, 15: 74-78, pl. 3.

Stebbing, T.R.R., 1875b. On some new exotic sessile-eyed crustaceans. Annals and Magazine of Natural History, series 4, 15: 184-188, pl. 15A.

Stebbing, T.R.R., 1876a. Description of a new species of sessile-eyed crustacean, and other notices. Annals and Magazine of Natural History, series 4, 17: 73-80, pls 4, 5.

Stebbing, T.R.R., 1876b. Amphipodous crustaceans. On the genera *Hyale* and *Anonyx* and a new species of *Probolium*. Annals and Magazine of Natural History, series 4, 17: 337-346, pls 18-19.

Stebbing, T.R.R., 1876c. On some new and little-known amphipodous Crustacea. Annals and Magazine of Natural History, series 4, 18: 443-449, pls 19, 20.

Stebbing, T.R.R., 1878a. On two new species of amphipodous crustaceans. Annals and Magazine of Natural History, series 5, 2: 364-370, pl. 15.

Stebbing, T.R.R., 1878b. Notes on sessile-eyed crustaceans, with description of a new species. Annals and Magazine of Natural History, series 5, 1: 31-37, pl. 5.

Stebbing, T.R.R., 1879a. Sessile-eyed Crustacea of Devonshire. Supplementary list. Report and Transactions of the Devonshire Association, 11: 516-524.

Stebbing, T.R.R., 1879b. On *Hyale Lubbockiana* (= *Allorchestes imbricatus,* Sp. Bate, and *Nicea Lubbockiana,* Sp. Bate). Annals and Magazine of Natural History, series 5, 4: 396.

Stebbing, T.R.R., 1883. The 'Challenger' Amphipoda. Annals and Magazine of Natural History, series 5, 11: 203-207.

Stebbing, T.R.R., 1885. Description of a new English amphipodous crustacean. Annals and Magazine of Natural History, series 5, 15: 59-62, pl. 2.

Stebbing, T.R.R., 1886. Some new amphipodous crustaceans from Singapore and New Zealand. Proceedings of the Scientific Meetings of the Zoological Society of London 1886: 4-6.

Stebbing, T.R.R., 1887. On some new exotic Amphipoda from Singapore and New Zealand. Transactions of the Zoological Society of London 12(6): 199-210, pls 38, 39.

Stebbing, T.R.R., 1888. Report on the Amphipoda collected by H.M.S. Challenger during the years 1873-76. Report on the Scientific Results of the Voyage of H.M.S. Challenger During the Years 1873-1876, Zoology 29: xxiv + 1737 pp., 210 pls. London: Eyre and Spottiswoodie.

Stebbing, T.R.R., 1890. The right generic names of some Amphipoda. Annals and Magazine of Natural History, series 6, 5: 192-194.

Stebbing, T.R.R., 1891a. Sessile-eyed crustaceans. Annals and Magazine of Natural History, series 6, 8: 324-331, pls 15, 16.

Stebbing, T.R.R., 1891b. On the genus *Urothoe* and a new genus *Urothoides*. Transactions of the Zoological Society of London 13: 1-30, 4 pls.

Stebbing, T.R.R., 1893. A History of Crustacea Recent Malacostraca. The International Scientific Series: 466 pp., 32 figs, 19 pls. New York: D. Appleton & Company.

Stebbing, T.R.R., 1894. The Amphipoda collected during the voyages of the William Barents in the arctic seas in the years 1880-1884. Bijdragen tot de Dierkunde. Uitgegeven Door het Koninklijk Zoologisch Genootschap Natura Artis Magistra te Amsterdam, 17e en 18e Aflevering (1): 48 pp., 7 pls.

Stebbing, T.R.R., 1895a. Descriptions of nine new species of amphipodous crustaceans from the tropical Atlantic. Transactions of the Zoological Society of London 13: 349-371, pls 51-55.

Stebbing, T.R.R., 1895b. Two new amphipods from the West Indies. Annals and Magazine of Natural History, series 6, 15: 397-403, pls 14, 15.

Stebbing, T.R.R., 1895c. A passage at arms over the Amphipoda. Natural Science 6: 259-268.

Stebbing, T.R.R., 1895d. Notes on Amphipoda, old and new. Annals and Magazine of Natural History, series 6, 16: 205-213, pls 7-10.

Stebbing, T.R.R., 1897. Amphipoda from the Copenhagen Museum and other sources. Transactions of the Linnean Society of London, (2, Zoology) 7: 25-45, pls 6-14.

Stebbing, T.R.R., 1899a. Revision of Amphipoda (continued). Annals and Magazine of Natural History, series 7, 4: 205-211.

Stebbing, T.R.R., 1899b. On the true *Podocerus* and some new genera of amphipods. Annals and Magazine of Natural History, series 7, 3: 237-241.

Stebbing, T.R.R., 1899c. Amphipoda from the Copenhagen Museum and other sources. Part II. Transactions of the Linnean Society of London, (2, Zoology) 8: 395-432, pls 30-35.

Stebbing, T.R.R., 1899d. Revision of Amphipoda. Annals and Magazine of Natural History, series 7, 3: 350.

Stebbing, T.R.R., 1900a. Arctic Crustacea: Bruce collection. Annals and Magazine of Natural History, series 7, 5: 1-16.

Stebbing, T.R.R., 1900b. Crustacea Amphipoda. Fauna Hawaiensis 2: 527-530, pl. 21.

Stebbing, T.R.R., 1903. Amphipoda from Costa Rica. Proceedings of the United States Museum 26: 925-931, pls 60-61.

Stebbing, T.R.R., 1904a. Gregarious Crustacea from Ceylon. Spolia Zeylanica 2(5): 29 pp., 6 pls.

Stebbing, T.R.R., 1904b. Biscayan plankton collected during a cruise of H.M.S. 'Research', 1900. Part II. The Amphipoda and Cladocera, with notes on a larval thyrostracan. And an appendix on their distribution by G. Herbert Fowler. Transactions of the Linnean Society of London, series 2, Zoology 10: 13-54, pls 2, 3.

Stebbing, T.R.R., 1906. Amphipoda I. Gammaridea. Das Tierreich 21: 806 pp., 127 figs.

Stebbing, T.R.R., 1907. The fauna of brackish ponds at Port Canning, Lower Bengal. Part V.-Definition of a new genus of Amphipoda, and description of the typical species. Records of the Indian Museum 1: 159-162, pl. 7.

Stebbing, T.R.R., 1908a. A new species of Amphipoda. The fauna of brackish ponds at Port Canning, Lower Bengal. Part IX. Records of the Indian Museum 2: 119-123, pl. 6.

Stebbing, T.R.R., 1908b. South African Crustacea (Part IV). Annals of the South African Museum 6: 1-96, 40 pls.

Stebbing, T.R.R., 1908c. On two new species of northern Amphipoda. Journal of the Linnean Society of London, Zoology 30: 191-197, pls 27-28.

Stebbing, T.R.R., 1910a. Crustacea. Part V. Amphipoda.

Scientific results trawling expedition H.M.C.S. "Thetis". Australian Museum, Memoir 4, 2: 565-658, pls 47*-60*. [Asterisks denote special pls.]

Stebbing, T.R.R., 1910b. General catalogue of South African Crustacea (Part V. of S.A. Crustacea, for the marine investigations in South Africa). Annals of the South African Museum 6: 281-593, pls 15-22.

Stebbing, T.R.R., 1914a. South African Crustacea (Part VII. of S.A. Crustacea, for the marine investigations in South Africa). Annals of the South African Museum 15: 1-55, 12 pls.

Stebbing, T.R.R., 1914b. Crustacea from the Falkland Islands collected by Mr. Rupert Vallentin, F.L.S. - Pt. II. Proceedings of the Zoological Society of London, 1914, 1: 341-378, 9 pls.

Stebbing, T.R.R., 1917a. The Malacostraca of Durban Bay. Annals of the Durban Museum 1: 435-450, pls 22-23.

Stebbing, T.R.R., 1917b. South African Crustacea (Part IX. of S.A. Crustacea, for the marine investigations in South Africa). Annals of the South African Museum 17 (2 of part I): 23-46, pls 90-97.

Stebbing, T.R.R., 1918. Some Crustacea of Natal. Annals of the Durban Museum 2: 47-75, pls 8-12.

Stebbing, T.R.R., 1920. Crustacea from the Falkland Islands collected by Mr. Rupert Vallentin, F.L.S. - Part III. Proceedings of the Zoological Society of London 1919: 327-340, 8 figs, 5 pls.

Stebbing, T.R.R., 1922. Isopoda and Amphipoda from Angola and South Africa. Goteborgs Kungliga Vetenskaps- och Vitterhets-Samhalles Handlingar 25: 16 pp., 4 pls.

Stebbing, T.R.R. Biography. See E.L. Mills, 1976b.

Stebbing, T.R.R. & D. Robertson, 1891. On four new British Amphipoda. Transactions of the Zoological Society of London 13: 31-42, pls 5, 6.

Stebbing, T.R.R. & D. Robertson, 1895. On four new British Amphipoda. Proceedings of the Zoological Society of London, pp. 31-42, pls 5, 6.

Steele, D.H., 1967a. The morphology of the marine amphipod *Stegocephalus inflatus* Krøyer. Canadian Journal of Zoology 45: 1129-1133, 3 figs.

Steele, D.H., 1967b. A new species of the genus *Anonyx* (Amphipoda) from the Barents Sea. Crustaceana 13: 257-264, 4 figs.

Steele, D.H., 1968. A redescription of *Lysianassa martensi* Goes, 1865 (Amphipoda) and its tentative assignment to the genus *Uristes*. Crustaceana 15: 275- 281, 3 figs.

Steele, D.H., 1969. Additional comments on the genus *Anonyx* (Crustacea: Amphipoda) of the Atlantic and arctic coasts of North America. Journal Fisheries Research Board of Canada 26: 683-686.

Steele, D.H., 1973. The biology of *Parhyalella pietschmanni* Schellenberg, 1938 (Amphipoda, Hyalellidae) at Nosy Be, Madagascar. Crustaceana 25: 276-280, 4 figs.

Steele, D.H., 1979a. Clinal variation in the morphology of *Anonyx nugax* (Phipps) (Crustacea, Amphipoda). Bulletin of the Biological Society of Washington 3: 41-46, 5 figs.

Steele, D.H., 1979b. Zoogeography of genus *Anonyx* (Crustacea, Amphipoda). Bulletin of the Biological Society of Washington 3: 47-53, 5 figs.

Steele, D.H., 1979c. A new species of *Psammonyx* (Crustacea, Amphipoda, Lysianassidae) from the northwestern Atlantic. Canadian Journal of Zoology 57: 1215-1221, 5 figs.

Steele, D.H., 1980. Erratum and addendum: a new species of *Psammonyx* (Crustacea, Amphipoda, Lysianassidae) from the northwestern Atlantic. Canadian Journal of Zoology 58: 143. [Refers to 1979c.]

Steele, D.H., 1982. The genus *Anonyx* (Crustacea, Amphipoda) in the North Pacific and Arctic Oceans: *Anonyx nugax* group. Canadian Journal of Zoology 60: 1754-1775, 33 figs.

Steele, D.H., 1983. The genus *Anonyx* (Crustacea, Amphipoda) in the North Pacific Ocean: *Anonyx validus* group. Canadian Journal of Zoology 61: 2921-2931, 8 figs.

Steele, D.H., 1986. The genus *Anonyx* (Crustacea, Amphipoda) in the North Pacific and Arctic Oceans: *Anonyx laticoxae* group. Canadian Journal of Zoology 64: 2603-2623, 33 figs.

Steele, D.H. & P. Brunel, 1968. Amphipoda of the Atlantic and Arctic coasts of North America: *Anonyx* (Lysianassidae). Journal of the Fisheries Research Board of Canada 25: 943-1060, 52 figs.

Steele, D.H., R.G. Hooper & D. Keats, 1986a. Two corophioid amphipods commensal on spider crabs in Newfoundland. Journal of Crustacean Biology 6: 119-124, 3 figs.

Steele, D.H. & V.J. Steele, 1973. Some aspects of the biology of *Calliopius laeviusculus* (Kroyer [sic] (Crustacea, Amphipoda) in the northwestern Atlantic. Canadian Journal of Zoology 51: 723-728, 5 figs.

Steele, P. & S.B. Collard, 1981. First Gulf of Mexico record for *Biancolina brassiacephala* (Amphipoda: Biancolinidae). Northeast Gulf Science 4: 115-118, 8 figs.

Stephensen, K., 1912a. Report on the Malacostraca Pycnogonida and some Entomostraca collected by the Danmark Expedition to north-east Greenland. Meddelelser om Gronland 45: 503-630, pls 39-43.

Stephensen, K., 1912b. Report on the Malacostraca collected by the "Tjalfe"-Expedition, under the direction of cand. mag. Ad. S. Jensen, especially at W. Greenland. Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 64: 57-134, 36 figs.

Stephensen, K., 1913a. Corrections to the paper on the Malacostraca from the Tjalfe-Expedition. Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 64: 329-330.

Stephensen, K., 1913b. Gronlands Krebsdyr og Pycnogonider (Conspectus Crustaceorum et Pycnogonidorum Groenlandiae). Meddelelser om Gronland 22: 479 pp.

Stephensen, K., 1914. Account of the Crustacea and the Pycnogonida collected by Dr. V. Nordmann in the summer of 1911 from northern Stromfjord and Giesecke Lake in west Greenland. Meddelelser om Gronland 51: 53-77, 8 pls.

Stephensen, K., 1915. Isopoda, Tanaidacea, Cumacea, Amphipoda (Excl. Hyperiidea). Report of the Danish Oceanographic Expeditions 1908-10 to the Mediterranean and Adjacent Seas, 2, Biology, D, 1: 53 pp., 33 figs.

Stephensen, K., 1917. Zoogeographical investigations of certain fjords in southern Greenland, with special reference to Crustacea, Pycnogonida and Echinodermata including a list of Alcyonaria and Pisces. Meddelelser om Gronland 53: 231-378, 31 figs.

Stephensen, K., 1921. *Tryphosa schneideri* an amphipod from northern Norway new to science (fam. Lysianassidae). Tromso Museum Arshefter 43(5): 9 pp., 1 fig.

Stephensen, K., 1923a. Revideret Fortegnelse over Danmarks Arter af Amphipoda (l. Del.). (Hyperiidea; Gammaridea: Lysianassidae). Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 76: 5-20.

Stephensen, K., 1923b. Crustacea Malacostraca. V. (Amphipoda. I.). Danish Ingolf-Expedition 3(8): 1-100, 22 figs.

Stephensen, K., 1925a. Crustacea Malacostraca. VI. (Amphipoda. II). Danish Ingolf-Expedition 3: 101-178, figs 23-53.

Stephensen, K., 1925b. *Danaella mimonectes* (n.gen., n.sp.)

a new bathypelagic gammarid (fam. Lysianassidae) from south Greenland waters. Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 80: 423-428, 3 figs.

Stephensen, K., 1926. Revideret Fortegnelse over Danmarks arter af Amphipoda. 2. Del. (Gammaridea: Fam. Stegocephalidae til Fam. Eusiridae). Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 82: 43-101.

Stephensen, K., 1927a. Revideret Fortegnelse over Danmarks Arter af Amphipoda (s. Del: Gammaridea: Fam. Gammaridae til Fam. Podoceridae (Dulichiidae aut.); Caprellidea). Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 84: 107-150.

Stephensen, K., 1927b. The Folden Fiord Crustacea II. List of the Amphipoda. Tromso Museum Skrifter 1(5): 7-13.

Stephensen, K., 1927c. Crustacea III Amphipoda. Faune Colonies Francaises, Contribution a l'Etude de la Faune du Cameroun, par Th. Monod 1(6): 589-591.

Stephensen, K., 1927d. Georg Ossian Sars. Naturens Verden 11: 289-292.

Stephensen, K., 1927e. Crustacea from the Auckland and Campbell Islands. Papers from Dr. Th. Mortensen's Pacific Expedition 1914-1916. XL. Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 83: 289-390, 33 figs.

Stephensen, K., 1928. Storkrebs II. Ringkrebs 1. Tanglopper (Amfipoder). Danmarks Fauna, Dansk Naturhistorisk Forening. 399 pp., 93 figs. Copenhagen: G.E.C. Gads Forlag.

Stephensen, K., 1929a. Marine Crustacea Amphipoda. The Zoology of the Faroes, Part 1, 2(33): 40 pp.

Stephensen, K., 1929b. Amphipoda. Die Tierwelt der Nord- und Ostee, Leipzig 14(10, f): 188 pp., 43 figs.

Stephensen, K., 1931a. Crustacea Malacostraca. VII. (Amphipoda. III.) Danish Ingolf-Expedition 3: 179-290, figs 54-81.

Stephensen, K., 1931b. On *Lepidepecreella cymba* (Goes), a gammarid amphipod from Spitzbergen. Arkiv for Zoologi 22 A(9): 6 pp., 2 figs.

Stephensen, K., 1931c. Amphipoda. Resultats scientifiques du Voyage aux Indes Orientales Neerlandaises... Memoire Musee Royal d'Histoire Naturelle de Belgique, series 1, 3(4): 14 pp., 3 figs.

Stephensen, K., 1932a. The Tanaidacea and Amphipoda of the Arctic. Fauna Arctica 6: 344-378.

Stephensen, K., 1932b. Some new amphipods from Japan. Annotationes Zoologicae Japonenses 13: 487-501, 5 figs.

Stephensen, K., 1933a. Amphipoda from the marine salines of Bonaire and Curacao. Zoologische Ergebnisse einer Reise nach Bonaire, Curacao und Aruba im Jahre 1930. Zoologische Jahrbucher, Systematik 64: 437-446, 4 figs.

Stephensen, K., 1933b. Amphipoda. The Godthaab Expedition 1928. Meddelelser om Gronland 79(7): 88 pp., 31 figs.

Stephensen, K., 1933c. Crustacea and Pycnogonida. Meddelelser om Gronland 104(15): 12 pp., 1 pl.

Stephensen, K., 1933d. Fresh- and brackish-water Amphipoda from Bonaire, Curacao and Aruba (Zoologische Ergebnisse einer Reise nach Bonaire, Curacao und Aruba im Jahre 1930). Zoologische Jahrbucher, Systematik 64: 414-436, 8 figs.

Stephensen, K., 1933e. *Ceinina japonica* (n.gen., n.sp.), a new aberrant species of the amphipodan family Talitridae from Japan. Transactions of the Sapporo Natural History Society 13: 63-68, 4 figs.

Stephensen, K., 1934. Re-description of *Hyperiopsis voringi* G.-O. Sars (Crust. Amphip.). Tromso Museum Arshefterr Naturhistorisk Avdelning, series 7, 53(3): 12 pp., 4 figs.

Stephensen, K., 1935a. The Amphipoda of N. Norway and Spitsbergen with adjacent waters. Tromso Museum Skrifter 3(1): 140 pp., 19 figs.

Stephensen, K., 1935b. [illegible] Amphipoder fra Vest- og Nord-Norge. Det Kongelige Norske Videnskabers Selskab Forhandlinger [illegible].

Stephensen, K., 1936a. On *Metopa groenlandica* H.J. Hansen (Crust. Amphip.). Meddelelser om Gronland 118(3): 8 pp., 3 figs.

Stephensen, K., 1936b. On the amphipod *Metopa groenlandica* H.J. Hansen found in the mantle cavity of the lamellibranchiate *Pandora glacialis* Leach in east Greenland. Meddelelser om Gronland 118(4): [illegible] pp., [illegible] figs.

Stephensen, K., 1937. Crustacea collected on the Fifth Thule Expedition. Report Fifth Thule Expedition 1921-24, Zoology 2(9): 25 pp., 4 figs.

Stephensen, K., 1938a. *Grandidierella japonica* n. sp., a new amphipod with stridulating (?) organs from brackish water in Japan. Contributions from Otsu Hydrobiological Station, Kyoto Imperial University 85: 179-184, 2 figs.

Stephensen, K., 1938b. The Amphipoda of N. Norway and Spitsbergen with adjacent waters. Tromso Museums Skrifter 3: 141-278, figs. [illegible].

Stephensen, K., 1938c. Amphipoda, Tanaidacea und Pycnogonida. Zoologische Ergebnisse der Reisen von Dr. Kohl-Larsen nach den Subantarktischen Inseln bei Neu-Seeland und nach Sud-Georgien. II. Senckenbergiana 20: 236-264, 5 figs.

Stephensen, K., 1940a. The Amphipoda of N. Norway and Spitsbergen with adjacent waters. Tromso Museum Skrifter 3: 279-362, figs 32-52.

Stephensen, K., 1940b. Marine Amphipoda. The Zoology of Iceland 3(26): 111 pp., 13 figs.

Stephensen, K., 1942. The Amphipoda of N. Norway and Spitsbergen with adjacent waters. Tromso Museums Skrifter 3: 363-526, figs 53-[illegible].

Stephensen, K., 1944a. Amphipoda. The zoology of east Greenland. Meddelelser om Gronland 121(14): 165 pp., 18 figs.

Stephensen, K., 1944b. Some Japanese amphipods. Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening 108: 25-88, 33 figs.

Stephensen, K., 1944c. Crustacea Malacostraca VIII (Amphipoda IV). Danish Ingolf-Expedition 3(13): 51 pp., 38 figs.

Stephensen, K., 1947a. Tanaidacea, Isopoda, Amphipoda, and Pycnogonida. Det Norske Videnskaps-Akademi i Oslo, Scientific Results of the Norwegian Antarctic Expeditions, 1927-1928, 27: 90 pp., 26 figs.

Stephensen, K., 1947b. Amphipods from Curacao, Bonaire, Aruba and Margarita. Studies on the Fauna of Curacao, Aruba, Bonaire and the Venezuelan Islands, II, 3: 20 pp., 3 figs.

Stephensen, K., 1949. The Amphipoda of Tristan da Cunha. Results of the Norwegian Scientific Expedition to Tristan da Cunha 1937-1938, 19: 61 pp., 23 figs.

Stephensen, K. & G. Thorson, 1936. On the amphipod *Metopa groenlandica* H.J. Hansen found in the mantle cavity of the lamellibranchiate *Pandora glacialis* Leach in east Greenland. Meddelelser om Gronland 118(4): 7 pp., 2 figs.

Stephensen, K. & Hj. Ussing, 1918. Krebsdyrene i Randers Fjord. Randers Fjords Naturhistorie, Kap. V, E: 325-350, 22 figs.

Stepien, C. A. & R. C. Brusca, 1985. Nocturnal attacks on nearshore fishes in southern California by crustacean zooplankton. Marine Ecology Progress Series 25: 91-105, 9 figs.

Steven, G.A., 1930. Bottom fauna and the food of fishes.

Journal of the Marine Biological Association of the United Kingdom 16: 677-700, 3 figs.

Stimpson, W., 1853. Synopsis of the marine Invertebrata of Grand Manan: or the region about the mouth of the Bay of Fundy, New Brunswick. Smithsonian Contributions to Knowledge 6: i-iv, 5-66, 3 pls.

Stimpson, W., 1856a. Descriptions of some new marine Invertebrata. Academy of Natural Science of Philadelphia, Proceedings 7: 385-394.

Stimpson, W., 1856b. Descriptions of some of the new marine invertebrata from the Chinese and Japanese Seas. Proceedings of the Academy of Natural Sciences of Philadelphia 7: 375-384.

Stimpson, W., 1856c. On some Californian Crustacea. Proceedings of the California Academy of Science 1: 87-90.

Stimpson, W., 1857. The Crustacea and Echinodermata of the pacific shores of North America. Journal of the Boston Society of Natural History 6: 1-92 [reprint], pls 18-23. [Pp. 444-532 in original]

Stimpson, W., 1863. Synopsis of the marine Invertebrata collected by the late arctic expedition, under Dr. I.I. Hayes. Proceedings of the Academy of Natural Sciences, Philadelphia 1863: 1-5.

Stimpson, W., 1864. Descriptions of new species of marine Invertebrata from Puget Sound, collected by the naturalists of the North-West Boundary Commission, A.H., Campbell, esq., commissioner. Proceedings of the Academy of Natural Sciences, Philadelphia 16: 153-165.

Stock, J.H., 1952. Some notes on the taxonomy, the distribution and the ecology of four species of the amphipod genus *Corophium* (Crustacea, Malacostraca). Beaufortia 21: 10 pp., 15 figs.

Stock, J.H., 1960. *Corophium volutator* forma *orientalis* Schellenberg, 1928, raised to specific rank. Crustaceana 1: 188-192, 2 figs.

Stock, J.H., 1984. Observations morphologiques et ecologiques sur une population intertidale de *"Melita" pelucida* Sars (Amphipoda) a Etretat (Seine-Maritime, France). Cahiers de Biologie Marine 25: 93-106, 31 figs.

Stock, J.H. & J.J. Vermeulen, 1982. A representitive of the mainly abyssal family Pardaliscidae (Crustacea, Amphipoda) in cave waters of the Caicos Islands. Bijdragen tot de Dierkunde 52: 3-12, 4 figs.

Stockton, W.L., 1982. Scavenging amphipods from under the Ross Ice Shelf, Antarctica. Deep-Sea Research 29: 819-835, 10 figs.

Stoner, A.W., 1980a. Abundance, reproductive seasonality and habitat preferences of amphipod crustaceans in seagrass meadows of Apalachee Bay, Florida. Contributions in Marine Science 23: 63-77, 4 figs.

Stoner, A.W., 1980b. Perception and choice of substratum by epifaunal amphipods associated with seagrasses. Marine Ecology - Progress Series 3: 105-111, 5 figs.

Stoner, A.W., 1983. Distributional ecology of amphipods and tanaidaceans associated with three sea grass species. Journal of Crustacean Biology 3: 505-518, 3 figs.

Stossich, M., 1880. Prospetto della fauna del mare Adriatico. Bollettino della Societa adriatica di Scienze Naturali, Trieste 6: 168-271.

Stout, V.R., 1912. Studies in Laguna Amphipoda. First Annual Report of the Laguna Marine Laboratory, pp. 134-149, figs 74-84.

Stout, V.R., 1913. Studies in Laguna Amphipoda. Zoologische Jahrbucher, Systematik 34: 633-659, 3 figs.

Stretch, J.J., 1985. Quantitative sampling of demersal zooplankton: reentry and airlift dredge sample comparisons. Journal of Experimental Marine Biology and Ecology 91: 125-136, 4 figs.

Stroobants, G., 1976. Description nouvelle d'*Aroui setosus* Chevreux 1910 (Crustacea Amphipoda) et comparison de l'evolution morphologique des *Aroui setosus* et des *Scopelocheirus hopei*. Bollettino de Museo Civico di Storia Naturale, Verona 3: 239-268, 11 figs.

Stubbs, F.J., 1914. *Corophium longicorne*: an ornithological study of a crustacean. The Zoologist, London 18: 54-62.

Stuxberg, A., 1880. Evertebratfaunan i Sibiriens Ishaf. Forelopande Studier Grundade pa de zoologiska Undersokningarna under Prof. A.E. Nordenskolds Ishafs-Expedition 1878-79. Bihang Kunglia Svenska Vetenskapsakademiens Handlingar 5(22): 76 pp.

Stuxberg, A., 1882. Evertebratfaunan I Sibiriens Ishaf. Forelopande Meddelanden. Vega-Expeditionens Vetenskapliga Iakttagelser 1: 677-812, [unnumbered figs].

Stuxberg, A., 1887. Faunan pa och kring Novaja Semlja. Vega-Expeditionens Vetenskaps Iakttagelser...., 5: 239 pp.

Svensson, E., 1934. Uber die Augen und das Gehirn von *Haploops tubicola* Lilj. Arkiv for Zoologi 25(18): 16 pp., 7 figs.

Swartz, R.C., W.A. DeBen, J.K.P. Jones, J.O. Lamberson & F.A. Cole, 1984a. Phoxocephalid amphipod bioassay for marine sediment toxicity. Aquatic Toxicology: Seventh Symposium, Special Technical Testing Publication 854: 284-306, 1 fig., 6 tables.

Takamaru, N. & T. Ochiai, 1982. Gammaridean amphipods in Hamanaka Bay and Biwase Bay, Hokkaido. Scientific Reports of the Hokkaido Fisheries Station 24: 29-39, 5 figs, 4 pls.

Tararam, A.S. & Y. Wakabara, 1981. The mobile fauna - especially Gammaridea - of *Sargassum cymosum*. Instituto Oceanografico, Universidade de Sao Paulo, Cidade Universitaria, Butanta, Marine Ecology - Progress Series 5: 157-163, fig. 8.

Tararam, A.S., Y. Wakabara & F.P.P. Leite, 1978. Notes on *Parhyale hawaiensis* (Dana), Crustacea-Amphipoda. Bulletin of Marine Science 28: 782-786, 12 figs.

Tararam, A.S., Y. Wakabara & A.M. Takeda, 1981. Seasonal variations of Amphipoda species living on *Sargassum* in Itanhaem, Sao Paulo - Brazil. Contribution to Instituto Oceanografico, Universidade de Sao Paulo Brazil 501: 305-321, 2 figs.

Tararam, A.S., Y. Wakabara & H. de S.L. Mesquita, 1985. Feeding habits of *Hyale media* (Dana, 1853) (Crustacea-Amphipoda). Boletim Instituta Oceanografia, Sao Paulo 33: 193-199, 2 figs.

Tattersall, W.M., 1906. Pelagic Amphipoda of the Irish atlantic slope. The marine fauna of the coast of Ireland, Part II. - Scientific Investigations, 1905, Appendix IV: 63-99, 5 pls.

Tattersall, W.M., 1909. Amphipoda and Isopoda, with descriptions of two new species. Scientific and biological researches in the North Atlantic conducted by the author on his yachts 'The Walwin' and 'The Silver Belle' By R. Norris Wolfenden. Memoirs of the Challenger Society 1: 210-219, pls 4-5.

Tattersall, W.M., 1910. Marine Amphipoda and Isopoda. Irish Field Club Union. Report of the sixth triennial conference and excursion held at Rosapenna July 8th to 13th, 1910. Irish Naturalist 19: 187.

Tattersall, W.M., 1913. Amphipoda. Clare Island Survey Part 42. Proceedings of the Royal Irish Academy 31(Section 2): 24 pp.

Tattersall, W.M., 1922a. Zoological results of a tour in the

Far East. Amphipoda with notes on an additional species of Isopoda. Memoirs of the Asiatic Society of Bengal 6: 435-459, pls 18-21.

Tattersall, W.M., 1922b. Amphipoda and Isopoda. The Percy Sladen Trust Expedition to the Abrolhos Islands (Indian Ocean). Journal of the Linnean Society of London, Zoology 35: 1-19, 3 pls.

Tattersall, W.M., Taylor, P.R., 1979. An association between an amphipod, *Liljeborgia* sp. and the hermit crab, *Pagurus hemphilli* (Benedict). Marine Behavior and Physiology 6: 185-188, 1 fig.

Tembe, V.B. & K.B. Deshpande, 1961. Amphipods of Bombay Shores. Part I. A preliminary note. Journal of the University of Bombay, new series 31: 113-117.

Templeton, R., 1836a. Catalogue of Irish Crustacea, Myriapoda, and Arachnoida, selected from the papers of the late John Templeton, Esq. Annals and Magazine of Natural History, series 1, 9: 9-14.

Templeton, R., 1836b. Descriptions of some undescribed exotic Crustacea. Transactions of the Entomological Society of London 1: 185-198, pls 20-22 (part of pl. 22).

Tencati, J.R. & S.R. Geiger, 1968. Pelagic amphipods of the slope waters of northeast Greenland. Journal of the Fisheries Research Board of Canada 25: 1637-1650, 4 figs.

Tesch, J.J., 1911. Amphipoda. Resume des observations sur le plankton des mers explorees par le conseil pendant les annees 1902-1908. Copenhague, Conseil Permanent International pour l'Exploration de la Mer, Bulletin Trimestriel, 1911, 2: 176-193, figs.

Tesch, J.J., 1916. De Amphipoden der Zuidelijke Noordzee, verzameld met de "Wodan". Rapporten en Verhandelingen Uitgegeven Door het Rijhsinstituut voor Visscheryonderzoek 1: 319-373, pls 10-12.

Thomas, J.D., 1976. A survey of gammarid amphipods of the Barataria Bay, Louisiana region. Contributions in Marine Science 20: 87-100, 1 fig.

Thomas, J.D., 1979a. Occurrence of the amphipod *Leucothoides pottsi* Shoemaker in the tunicate *Ecteinascidia turbinata* Herdman from Big Pine Key, Florida, U.S.A. Crustaceana 37: 107-109.

Thomas, J.D., 1979b. A redescription of the wood-rasping amphipod *Tropichelura gomezi* Ortiz, 1976 (Cheluridae) from the Florida Keys, with notes on its distribution and ecology. Proceedings of the Biological Society of Washington 92: 863-872, 4 figs.

Thomas, J.D., 1983. *Curidia debrogania,* a new genus and species of amphipod (Crustacea: Ochlesidae) from the Barrier Reefs of Belize, Central America. Proceedings of the Biological Society of Washington 96: 127-133, 3 figs.

Thomas, J.D. & J.L. Barnard, 1983a. Transformation of the *Leucothoides* morph to the *Anamixis* morph (Amphipoda). Journal of Crustacean Biology 3: 154-157.

Thomas, J.D. & J.L. Barnard, 1983b. The Platyischnopidae of America (Crustacea: Amphipoda). Smithsonian Contributions to Zoology 375: 33 pp., 12 figs.

Thomas, J.D. & J.L. Barnard, 1984. *Acanthohaustorius panus,* a new species of sand-burrowing amphipod from Looe Key Reef, Florida Keys, with redescription and distribution Data of *Acanthohaustorius bousfieldi* Frame, 1980 (Amphipoda: Haustoriidae). Proceedings of the Biological Society of Washington 97: 909-926, 9 figs.

Thomas, J.D. & J.L. Barnard, 1985a. *Perioculodes cerasinus,* n.sp., the first record of the genus from the Caribbean Sea (Amphipoda: Oedicerotidae). Proceedings of the Biological Society of Washington 98: 98-106, 3 figs.

Thomas, J.D. & J.L. Barnard, 1985b. Two new species of two new gammaridan genera (Crustacea: Amphipoda) from the Florida Keys. Proceedings of the Biological Society of Washington 98: 191-203, 7 figs.

Thomas, J.D. & J.L. Barnard, 1985c. A new marine genus of the *Maera* group (Crustacea: Amphipoda) from Belize. Proceedings of the Biological Society of Washington 98: 630-635, 3 figs.

Thomas, J.D. & J.L. Barnard, 1986a. Two species of *Hornellia* (subgenus *Metaceradocus*) from the Florida Keys and Belize (Amphipoda, Melphidippoidea). Bulletin of Marine Science 38: 477-487, 6 figs.

Thomas, J.D. & J.L. Barnard, 1986b. New genera and species of the *Megaluropus* group (Amphipoda, Megaluropidae) from American Seas. Bulletin of Marine Science 38: 442-476, 15 figs.

Thomas, J.D. & J.L. Barnard, 1987. The Indo-Pacific *Audulla chelifera* reported from the Caribbean Sea. Proceedings of the Biological Society of Washington 100: 364-370, 4 figs.

Thomas, J.D. & K.D. Cairns, 1984. Discovery of a majid host for the commensal amphipod *Stenothoe symbiotica* Shoemaker. Bulletin of Marine Science 34: 484-485.

Thomas, J.D. & R.W. Heard, 1979. A new species of *Cerapus* Say, 1817 (Crustacea: Amphipoda) from the northern Gulf of Mexico, with notes on its ecology. Proceedings of the Biological Society of Washington 92: 98-105, 4 figs.

Thomas, J.D. & G.W. Taylor, 1981. Mouthpart morphology and feeding strategies of the commensal amphipod, *Anamixis hanseni* Stebbing. Bulletin of Marine Science 31: 462-467, 5 figs.

Thompson, W., 1847a. Additions to the fauna of Ireland. Annals and Magazine of Natural History, series 1, 20: 237-250.

Thompson, W., 1847b. Note on the *Teredo norvegica* (*T. navalis,* Turton, not Linn.), *Xylophaga dorsalis, Limnoria terebrans* and *Chelura terebrans,* combined in destroying the submerged wood-work at the Harbour of Ardrossan on the coast of Ayrshire. Annals and Magazine of Natural History, series 1, 20: 157-164.

Thompson, W., 1856. The Natural History of Ireland. 4: Mammalia, Reptiles, and Fishes, also Invertebrata, 4: xxxii + 516 pp. London: Patterson.

Thomson, G.M., 1879a. Additions to the amphipodous Crustacea of New Zealand. Annals and Magazine of Natural History, series 5, 4: 329-333, pl. 16.

Thomson, G.M., 1879b. New Zealand Crustacea, with descriptions of new species. Transactions and Proceedings of the New Zealand Institute 11: 230-248, pl. 10.

Thomson, G.M., 1880. A new species of Crustacea from New Zealand. Annals and Magazine of Natural History, series 5, 6: 1-6, pl. 1.

Thomson, G.M., 1881. Recent additions to and notes on New Zealand Crustacea. Transactions and Proceedings of the New Zealand Institute 13: 204-221, pls 7-8.

Thomson, G.M., 1882. Additions to the crustacean fauna of New Zealand. Transactions and Proceedings of the New Zealand Institute 14: 230-238, pls 17, 18.

Thomson, G.M., 1884. Descriptions of new crustaceans. Transactions and Proceedings of the New Zealand Institute 16: 234-240, pls 12, 13.

Thomson, G.M., 1885. New Crustacea. New Zealand Journal of Science 2: 576-577.

Thomson, G.M., 1889. Notes on, and recent additions to, the New Zealand crustacean fauna. Transactions and Proceedings of the New Zealand Institute 21: 259-268, pls 13, 14.

Thomson, G.M., 1893. Notes on Tasmanian Crustacea, with descriptions of new species. Papers and Proceedings of the Royal Society of Tasmania, for 1892: 45-76, 6 pls.

Thomson, G.M., 1895. Notes on some Crustacea from Macquarie Island. Transactions and Proceedings of the New Zealand Institute 27: 210-214, pl. 14.

Thomson, G.M., 1897. On two new gammarids from New Zealand. Annals and Magazine of Natural History, series 6, 20: 447-451, pl. 10.

Thomson, G.M., 1902. Some recent additions to and notes on the crustacean fauna of New Zealand. Annals and Magazine of Natural History, series 7, 10: 462-465.

Thomson, G.M., 1913. The natural history of Otago Harbour and the adjacent sea, together with a record of the researches carried on at the Portobello Marine fish-hatchery. Part I. Transactions and Proceedings of the New Zealand Institute 45: 225-251, pl. 10.

Thomson, G.M. & C. Chilton, 1886. Critical list of the Crustacea Malacostraca of New Zealand. Transactions and Proceedings of the New Zealand Institute 18: 141-159.

Thomson, J.M., 1946. New Crustacea from the Swan River Estuary. Royal Society of West Australia, Journal 30: 35-53, 5 figs.

Thorsteinson, E.D., 1941. New or noteworthy amphipods from the north Pacific Coast. University of Washington Publications in Oceanography 4: 50-96, 8 pls.

Thurston, M.H., 1970. Growth in *Bovallia gigantea* Pfeffer (Crustacea: Amphipoda). Antarctic Ecology 1: 269-278, 5 figs.

Thurston, M.H., 1972. Two new species of *Orchomene* Boeck (Crustacea: Amphipoda) from the Falkland Islands, South Georgia and Graham Land. British Antarctic Survey Bulletin 30: 51-63, 6 figs.

Thurston, M.H., 1974a. Crustacea Amphipoda from Graham Land and the Scotia Arc, collected by Operation Tabarin and the Falkland Islands Dependencies Survey, 1944-59. British Antarctic Survey Scientific Reports 85: 89 pp., 28 figs.

Thurston, M.H., 1974b. The Crustacea Amphipoda of Signy Island, South Orkney Islands. British Antarctic Survey Scientific Reports 71: 133 pp., 43 figs.

Thurston, M.H., 1976a. The vertical distribution and diurnal migration of the Crustacea Amphipoda collected during the Sond Cruise, 1965. I. The Gammaridea. Journal of the Marine Biological Association of the United Kingdom 56: 359-382, 9 figs.

Thurston, M.H., 1976b. New pelagic amphipods (Crustacea: Amphipoda) collected on the Sond Cruise. Journal of the Marine Biological Association of the United Kingdom 56: 143-159, 6 figs.

Thurston, M.H., 1979. Scavenging abyssal amphipods from the north-east Atlantic Ocean. Marine Biology 51: 55-68, 4 figs.

Thurston, M.H., 1980a. Abyssal benthic Amphipoda (Crustacea) from the east Iceland basin 1. The genus *Rhachotropis*. Bulletin of the British Museum of Natural History, Zoology 38: 43-67, 10 figs.

Thurston, M.H., 1980b. Abyssal benthic Amphipoda (Crustacea) from the east Iceland basin 2. *Lepechinella* and and allied new genus. Bulletin of the British Museum of Natural History (Zoology) 38: 69-87, 12 figs.

Thurston, M.H., 1982. *Cheus annae*, new genus, new species (Cheidae, new family), a fossorial amphipod from the Falkland Islands. Journal of Crustacean Biology 2: 410-419, 3 figs.

Thurston, M.H. & E. Allen, 1969. Type material of the families Lysianassidae, Stegocephalidae, Ampeliscidae and Haustoriidae (Crustacea: Amphipoda) in the collections of the British Museum (Natural History). Bulletin of the British Museum of Natural History, Zoology 17: 349-388.

Tiganus, V., 1976. Dynamique saisonniere des populations d'amphipodes des champs a *Cystoseira harbata* (Ag.) du littoral roumain de la Mer Noire. Cercetari Marine 9: 151-171, 9 figs, 3 tables.

Tkhan, Dang Ngok, See Dang.

Toulmand, A., 1964. Les amphipodes des facies sableux intertidaux de Roscoff. Apercus faunistiques et ecologiques. Cahiers de Biologie Marine 5: 319-342, 10 figs.

Toulmand, A., 1966. Description de *Bathyporeia nana* n.sp. (Amphipoda, Haustoriidae). Archives de Zoologie Experimentale et Generale 107: 219-235, 6 figs.

Toulmand, A. & J.-P. Truchot, 1964. Inventaire de la faune marine de Roscoff; Amphipodes cumaces. Supplementaux Travaux de la Station Biologique de Roscoff: 1-42.

Trebatoski, M.G., E.L. Mills & I.W. Sherman, 1965. Species-specific differences of *Ampelisca* (Amphipoda) as demonstrated by starch gel electrophoresis. Biological Bulletin 129: 427.

Truchot, J.-P., 1963. Etude faunistique et ecologique des amphipodes des facies rocheux intertidaux de Roscoff. Cahiers de Biologie Marine 4: 121- 176, 16 figs.

Trusheim, F., 1930. Sternformige Fahrten von *Corophium*. Senckenbergiana 12: 254-260, 3 figs.

Turquier, Y., 1965. A propos des *Corophium* (Crustacea, Amphipoda) des cotes francaises de la Manche. Bulletin, Societe Linneennede Normandie, series 10, 6: 133-139, 2 pls.

Turton, W., 1806. [Various amphipods], pp. 760, 761, 774, 775. In: J.F. Gmelin's: A General System of Nature 3(2): London: Lackington, Allen, & Co.

Tzvetkova, N.L., 1967. K faune ekologii bokoplavov (Amphipoda, Gammaridea) Zaliva Poc'et (Japonskoe More). Akademija Nauk SSSR, Zoologicheskii Institut, Issledovanija Fauny Morei 5: 160-195, 7 figs.

Tzvetkova, N.L., 1972. On parallelism in littoral gammarids (Amphipoda, Gammaridae) of the Atlantic and Pacific. Akademiia Nauk SSSR, Zhurnal Obschei Biologii 33: 307-314, 2 figs. [In Russian]

Tzvetkova, N.L., 1975a. Pribrezhnye gammaridy severnykh I dal'nevostochnykh morei SSSR I sopredel'nykh vod. Akademija Nauk SSR, Zoologicheskii Institut, Izdatel'stvo "Nauka" Leningradskoe Otdelenie, pp. 1-256, 89 figs.

Tzvetkova, N.L., 1975b. O novom vide Pleustidae (Amphipoda)-kommensale morskogo ezha s Komandorskikh Ostrovov. Zoologicheskii Zhurnal 54: 121-124, 1 unnumbered fig.

Tzvetkova, N.L., 1976. New species of Dexaminidae, Phliantidae and Biancolinidae, warm-water elements of the Possjet Bay fauna (Sea of Japan). Zoologicheskii Zhurnal 55: 684-695, 5 figs. [in Russian]

Tzvetkova, N.L., 1977. New genus and new species of amphipods (Amphipoda, Corophioidea) from the Japan Sea. Akademija Nauk SSSR, Zoologicheskii Institut, Issledovanija Fauny Morei 21(29): 88-101, 4 figs. [in Russian]

Tzvetkova, N.L., 1980. New species of *Photis* (Amphipoda, Corophioidea) from the Bering Sea. Akademija Nauk SSSR, Zoologicheskii Institut, Issledovanija Fauny Morei 25: 101-104, 1 fig. [in Russian]

Tzvetkova, N.L. & V.A. Kudrjaschov, 1975. Novyi rod amfipod semeistva Calliopiidae iz severnoi chasti Tichogo Okeana. Biologija Morja 4: 13-23, 5 figs.

Ueno, M., 1943. *Kamaka biwae*, a new amphipod of marine derivative found in Lake Biwa. Bulletin of the Biogeographical Society of Japan 13: 139-143, 28 figs.

Unger, E., 1918. A *Corophium devium* elofordulasa a Dunaban.

Allattani Kozlemenyek 17: 148-149.

Uschakov, P.V., 1931. Biconosen der Meeresstrasse Matotschkin Schar auf Nowaja Semlja. Travaux de l'Expedition de Institut Hydrologie Nouvelle Zemble, 6 Exploration Mers URSS 12: 5-128, 2 pls.

Uschakov, P.V., 1948. Fauna bespozvopochnyx Amurskogo limana i sosednix oprecneppyx chastkov Saxalinskogo Zaliva. Pamjati Akademika Sergeja Alekseevich Zernova, Akademija Nauk SSSR (Notebooks of the Academician Sergei Alekseyich Zernov [Hydrobiologist]): 175-191, 2 figs.

Ussing, Hj. & K. Stephensen, 1924. *Corophium bonelli* (M.-Edw.?) G.O. Sars, ny for Danmark, med Noter om andre *Corophium*-Arter. Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening Kobenhavn 78: 69-79.

Vader, W., 1967. Notes on Norwegian marine amphipods 1-3. Sarsia 29: 283-294, 3 figs.

Vader, W., 1969a. Notes on a collection of Amphipoda from the Trondheimsfjord area. Kunglia Videnskabers Selskabs Skrifter, 1969 (3): 20 pp., 6 figs.

Vader, W., 1969b. Herkenning en biotoop van de West-Europese Dexaminidae (Crustacea, Amphipoda). Zoologische Bijdragen II, Bijdragen Faunistiek Nederland 1: 59-67, 2 figs.

Vader, W., 1970a. The amphipod, *Aristias neglectus* Hansen, found in association with Brachiopoda. Sarsia 43: 13-14.

Vader, W., 1970b. Amphipods associated with the sea anemone, *Bolocera tuediae,* in western Norway. Sarsia 43: 87-98, 4 figs.

Vader, W., 1970c. De Glasvlo, '*Hyale nilssoni,* in de Waddenzee (Amphipoda Talitridae). De Levende Natuur 73: 142-144.

Vader, W., 1971a. Dippers feeding on marine invertebrates. British Birds 64: 456-458.

Vader, W., 1971b. Additions to the Amphipoda of northern Norway. Astarte Journal of Arctic Biology 4: 47-51, 1 fig.

Vader, W., 1971c. De vlokreeft *Podoceropsis nitida,* een kostganger van heremietkreeften. De Levende Natuur 74: 134-137.

Vader, W., 1972a. Notes on Norwegian marine Amphipoda 5. New records of *Leptamphopus sarsii* (Calliopiidae). Sarsia 50: 25-27.

Vader, W., 1972b. Associations between amphipods and molluscs. A review of published records. Sarsia 48: 13-18.

Vader, W., 1972c. Associations between gammarid and caprellid amphipods and medusae. Sarsia 50: 51-56.

Vader, W., 1974. Een nieuwe vlokreeft voor de Nederlandse fauna. De Levende Natuur 77: 93-96, 5 figs.

Vader, W., 1978. Associations between amphipods and echinoderms. Astarte 11: 123-134.

Vader, W., 1983a. Prehensile pereopods in gammaridean Amphipoda. Sarsia 68: 139-148, 11 figs.

Vader, W., 1983b. Associations between amphipods (Crustacea: Amphipoda) and sea anemones (Anthozoa, Actiniaria). Memoirs of the Australian Museum 1983: 141-153.

Vader, W., 1984a. Notes on Norwegian marine Amphipoda 7. Amphipod associates of *Geodia* sponges in western Norway. Fauna Norvegica, series A, 5: 14-16, 1 table.

Vader, W., 1984b. Notes on Norwegian marine Amphipoda. 8. Amphipods found in association with sponges and tunicates. Fauna Norvegica, series A, 5: 16-21.

Vader, W., 1985. Notes on Norwegian marine Amphipoda. 9. *Aristias megalops* Sars, 1985 (Lysianassoidea) rediscovered. Fauna Norvegica, series A, 6: 1-2.

Vader, W., 1986. *Menigratopsis svennilssoni* (Amphipoda, Lysianassoidea) found in northern Norway. Fauna Norvegica, series A, 7: 47, 1 fig.

Vader, W. & C.L. Beehler, 1983. *Metopa glacialis* (Amphipoda, Stenothoidae) in the Barents and Beaufort Seas, and its association with the lamellibranchs *Musculus niger* and *M. discors* s.l., Astarte 12: 57-61.

Vader, W. & P.J. Johannessen, 1978. Notes on Norwegian marine Amphipoda. 6. *Menigratopsis svennilssoni* (Lysianassidae), an amphipod new to the Norwegian fauna. Sarsia 63: 335-336, 2 figs.

Vader, W. & S. Lonning, 1973. Physiological adaptations in associated amphipods [sic] a comparative study of tolerance to sea anemones in four species of Lysianassidae. Sarsia 53: 29-40, 4 figs.

Vader, W. & K. Romppainen, 1985. Notes on Norwegian marine Amphipoda. 10. Scavengers and fish associates. Fauna Norvegica, series A, 6: 3-8.

Vanhoffen, E., 1897. Die Fauna und Flora Gronlands. Gronland-Expedition der Gesellschaft fur Erdkunde zu Berlin 1891-1893, 2(1): 383 pp., 8 pls.

Vanhoffen, E., 1907. Crustaceen aus dem kleinen Karajaktjord in West-Gronland. Zoologische Jahrbucher, Systematik 25: 507-524, pls 20-22.

Vanhoffen, E., 1911. Beitrage zur Kenntnis der Brackwasserfaune im Frischen Haff. Sitzungberichte Gesellschaft Naturforschung Freunde, Berlin 1911 (9): 399-405, 4 figs.

Vanhoffen, E., 1917. Die niedere Tierwelt des Frischen Haffs. Sitzungberichte der Gesellschaft Naturforschender Freunde zu Berlin 2: 113-147, 30 figs.

Varela, C., 1983. Anfipodos de las playas de arena del sur de Chile (Bahia de Maiquillahue, Valdivia). Studies on Neotropical Fauna and Environment 18: 25-52, 14 figs.

Villers, C. de, 1789. Caroli Linnaei Entomologia, Faunae Suecicae Descriptionibus Aucta. 4: ccxii + 556 pp., pl. 11. Lugduni: Piestre et Delamolliere [sic].

Viviani, D., 1805. Phosphorescentia maris Quatuordecim Lucescentium Animalculorum, Novis Speciebus Illustrata: 3-17, 3 pls. Genuae: Joannis Giossi.

Vosseler, J., 1889. Amphipoden und Isopoden von Spitzbergen. Beitrage zur Fauna Spitzbergens. Resultate einer im Jahre 1886 unternommenen Reise von Dr. Willy Kukenthal-Jena. Archiv fur Naturgeschichte 55: 151-162, pl. 8.

Wailes, G.H., 1930. Amphipoda from British Columbia. Museum and Art Notes, Vancouver 5: 30-31, 2 pls.

Wailes, G.H., 1931a. Amphipoda from British Columbia. Museum and Art Notes, Vancouver 6: 40-41, 1 fig.

Wailes, G.H., 1933. The plankton of the west coast of Vancouver Island, British Columbia. Museum and Art Notes, Vancouver, Supplement 7(9): 11 pp.

Wakabara, Y., 1973. Levantamento dos Amphipoda. Publicacao especial, Universidade Sao Paulo Instituo Oceanografico 3: 175-182, 2 figs, 2 tables.

Wakabara, Y.E., E. Kawakami de Rezende & A.S. Tararam, 1982. Amphipods as one of the main food components of 3 pleuronectiformes from the continental shelf of south Brazil and north Uruguay. Marine Biology 68: 67-70, 1 fig.

Wakabara, Y. & F.P. Pereira Leite, 1977. *Heterophlias seclusus* Shoemaker, 1933 (Amphipoda, Philiantidae) from the Brazilian coast. Crustaceana 33: 90-96, 5 figs.

Wakabara, Y., A.S. Tararam & A.M. Takeda, 1983. Comparative study of the amphipod fauna living on Sargassum of two Itanhaem shores, Brazil. Journal of Crustacean Biology 3: 602-607, 2 figs.

Walker, A.O., 1888. Report on the Crustacea of Liverpool Bay. Proceedings of the Liverpool Biological Society 2: 171-181, pl. 13.

Walker, A.O., 1889. Third Report on the higher Crustacea of the L.M.B.C. District. Proceedings of the Liverpool Biological Society 3: 195-213, pls 10, 11.

Walker, A.O., 1891a. On *Pherusa fucicola* (Leach). Annals and Magazine of Natural History, series 6, 7: 418-422.

Walker, A.O., 1891b. On *Pherusa fucicola* Leach. Annals and Magazine of Natural History, series 6, 8: 81-83.

Walker, A.O., 1892. The Lysianassides of the 'British Sessile-eyed Crustacea', Bate and Westwood. The Annals and Magazine of Natural History, series 6, 9: 134-138.

Walker, A.O., 1895a. The Amphipoda of Bate and Westwood's 'British Sessile-eyed Crustacea'. Annals and Magazine of Natural History, series 6, 15: 464-476.

Walker, A.O., 1895b. Revision of the Amphipoda of the L.M.B.C. District. Transactions of the Liverpool Biological Society 9: 287-320, pls 18, 19.

Walker, A.O., 1896a. *Phoxocephalus pectinatus*, Walker, or *P. simplex* (Bate)? Annals and Magazine of Natural History, series 6, 18: 156-157.

Walker, A.O., 1896b. On two new species of Amphipoda Gammarina. Annals and Magazine of Natural History, series 6, 17: 343-346, pl. 16.

Walker, A.O., 1897. On some new species of *Edriopthalma* from the Irish Seas. Journal of the Linnean Society of London 26: 226-232, pls 17, 18.

Walker, A.O., 1898a. Malacostraca from the west coast of Ireland. Proceedings and Transactions of the Liverpool Biological Society 12: 159-172.

Walker, A.O., 1898b. Crustacea collected by W.A. Herdman, F.R.S., in Puget Sound, Pacific Coast of North America, September, 1897. Transactions of the Liverpool Biological Society 12: 268-287, pls 15, 16.

Walker, A.O., 1901. Contributions to the malacostracan fauna of the Mediterranean. Journal of the Linnean Society of London (Zoology) 28: 290-307, pl. 27.

Walker, A.O., 1903. Amphipoda of the 'Southern Cross' Antarctic Expedition. Journal of the Linnean Society of London 29: 38-64, pls 7-11.

Walker, A.O., 1904. Report on the Amphipoda collected by Professor Herdman, at Ceylon, in 1902. Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar, Supplementary Report 17: 229-300, 8 pls.

Walker, A.O., 1905a. The secondary appendage of the upper antennae as a character in the Amphipoda. Annals and Magazine of Natural History, series 7, 16: 464.

Walker, A.O., 1905b. Marine crustaceans. XVI. Amphipoda. Fauna and Geography of the Maldive and Laccadive Archipelagoes, 2, Supplement 1: 923-932, figs 140-142, pl. 88.

Walker, A.O., 1906a. Preliminary descriptions of new species of Amphipoda from the 'Discovery' Antarctic Expedition,. 1902-1904. Annals and Magazine of Natural History, series 7, 18: 150-154.

Walker, A.O., 1906b. Preliminary descriptions of new species of Amphipoda from the 'Discovery' Antarctic Expedition, 1902-1904. Annals and Magazine of Natural History, series 7, 17: 452-458.

Walker, A.O., 1906c. Preliminary descriptions of new species of Amphipoda from the 'Discovery' Antarctic Expedition, 1902-1904. Annals and Magazine of Natural History, series 7, 18: 13-18.

Walker, A.O., 1907. Crustacea. III.-Amphipoda. National Antarctic Expedition, British Museum (Natural History) 3: 1-39, 13 pls.

Walker, A.O., 1908. Amphipoda from the Auckland Islands. Annals and Magazine of Natural History, series 8, 2: 33-39, pl. 5.

Walker, A.O., 1909a. Note on *Neopleustes bicuspis* (Krøyer) and *N. monocuspis* (Sars). Transactions of the Liverpool Biological Society 23: 101-102.

Walker, A.O., 1909b. Amphipoda Gammaridea from the Indian Ocean, British East Africa, and the Red Sea. Transactions of the Linnean Society of London, series 2, Zoology 12: 323-344, pls 42, 43.

Walker, A.O., 1910a. Marine amphipods from Peru. Proceedings of the United States National Museum 38(1767): 621-622, 1 fig.

Walker, A.O., 1910b. Crustacea collected by the late Mr. R.L. Ascroft (sic) and Mr. Harvey in the north of the Bay of Biscay. Annals and Magazine of Natural History, series 8, 5: 158-161.

Walker, A.O., 1910c. Notes on Amphipoda. Annals and Magazine of Natural History, series 8, 6: 31-33.

Walker, A.O., 1911. Notes on *Jassa falcata* (Mont.). Proceedings and Transactions of the Liverpool Biological Society 25: 67-72, 1 pl.

Walker, A.O., 1912. *Apherusa jurinei* (M.-Edw.). Annals and Magazine of Natural History, series 8, 10: 600-601.

Walker, A.O., 1914. Species of Amphipoda taken by 'Runa,' July and August 1913, not in Norman's Final Shetland Dredging Report, 1868. Annals and Magazine of Natural History, series 8, 13: 558-561.

Walker, A.O., 1916. *Edriophthalma* from South America. Annals and Magazine of Natural History, series 8, 17: 343-346, 1 fig.

Walker, A.O. & J. Hornell, 1896. Report on the Schizopoda, Cumacea, Isopoda and Amphipoda of the Channel Islands. Journal of Marine Zoology and Microscopy 2(7): 49-55.

Walker, A.O. & A. Scott, 1903. II.-Decapoda and sessile-eyed crustaceans from Abd-el-Kuri. The Natural History of Sokotra and Abd-el-Kuri: 216-232, pls 14A, 14B.

Walker, D., 1862. Notes on the zoology of the Last Arctic Expedition under Captain Sir F.L. M'Clintock [sic], R.N. Journal of the Royal Dublin Society 3: 61-77.

Watkin, E.E., 1940. The swimming and burrowing habits of the amphipod *Urothoe marina* (Bate). Proceedings of the Royal Society of Edinburgh 60: 271-280, 1 fig.

Watkin, E.E., 1941a. The male of the amphipod *Haustorius arenarius* Slabber. Journal of the Marine Biological Association of the United Kingdom 25: 303-305.

Watkin, E.E., 1941b. Observations on the night tidal migrant Crustacea of Kames Bay. Journal of the Marine Biological Association of the United Kingdom 25: 81-96.

Watkin, E.E., 1941c. The yearly cycle of the amphipod, *Corophium volutator*. Journal of Animal Ecology 10: 77-93, 3 figs.

Watkin, E.E., 1942. The macrofauna of the intertidal sand of Kames Bay, Millport, Buteshire. Transactions of the Royal Society of Edinburgh 60: 543-561, 8 tables.

Watling, L., 1976. *Parametopella inquilinus*, new species from Delaware Bay oyster beds (Amphipoda: Stenothoidae). Proceedings of the Biological Society of Washington 88: 429-432, 2 figs.

Watling, L., 1979. Zoogeographic affinities of northeastern North American Gammaridean Amphipoda. Bulletin of the Biological Society of Washington 3: 256-282, 1 fig.

Watling, L., 1981. Amphipoda from the northwestern Atlantic: The Genera *Jerbarnia*, *Epimeria*, and *Harpinia*. Sarsia 66: 203-211, 6 figs.

Watling, L. & H. Holman, 1980. New Amphipoda from the Southern Ocean, with partial revisions of the Acanthonotozomatidae and Paramphithoidae. Proceedings of the Biological Society of Washington 93: 609-654, 27

figs.
Watling, L. & H. Holman, 1981. Additional acanthonotozomatid, paramphithoid, and stegocephalid Amphipoda from the Southern Ocean. Proceedings of the Biological Society of Washington 94: 181-227, 27 figs.
Watling, L. & D. Maurer, 1972. Marine shallow water amphipods of the Delaware Bay area, U.S.A. Crustaceana, Supplement 3: 251-266.
Watling, L. & D. Maurer, 1972. 1973. A new euryhaline species of *Parapleustes* (Amphipoda) from the east coast of North America. Proceedings of the Biological Society of Washington 86: 1-8, 4 figs.
Watson, C.J.J., F.A. McNeill, R.A. Johnson & T. Iredale, 1936. Destruction of timber by marine organisms in the Port of Brisbane. Queensland Forest Service 12: x + 107 pp., 6 figs, 15 pls.
Weller, M.W., 1975. Ecological studies of the Auckland Islands flightless teal. The Auk 92: 280-297, 8 figs.
Weslawski, J.M., 1983a. Observations on the coastal Amphipoda of the Hornsund Fjord (South West Spitsbergen). Polskie Archiwum Hydrobiologii 30: 199-207, 2 figs.
Westinga, E. & P.C. Hoetjes, 1981. The intrasponge fauna of *Spheciospongia vesparia* (Porifera, Demospongiae) at Curacao and Bonaire. Marine Biology 62: 139-150, 7 figs.
Westwood, [J.O.], 1853. The discovery in England of a new genus and species of amphipodous *Crustacea*. Annals and Magazine of Natural History, series 2, 12: 44.
White, A., 1847. List of the Specimens of Crustacea in the Collection of the British Müseum: viii + 143 pp., London: E. Newman.
White, A., 1848. Descriptions of new or little-known Crustacea in the collection at the British Museum. Annals and Magazine of Natural History, series 2, 1: 221-228.
White, A., 1850a. Descriptions of two species of Crustacea in the British Museum. Proceedings of the Zoological Society of London 18: 95-97, pl. 16.
White, A., 1850b. List of the specimens of British animals in the collection of the British Museum, part IV.-Crustacea, pp. 1-141.
White, A., 1857. A Popular History of British Crustacea: 358 pp., 20 pls. London: Lovell Reeve.
White, A. & E. Doubleday, 1842. List of the annulose animals hitherto recorded as found in New Zealand, with the descriptions of some new species. Pp. 265-296. **In** J.E. Gray (ed.). Fauna of New Zealand. [place and publisher unknown]
Whiteaves, J.F., 1872. Notes on a deep-sea dredging-expedition round the Island of Anticosti, in the Gulf of St. Lawrence. Annals and Magazine of Natural History, series 4, 10: 341-354.
Whiteaves, J.F., 1874. On recent deep-sea dredging operations in the Gulf of St. Lawrence. American Journal of Science and Arts, series 3, 7: 210-219.
Whiteley, G.C. Jr., 1948. The distribution of larger planktonic Crustacea on Georges Bank. Ecological Monographs 18: 233-264, 10 figs.
Wickins, J.F., 1983. Catches of large lysianassid amphipods in baited traps at the nuclear energy authority dump site during June 1979. Deep-Sea Research 30(1A): 83-86, 3 figs.
Wicksten, M.K., 1982. Crustaceans from baited traps and gill nets off southern California. California Fish and Game 68: 244-248, 1 fig.
Wigley, R.L., 1966. Two new marine amphipods from Massachusetts, U.S.A. Crustaceana 10: 259-270, 8 figs.
Wildish, D.J. & J.J. Dickinson, 1982. A new species of *Haploops* (Amphipoda, Ampeliscidae) from the Bay of Fundy. Canadian Journal of Zoology 60: 962-967, 4 figs.
Williams, A.B. & K.H. Bynum, 1972. A ten-year study of meroplankton in North Carolina estuaries: amphipods. Chesapeake Science 13: 175-192.
Williams, G., 1938. On the occurrence of *Scopelocheirus hopei* and *Cirolana borealis* in living *Acanthias vulgaris* (spiny dogfish). Irish Naturalist Journal 7: 89-91.
Williams, G., 1954. Fauna of Strangford Lough and neighbouring coasts. Proceedings of the Royal Irish Academy 56(section B)(3): 29-133, 4 pls.
Williamson, H.C., 1916. *Amphipoda montagui* (M.-Edwards) = *Isaea montagui*, M. Edwards, a study in classification. Journal of Zoological Research 1: 135-151, 29 figs.
Wolski, T., 1930. *Corophium curvispinum* G.O. Sars w Prypeci i wodociagach warszawskich. Fragmenta Faunistica Museum Zoologic Polonici 1: 152-159.
Wouters, K.A., 1985. *Corophium curvispinum* Sars, 1895 (Amphipoda) in the River Meuse, Belgium. Crustaceana 48: 218-220, 1 fig.
Woynarovich, E., 1943. Über das Vorkommen von *Corophium curvispinum* G.O. Sars in der Bodrog. Fragmenta Faunistica Hungarica 6: 153.
Wrzesniowski, A., 1874. On *Callisoma Branickii*, a new species from Nice. Annals and Magazine of Natural History, series 4, 14: 15-16.
Wundsch, H.H., 1912. Eine neue Species des Genus *Corophium* Latr. aus dem Muggelsee bei Berlin. Zoologischer Anzeiger 39: 729-738, 16 figs.
Wundsch, H.H., 1913. Das Auftreten der marinen Amphipodengattung *Corophium* Latr. im Gebiet der Oder und Oberspree. Zeitschrift fur Fischerei und deren Hilfswissenschaften 14: 136-149, 3 figs, pl. 2.
Wundsch, H.H., 1915. Weitere Beitrage zur Frage der Susswasserform von *Corophium curvispinum* G.O. Sars. Sitzungsberichte Gesellschaft Naturforschender Freunde Berlin, 1915, 2: 56-81, 11 figs, pls 4-5.
Wundsch, H.H., 1920. Weitere Fundorte der Susswasserform von *Corophium curvispinum* G.O. Sars in der Baltischen Tiefebene. Archiv fur Hydrobiologie 12: 693-697.
Yamato, S., 1985. Discrimination of four intertidal melitid species (Amphipoda: Melitidae) in the Inland Sea of Japan, and evidence of their reproductive isolation. Benthos Research, Bulletin of the Japanese Association of Benthology 28: 36-41, 5 figs.
Yayanos, A.A., 1978. Recovery and maintenance of live amphipods at a pressure of 580 bars from an ocean depth of 5700 meters. Science 200(4345): 1056-1059.
Yayanos, A.A., 1981. Reversible inactivation of deep-sea amphipods (*Paralicella capresca*) by a decompression from 601 bars to atmospheric pressure. Comparative Biochemistry and Physiology A69: 563-565, 1 fig.
Yonge, C.M., 1949. The New Naturalist. The Sea Shore: 311 pp., 61 colour photographs, 62 black and white photographs, and 88 figs. London: Collins St. James's Place.
Yoo, K.I., 1970. On the distribution of the pelagic amphipod, *Cyphocaris challengeri* (Gammaridea: Lysianassidae) in the western north Pacific. Korean Journal of Zoology 13: 94-100, 4 figs.
Zaddach, E.G., 1844. Synopseos crustaceorum prussicorum prodromus. Dissertatio zoologica, quam scripsit et ex auctoritate amplissimi phiposophorum ordinis in academia Albertina pro facultate docendi adipiscenda die XI. M.Decembris....: viii and 39 pp. Regiomonti: E.J. Daljowski.
Zaddach, E.G., 1879. Die Meeres Fauna an der preussischen Kuste. Schriften der Physikalisch-Okonomischen Gesellschaft zu Konigsberg 19: 9-39, 5 pls.

Zavattari, E., 1920. Biologia neritica mediterranea II. Osservazioni etologiche sopra l'anfipodo tubicolo *Ericthonius brasiliensis* (Dana). Reale Comitato Talassografico Italiano, Venezia Memoria 77: 3-22.

Zhang, W.-Q., 1974. A new species of the genus *Corophium* (Crustacea, Amphipoda, Gammaridea) from the southern coast of Shantung Peninsula, North China. Studia Marina Sinica 9: 139-146, 2 figs.

Zimmerman, R.J., 1978. The feeding habits and trophic position of dominant gammaridean amphipods in a Caribbean seagrass community. Dissertation for Degree of Doctor of Philosophy in the Department of Marine Sciences, University of Puerto Rico, Mayaguez, Puerto Rico: xi + 86 pp., 6 figs, 5 pls.

Zimmerman, R.J. & J.L. Barnard, 1977. A new genus of primitive marine hadziid (Amphipoda) from Bimini and Puerto Rico. Proceedings of the Biological Society of Washington 89: 565-580, 5 figs.

Zimmerman, R., R. Gibson & J. Harrington, 1976. The food and feeding of seagrass-associated gammaridean amphipods in the Indian River. In: The Harbor Branch Consortium Indian River Coastal Zone Study, 1975-1976 Annual Report, 1: 87-92, 6 figs.

Zontmoba, N.K., 1958. Nekotorye materialy o bokoplavakh (Amphipoda) i desiatinogikh rakakh (Decapoda) nribrezhnoi zony vostochnogo Murmana. Akademiia Nauk SSSR Trudy Murmanskoi Biologicheskoi Stantsii 4: 130-139.

Accepted 7 December 1990

APPENDIX I

Dissection of an Amphipod for Right-handed Operators

All data for the sample collection of the amphipod 'species' are written on a card and each specimen assigned a code letter or number.

Measurements. A fairly exact measurement can be made as outlined in Barnard & Drummond (1978). The amphipod is mounted temporarily in its preservative on a deep depression slide with cover glass applied. Under low power microscopy with camera lucida a line is drawn on paper from the front of the head to the apex of urosomite 3 along a parabolic curve just above the coxae more or less along the lower gut line. The line on paper is then measured and converted to millimeters, preferably to hundredths on specimens less than 10 mm long, to tenths on larger specimens. The conversion can be made by constructing a simple spline made from a strip of paper or flexible plastic drawing paper about 1 x 15 cm. The spline is marked with arbitrary rules which are then compared to a stage micrometer viewed through the camera lucida. The spline on edge is wrapped along the parabolic line of the amphipod length drawn on the paper so that an arbitrary length is ascertained on the spline and then the spline is flattened onto the rule line made by the stage micrometer. The stage micrometer must, of course, be used with the same magnification applied to the drawing of the amphipod length on paper, i.e., the same objective and same setting of the camera lucida. Many taxonomists maintain a constant arrangement of their microscope and camera lucida powers so that a permanent spline can be made which is marked off in millimetre increments. The distances between magnified millimetre rule lines on the spline reflect the constant power setting of the microscope and camera lucida. For ecological studies requiring measurement of many specimens a flat dish filled with many specimens can be placed in a microprojector and the bodies projected onto paper and quickly measured with a precomposed spline or the parabolic length lines can be drawn on the paper and measured later.

Mounting. Subject amphipods in alcohol are infiltrated with glycerin, acetic acid or other mounting medium (or its precursors, such as xylene prior to canada balsam; however xylene is now considered to be carcinogenic) by slow addition of the desired fluid to alcohol over a period of 1-4 hours. Continuous observation is required to prevent rapid shrinkage of the specimens owing to osmotic effects.

Dissection. For right-handed operators. In a flat-bottomed syracuse dish, the amphipod is laid on its left side with its legs projecting away from the operator, so that it appears upside down through the oculars of the stereoscope. The body is covered to more than twice its depth with mounting medium to prevent the effects of surface tension during dissection and to ameliorate the glare of reflected light from projecting legs.

A pair of jeweller's forceps with very fine points, a fine dissecting needle such as an insect pin mounted on a stick of wood, and a coarse, standard dissecting needle are used. One standard glass slide is needed for each dissected part plus one additional depression slide for discarded damaged materials, and thin cover slips are needed. After labelling slides with specimen code and morphological code a small drop of glycerin (or other mounting medium) is placed on the flat slides, and the depression-slide concavity is sparingly filled with glycerin. Permanent slides have the disadvantage of restricting the manipulation of mounted parts for 3-dimensional observation; parts from glycerin slides may be removed and stored permanently in alcohol in a tiny vial made of a bit of capillary tubing with one end closed by melting in a fire, the other end stoppered with cotton or pith (plastic foam is biodegradable).

Before dissection one follows the precepts of the amphipod analytical sheet (Appendix II) on relationships of undissected parts to each other. One commences removing the pereopods (legs) of the amphipod at either the fourth or fifth coxa (sideplate) depending on which of these coxae is largest or would pull away from the body without entangling other legs or coxae. The amphipod is upside down on its left side, being held with a coarse needle in the left hand through a body segment or with forceps or a blunt stick, and the coxa is either being pulled and ripped gently at its base with the fine forceps or various instruments are used to scissor apart the segment above the coxa so that the integrity of the proximal coxal margin is maintained. In most cases the coxa can be pulled free of the body carrying some of its proximal musculature and part of the segment. Occasionally the firmness of the attachment dictates the use of a fine scalpel.

When the coxa is removed, the remainder of the leg and gill (and, if a female, the brood lamella) will come with it. As the legs are excised, identifying structures such as gill and oostegite sizes are recorded. Antennae 1 and 2 are dissected at their bases (right side only). Care in removal of antenna 2 at its juncture is needed because it often breaks easily at joint 2 or 3 and also may bring away the mandible or tear the prebuccal parts.

The seven coxae-legs and two antennae are removed from the dish to the flat slides with the drops of glycerin. When placed in the glycerin the parts, if being taken from a specimen in alcohol, might disperse the drop, but a light breath of air will accelerate evaporation of the alcohol and the amalgamation of the puddle. The legs must be fully immersed in the glycerin to prevent drying and uptake of air bubbles.

After making observations in the analytical sheet, the right uropods 1, 2 and 3, both lobes of the telson, and one member of each pair of the pleopods are removed and placed on flat slides with tiny drops of glycerin. All parts are manipulated, while the glycerin puddles coalesce, and arranged so that their respective dorsal (uropods) and anterior (pleopods) sides are up and so that legs are viewed from the left. The telson generally should be removed by actually first removing its segment to a glass slide glycerin puddle and then teasing away the segment from the base of the telson. Generally it is wise to dissect off right gnathopods 1-2 also and place them on slides as if they were left lateral; this provides slides to show the medial surfaces of those gnathopods.

A clean cover slip, taken from a jar of alcohol and dried with fine tissue, then gripped in the forceps, is lowered horizontally over the glycerin of each slide until it can be dropped smartly onto the puddle without engaging air bubbles. Glycerin is to be applied sparingly so as to prevent excessive sliding of the cover slip. If the perimeter of the cover slip lacks glycerin it may be added later by placing a small drop at the edge.

Before removing mouthparts determine whether or not they are grouped in a coniform or quadratiform bundle from lateral view.

Mouthparts are removed from the head, again with the amphipod head pointing away from the observer so that motion to the right with the forceps can be used to snap off the mouthparts. The maxillipeds, which are the most posterior mouthparts, cover all the other mouthparts and must be removed at their base first; both maxillipeds will come off together. More anteriorly, a pair of bilobed second maxillae is to be removed and then the first maxillae, each of which appears to have three lobes (inner lobe, outer lobe, and palp but in a few genera lacking a palp). The inner lobes are difficult to remove in connection with the outer unless special care is taken and caution must be exercised not to damage the lower lip. Mandibles are removed next; they are usually brittle and easily broken; they are most easily removed by rotating them to ascertain the basal muscular attachment and snipping this with forceps. Sclerotic connections to upper and lower lips also must be disarticulated to avoid their damage. Usually each mandible will have a palp. After maxilla 1 and the mandibles are removed, a lower lip and an upper lip will remain; the lower lip is extensive and for removal must be grabbed deeply in its muscular and tendon attachments without separating the inner and outer lobes. After practice one may desire to remove lower lips before dissecting mandibles as the two mouthparts often are closely connected with tissues and the mandibles will tear the lower lip when being removed. If difficulty in identifying the inner plate of maxilla 1 occurs it may be feasible to remove both first maxillae plus lower lip by grabbing all three parts with a thicker forceps, then teasing apart the three units on the bottom of the dish or on a separate slide.

The upper lip and epistome are not removed from the head at this time. Their interrelationship from lateral view must be preserved. The observer should note the condition of the ventral margin of the upper lip from anterior view (rounded, incised, truncated) before mounting the carcass on the depression slide. Later the head can be removed from the body and surgery performed to render a flat mount of these prebuccal parts on a separate slide.

Mouthparts are transferred to a tiny drop of glycerin on flat slides, arranged in sequence and each fitted with a cover slip. Preferably the mouthparts are arranged so that the following parts project upward or are on top: mandibular molars and the inner lobes of lower lip, maxillae and maxillipeds. If the base of the maxillipeds curves upward, it may be cut off so that the cover slip will set firmly. The mandibles should be arranged with the molars projecting obliquely toward the observer or directly horizontal if the center of gravity so permits. Often mandibles are placed on a slide with supports for the cover slip to prevent crushing. Supports may be made of wire or sand grains.

Because a mostly unilateral dissection has been made, the remaining amphipod carcass has a complete set of pereonal (less gnathopods?) and pleonal parts except telson remaining on one side (the right if done by a right-handed operator). If not already removed, coxa 1 and any other (right) legs are removed which would obscure the head and pleon from lateral view. The carcass is mounted right side down in the glycerin of the depression slide and a cover slip firmly set. If the amphipod or any of its parts are so large that they will be crushed by the coverslip or lie in a tilted position, two pieces of wire of appropriate thickness (or variously thick insect needles, pins, paper clips cut with nipping pliers) are placed on each side of the amphipod, which is covered with sufficient glycerin to fill the area between the two wires, and the cover slip set on the supports. The top glass should fit the carcass snugly so as to hold it in place but not to crush it. Glycerin has sufficient surface tension so that it will not leak out from under the elevated cover slip as long as the slide is kept in a horizontal position.

At a later time after observation of the legs, the gills from legs 2 to 7 (or 2-6 or 2-5) are removed and placed in sequence on a flat slide with glycerin puddle. If the animal is a female, the brood lamellae are removed in sequence and placed in a row on another slide. At this stage one is working from glycerin to glycerin without the effects of a change in surface tension so that it is easy to keep the parts in order, making notes of characteristics that will permit proper orientation. Cover slips are set in place.

If the amphipod species is dimorphic, a slide of antennae, gnathopods, uropod 3 and any other possible parts that might reflect secondary sexual differences, should be prepared for rapid identification; but a full dissection should be prepared for descriptive purposes.

Parts of greatly differing thickness should not be intermingled on the same slide as the thinner parts will not be properly fitted by the cover slip. Delicate parts may need artificial support of the cover slip as noted above in discussion of the mandibles. The authors keep several vials of sand and silt of differing grain sizes available to select various grains to place under cover slips for elevation of the cover slip. Dirt may be removed from heavily setose appendages by use of a fine camel's-hair brush or very careful use of highly diluted hydrogen peroxide or sodium hypochlorite (in the United States commonly sold as 'bleach' or 'clorox'). Sonic cleaning is also possible but much practice on unimportant specimens must be undertaken before attempting this on unique specimens.

Eventually the student will gain sufficient experience for examination of most parts without dissection. Even mouthparts can be partially to fully examined by careful manipulation under a fine stereoscope with adequate 2-directional light sources. Mandibles often can be rotated for viewing molars without their complete removal. This protects unique specimens from unnecessary damage or loss of parts or the need to mount parts permanently.

Illustrating. The taxonomist anticipating a need to illustrate the organism must undertake a different course of dissection. If a body view is required and the amphipod is already highly translucent it may be possible to mount it before dissection in a depression slide, ensure its rigidity against movement and simply draw it on a compound microscope fitted with camera lucida. However, if some of the left coxae are obscured by opacity from opposite appendages the right coxae may have to be removed carefully without losing integrity on the side to be drawn. The right pleopods might also be removed. We prefer depicting the left side of the body and left sided appendages because the body drawing is then arranged for publication with the anterior or dorsal margin toward the left side of the page (the normal direction from which a written Romance or Anglo-Saxon language is deciphered; this method also evolved from the publishing standards of several USA government agencies many decades ago); other language cultures may prefer right sided illustrations. The lateral in toto drawing represents a composite reconstruction of body and coxae drawn first, with extirpated legs superimposed on the drawing by use of a microprojector or camera lucida in which degree of magnification can be replicated. After the preliminary body drawing is accomplished the left thoracic legs are removed and mounted on slides as discussed above. In this way legs are attached to the body drawing in perfectly flat but somewhat unnatural condition. One must determine accurately the attachment loci of the legs to their coxae by study of the slides.

If the body segment margins are difficult to see one may remove the pleon to a new slide and then, one by one, dissect the pereonites off the carcass, starting with segments 7, 6, 5, followed by removal of the head to obtain the anterior margin of segment 1 and then continue pulling off segments 4, 3, and 1 until only segment 2 remains for analysis. As each segment is removed the carcass is remounted with cover slip and adjusted to the proper lateral position to reconstruct onto the drawing the shape of the segmental line. Note that it is more important to determine the anterior margin of segment 1 than, for example the posterior margin of segment 2 and hence one must view the anterior margin of segment 1 before too many other segments are removed and body integrity is lost.

An enlarged view of the pleon is now undertaken preferably with the pleopods attached so that they can also be added to the drawing. The right-sided pleopods and uropods can be removed to facilitate light transmission and untangling of rami.

An enlargement of the pleon is desirable to show details of the uropods and margins of the epimera so that before dissection its details can be added to the in toto view and new enlarged drawing. Then, if pleonite segmental lines are difficult to see, one may duplicate the method for the thorax by pulling off segments one by one and remounting the pleonal carcass; this is generally mandatory to observe posterior margins of epimera; as each segment is removed it is placed on a glass slide where further dissections of parts will be necessary later to provide dorsal views of uropods and telson plus flat-sided views of pleopods. Details are added both to the in toto view and the enlargement of the pleon. When a slide for telson is ultimately prepared the segment should be teased away from the telson so as to preserve the basal telsonic margin (do not pull the telson off of the segment because this damages valuable characters). Uropod 3 is preferably left attached to urosomite 3 with the telson and mounted flat and drawings of both attempted; if uropod 3 does not flatten properly then it must be removed to its own slide. Each of uropods 1 and 2 are preferably retained together as attached to their individual segments, the top of each segment destroyed and each segment flattened from the top by the cover slip. This results in these uropods being mounted dorsal side up rather than in the oblique position normally resultant from a fully dissected uropod.

Preserved amphipods frequently have broken appendages. Sometimes the loss of uropod 3 is a consistent occurrence especially in gammarids and oedicerotids. So few Gammaridea lack a third uropod that the first assumption always should be that the part has been removed accidentally and close examination should be made for sockets and musculature indicating the loss.

Antennae are often broken and such specimens should be avoided until experience is sufficient to recognise amphipods by other means. In the photid-corophiid complex, legs (except gnathopods) and antennae are frequently autotomised when the animals are preserved, and specialists usually have found other means of identification in those families.

The ecologist making a study of a single species should be prepared to take special care in preservation of material to ensure completeness of the specimens. One may find slow dilution of seawater or special anesthetics suitable to kill the organism slowly and to prevent autotomy.

APPENDIX II

Amphipod Analytical Sheet

A Checklist of Characters to be Examined before Using Keys

Before the keys are utilised for the identification of an amphipod, the morphological characteristics of the organism should be determined. This requires a complete dissection, mounting, and examination of parts on microscope slides as discussed in Appendix I. The following checklist may be useful as a guide to characters that should be determined. This procedure is very laborious at first but pays dividends in the final result and makes familiar, more rapidly, those characters which ultimately are most important. Principal characters are italicised.

The checklist is designed to indicate the characters present by circling the pertinent items in the sentences, or adding percentages to blanks or zeros to the ends of inappropriate sentences. Descriptive phrases applied to various shapes are minimal in number; the observer may have to compose further refinements. But descriptive refinements can be overextended to the unnecessary wastage of time, for this checklist applies to initial analysis of the generic position and does not apply to fine details necessary for specific identity.

One may find it useful to replicate copies of this checklist for the keeping of records.

BODY

Pereon [mesosome] and Pleon [combining metasome and urosome])

General, segments:

Abnormal disproportion or enlargement (example, *Danaella*).
Cylindricalisation (examples, Colomastigidae, Eophliantidae).
Dorsal depression with or without splaying of coxae (examples, Phliantidae, *Corophium*).

Ornamentation:

Teeth, dorsal and lateral; pereon 1, 2, 3, 4, 5, 6, 7; pleon 1, 2, 3, 4, 5, 6.
Spine or setal groups, dorsal, especially on pleon 1, 2, 3, 4, 5, 6.
Elongation of metasome: example, is it as long as 5 or 6 pereonites? (for distinguishing a few Gammaridae and Eusiridae).

Urosome:

Coalescence of segments: 1-2, 1-3, 2-3 (examples: Ampeliscidae, Kuriidae, Dulichiidae).
Dorsal depression (examples, Corophiidae, Cheluridae).
Elongation of urosomite 1 (example, Dulichiidae).

Pleonal epimera:

Shape and ornamentation from lateral view, especially of epimeron 3 (primarily for identification to species).

Size:

Normal: like basic gammaridean; 1-4 of medium length, subquadrate, 5-7 shorter, successively smaller, 5-6 slightly lobed.
Elongation (example, Stegocephalidae).
Reduction (example, Dulichiidae).
Disproportional sizes of 1-4: 1 long, 2 shorter, 3 shorter, 4 long (example, Argissidae).
Coxa 1 absent or vestigial (rare examples, Bateidae, *Anamixis*).
Coxa 1 reduced in size and partially to fully covered by following coxae (example, Stenothoidae). (Caution: keep amphipod specimen in unflexed condition for proper observation).
Coxae 1-2 or 1-3 reduced in size and covered by following coxae (primarily genera of Lysianassidae).
Coxa 3 larger than 4 (example, Synopiidae).
Coxa 5 as long as 4 (occasional).

Position:

Serial contiguity: coxae contiguous or overlapping.
Serial discontiguity (example, Dulichiidae, Eophliantidae).
Concealment of one coxa by another (see above).
Lateral splaying (Phliantidae).

Shape:

Coxae 1-4 subquadrate.
Acumination of coxae 1, 2, 3, 4.
Excavation posteriorly of coxa 4: posterior margin straight, concave or deeply excavate and/or bearing posterior lobe (contrast Stegocephalidae and Corophioidea).
Coxa 1 tapered, expanded, oval, semicircular, quadrate, conical, acutely lobed.
Ventral serrations.

Special patterns:

Disproportional sizes of 1-4 (Argissidae, see above).
Crescentic curve formed ventrally by coxae 4-5 together (example *Epimeria*).

HEAD

Size:

Length as a function of one or more pereonites (1, 1-2, 1-3), head measured on horizontal axis from front of lateral lobe to perpendicular line from posterior cephalic extent. Head length has been found to be correlative both to total body length and instar stage.
Massive (see definition in glossary).

Shape:

Normal gammaridean: head cuboidal, with lateral lobes.

Globular: subspheroid; neck cylindrical.
Galeate (see definition in glossary).

Rostrum:

Length in relation to head (%) and to article 1 of antenna 1 (%).
Shape: acute, spatulate; horizontal, deflexed.

Lateral lobe:

Shape and extent of projection.
Notch or ornamentation.
Ocular bulge on side of head.
Marginal details of anteroventral corner of head near insertion of antenna 2.

EYES

Composition:

Presence or absence (careful examination required because eyes often lose pigment in preservative).
Paired ommatidial mass below cephalic cuticle (common).
Cuticular lenses in lateral pairs (Ampeliscidae almost exclusively). Occasionally lenses occupy anterior surface of head.
Diffused pigment or stain.
Quadrigeminous lenticular bodies (example, Argissidae).
Bright pigmentary masses enveloping brain (especially Ampeliscidae).
Shape: ovoid, flask-like, reniform.
Position:
Near lateral cephalic surface.
In lateral lobes.
In rostrum (especially Oedicerotidae).
Dorsally confluent (especially Oedicerotidae).
Accessory detached ommatidia (pattern often confused by preservational accidents).
Occupying cephalic extent almost fully (Hyperiopsidae).

ANTENNA 1

Length:

As percent of total body (front of head to base of telson (%).
In relation to antenna 2 and to its peduncle (%).

Flagellum:

Proportion to peduncle (%).
Elongation of basal article (often conjoint, composed of incompletely segmented articles).
Proportion to peduncular article 3, especially when latter elongated (%).
Number of articles: 0, 1, 2, 3, 4, 5, 6-10, 11-15, 16+.

Peduncle: *Proportion to head.*

Relative lengths of all three articles (value of 100 assigned to length of article 1): 1=100%; 2=(%); 3=(%).
Ornamentation on any article, all sides.
Distinctive spines or setal bundles.
Possible geniculation between articles (example, several Haustoriidae).
Presence of callynophore (see glossary).

Accessory flagellum (attached to article 3 of peduncle, medial):

Number of articles: 0, 1, 2, 3, 4, 5-10, 11+.
A fused scale.
Special shape.
Elongation of basal article.

Accessory organs:

Calceoli. See Lincoln & Hurley (1981) for 9 kinds.
Aesthetascs, if especially enlarged or in dense bundles.

ANTENNA 2

Length as percent of body length (including head) (%).

Peduncle: proportion to head (%).

Relative proportions of articles: 4=100%; 5=(%).
Tumidity of articles 3, 4, or 5; article 1 large and subspherical.
Gland cone and/or *ensiform process* on articles 2 and 1; extreme enlargement and shape. (Ensiform process generically important primarily in Phoxocephalidae. Gland cone often medial and hidden from lateral view).

Flagellum: proportion to peduncle (%) or article 5 (%).

Number of articles: 0, 1, 2, 3, 4, 5, 6-10, 11-15, 16+.

Ornaments:

Aesthetascs, calceoli on peduncle and/or flagellum.
Distinctive spine groups.
'*Fossorial*' *condition*, with long plumose setae.

MOUTHPARTS

From lateral view forming a *conical bundle* below head (rare) *or a quadrate* bundle (common). To be examined before dissection.
Reduction and amalgamation of mandibles and maxillae along a ventral keel (Anamixidae).

EPISTOMAL-LABRAL COMPLEX (prebuccal)

Lateral view (primarily of generic importance in Lysianassidae):

Epistome and labrum separated by notch (common) or coalesced.
Epistome formed as lobe dominating labrum, vice versa, or produced together.

Shape of lobes:

Epistome: flat, rounded, acute.

Labrum: flat, rounded, acute.
Prebuccal mass inconspicuous and of normal gammaridean proportions.

UPPER LIP (anterior view)

Ventral margin: rounded, truncate, incised, lobed asymmetrically or symmetrically.

MANDIBLE

Shape and size of body: bulky (Synopiidae), styliform (Iphimediidae), elytriform (Stegocephalidae, Pardaliscidae), OR normal (Gammaridae).

Incisor: normal, extremely broadened; needle-like, toothed, untoothed, teeth separated by flat margin.

Lacinia mobilis, if present on either right or left mandible: toothed, special shape such as vermiform.
Raker spines proximal to lacinia mobilis: 1-2; 3-6; 7+.

Molar: Absent.

Size: small (Fig.65C), medium (Fig.65A), large (Fig.65D), fully dominating mandible (Fig.129E).
Shape: cylindrical, cuboidal, laminate, conical, tuberous.
Texture: triturative (rasp-like), spinose (spines articulate), setulose, minutely fuzzy, striate, smooth.
Accessory seta or spine on triturative molar.

Palp:

Number of articles: 0, 1, 2, 3.
Attachment position relative to molar: over (level with), distal to, proximal to (variation from "level" primarily in Lysianassidae).
Relative length of articles: 1=(%); 2=100%; 3=(%).
Shape:
Article 3: cylindrical, falconiform, tuberculiform.
Article 2: occasionally curved strongly.
Article 1: rarely with distal cusp.
Setation: article 3: distal only, medial.
Disymmetry of right and left members (especially lacinia mobilis, incisor, spine-row).

LOWER LIP

Normal gammaridean (Fig.1).
Inner lobes: *weak* (Fig.60G), *absent.*
Mandibular projection of outer lobes: pointed, obtuse, absent.
Outer lobes: *distally notched*; medially excavate (Ampithoidae, Fig.26A).
Special shapes: Pleustidae (Fig.115A), *Trischizostoma* Fig.90T).

MAXILLA 1

Inner plate:

Size: absent (very rare), small (Fig.25D), medium (Fig.1), as large (broad and bulky) as outer plate (rare).
Setation: *terminal*, *medial*, or both.
Number of setae: 1, 2, 3, 4-6, 6-12.
Structure of setae: normal; sickle-shaped or strongly constricted.

Outer plate:

Number of spines: 1-4, 5-6, 7-8, 9-11+.
Shape of spines: normally slender, extremely stout, some bifid, some serrate, in two distinct groups by position or structure.

Palp:

Number of articles: 0, 1, 2.
Normal structure: article 1 short, article 2 long.
Article 1 long, article 2 short.
Modifications: *strongly bent* (geniculate), *foliaceous*, bearing scales (examples: Stilipedidae, Hyperiopsidae).

MAXILLA 2

Normal gammaridean (Fig.1).
Abnormally small, plates partially coalesced, setae very sparse.
Breadth of lobes: subequal, inner broader, outer broader.
Axial divergence of lobes (Fig.123A).
Extension of outer plate on basal article (Fig.123D).
Specialised spines (rare).
Extent of medial setation on inner plate: strong, sparse, absent.
Presence of oblique facial setal row on inner plate.

MAXILLIPED

Inner lobes (proximal):

Size: vestigial (Fig.103C), normal (Fig.1).
Abnormal shape: foliaceous (rare), styliform (note: inner lobes often appear styliform if not fully depressed by cover slip).

Outer lobes:

Size relative to inner: usually larger, *vestigial* (Fig.126G), foliaceous (rare).
Spination: absent, medial, distal.

Palp:

Extension in relation to outer plate: shorter, equal, longer.
Number of articles: 0, 2, 3, 4.
Medial or terminal extensions of articles, e.g., lobes, cusps: articles 1, 2, 3.
Elongation of articles 1, 2, 3.
Terminal palp article (usually 4): claw-like (normal); barrel-shaped; vestigial; bearing distal nail, spine, or setae.

GNATHOPODS

Judgment of gnathopods 1-2 as: *feeble together* (Fig.127C), *normal* (basic gammaridean with gnathopod 2 powerful),

powerful together (Fig.83A).

GNATHOPOD 1 (excluding coxa 1)

Present, *vestigial*, or *absent* (Bateidae and *Paranamixis* only).
Size (or length) relative to gnathopod 2: smaller, equal, larger.
Sexual dimorphism: similar or different in male and female.

Articles:

2: Length in relation to coxa 1 (rarely important except when coxa 1 abnormal).
3: Length normal; or elongate (like Fig.92K).
4: Merochelation: with strong thumb-like extension (rare).
5: Length relative to article 6 (%).
Posterior lobe: present, weak, absent.
Carpochelation: with strong distoposterior tooth or teeth forming thumb or guarding article 6.
6: Breadth: relative to article 5; wider, equally wide, narrower.
Shape: ovate, pyriform, quadrangular, rectangular, linearly rectangular, styliform.
Palm: Present, absent, undecided.
Slope: transverse, oblique: slight; moderate; extreme.
Chela if present: parachelate (describe if strongly chelate).
Definition of proximoposterior corner of palm: spines, protuberance, tooth, change in slope only.
Ornamentation: special spines, teeth.
7: Fit of the dactyl to palm: congruent, overlapping, not fitting.
Shape and ornaments: claw-like (normal); vestigial; absent (rare); with special setae or spines; hidden in setae or cirri; flagelliform.
Distal articles especially scaly or with small stiff setae (Lysianassidae).

GNATHOPOD 2

Articles:

3: *Length normal*; *elongate* (Fig.93E).
4: Merochelation: with strong thumb-like extension.
5: *Length relative to article 6 (%).*
Posterior lobe: *present, weak, absent.*
Carpochelation: with strong distoposterior tooth or teeth forming thumb or guarding article 6.
Scales or stiff setae (pineapple cushion of Lysianassidae).
General shape: cup-like, elongate rectangle, ovate.
6: Breadth relative to article 5: wider, equal, narrower.
Shape: ovate, pyriform, rectangular, linearly rectangular, mitten-like (Lysianassidae, Talitroidea), quadrangular.
Palm: *Present, absent, undecided.*
Slope: transverse; oblique; slight, moderate, extreme.
Chela if present: parachelate (describe if strongly chelate).
Definition of proximoposterior corner of palm: spines, protuberance, tooth, change in slope only.
Ornamentation: special spines, teeth.
7: Fit of this dactyl to palm: congruent, overlapping, not fitting.
Shape and ornaments: claw-like (normal); vestigial; absent (rare); with special setae, spines, or processes.

Sexual dimorphism in female: gnathopod 2 like male but much smaller, like gnathopod 1 and of similar size, like gnathopod 1 but larger.

PEREOPODS 3-4

Internal glands present or absent.
Orientation of pereopod 4 like that of pereopod 3 (*Eohaustorius*).
Chelate or prehensile.
Articles 4-5, 4-6, or 4, 5, 6 inflated strongly (rare).
Article 4 extraordinarily elongate (Ampeliscidae, Hyperiopsidae).
Special spines on article 6 near claw: spines striate, hooked.
Article 7 absent (Haustoriidae).

PEREOPODS 5-7

Relative lengths: *pereopod 3* (%); 4=100%; 5=(%).

General structure:

All similar in structure and slightly longer successively (normal).
Article 2 expanded: pereopod 5 ( ), 6 ( ), 7 ( ).
Expanded lobe of article 2 of pereopod 7 different from pereopods 5 and 6.
Chelate, subchelate, or prehensile: pereopods 5, 6, 7.
Fossorial setation (see glossary) present, absent.
Article 7 absent (Haustoriidae, Stegocephalidae): pereopods 5, 6, 7.
Pereopod 7 reduced to fewer than 6 articles.

PLEOPODS

(Rarely significant in marine Gammaridea [but see Phliantidae especially]).

Relative length (size) of each pair: 1=100%; 2=(%); 3=(%).
Width of peduncle in relation to length (%).
Length of longest ramus relative to peduncle (%).
Length of inner ramus to outer (%) (note absence of rami or low number of articles).
Shape of coupling hooks on peduncles; presence of accessory simple spines near coupling hooks.
Lobation of peduncles.

UROPODS 1 and 2

Absence (rare) or presence.
Projection along following uropods. (Percentages often exceeding 100 %.)
Uropod 1 reaching (%) along uropod 2; (%) along uropod 3.
Uropod 2 reaching (%) along uropod 3.
Relative length of rami: outer or inner shortened (occasional), inner absent or vestigial (rare).
Spination density of peduncle and rami (usually of specific value only).
Incision of inner ramus (example *Anonyx*).

UROPOD 3

Absence (rare) or presence.
Rami absent (rare).
Length relative to other uropods; extension beyond longest of other uropods (% of its own length).
Length of peduncle relative to urosomite 3 (%), to peduncles of other uropods (% of peduncle of uropod 1), or to telson (%).
Length of longest ramus relative to peduncle (%).
Length of inner ramus to outer (%).
Shape of rami: styliform, lanceolate, barrel-shaped, foliaceous.
Articles of outer ramus (1 or 2); Ratio of article 2 length to article 1 (:).
Minute ornamentation and hooks on rami (especially Ischyroceridae and Ampithoidae).
Special peduncular processes.

TELSON

Absence (rare) or presence.
Fused to urosomite 3 (rare).
General shape and length (make sketch).
Length in relation to urosomite 3 (%) or uropod 3 (%).
Degree of cleft between lobes (%), emarginate only.
Ornamentation: apically pointed, notched, trifid, truncate, rounded, concave.
Greatly enlarged and with ventral keel (rare), forming dorsoventral plate.
Dorsoventrally thickened (*fleshy*) (example, Isaeidae), bearing lateral nobs, scales, hooks.

SEXUAL DIMORPHISM

(primarily for identification to species)

Especially:
Antennae:
Eyes:
Gnathopods:
Coxae:
Pleonal epimera 1-3:
Uropod 3:
Urosomal teeth:

APPENDIX III

Glossary of Special Terms

accessory flagellum. The secondary ramus of antenna 1, often absent or vestigial (Fig.1), and attached medially to peduncular article 3.

ad. A suffix added to a word to indicate motion towards. For example, apicad refers to description of a condition that is accentuated towards the apex; also used as 'distad, basad'.

aequiramous. Uropod 3 with equal rami. (Fig.19, r3.)

aesthetasc, aesthete. Sensory setae of antennae, flattened and nontapering.

arctic. North polar waters of -1.75 to 4° for 9 months a year.

article. The segment of an appendage (Fig.1). See Segment.

austral. Southern waters of 4-10°C for 9 months a year.

baler lobe. An accessory lobe at the base of a maxilla or maxilliped.

beveled. The slant or slope of a line when not at right angles with another. Referring to the apex of mandibular palp article 3 when truncated diagonally or the anteroventral corners of coxae which are lopped off.

boreal. Northern waters of 4-10°C for 9 months a year.

button comb. A seta or setule modified into a plaque with fringe.

calceolus. A small globular, linguiform or helmet-shaped, articulate sense organ on the antennae; of rare occurrence in marine Gammaridea and most often seen in Eusiridae and Lysianassidae (Fig.19 calc). See Lincoln & Hurley (1981) for 9 kinds.

callynophore. Partially or completely fused proximal articles of primary flagellum on antenna 1 which bear transverse rows of aesthetascs usually grouped together into one or two longitudinal fields to form a brush. (Lowry, 1986). (Fig.86B.)

carpochelate. Immovable finger of prehensile appendage occurring on carpus (article 5), examples *Leucothoe*, *Microdeutopus*. (Fig.83A.)

carpus. Article 5 of a thoracic appendage (gnathopod, pereopod). In the vernacular known as 'wrist'.

cheek. The lateral side of the head below the eye or ocular lobe and above the mandible; especially projecting in Urothoidae. (Fig.83D,F.)

chela. Immovable finger of prehensile appendage.

chelate. Descriptive of the palm of a gnathopod protruding as an immovable finger on which the dactyl closes (Fig.92G,I,M). See parachelate, carpochelate, propodochelate, merochelate, complexly chelate.

clavate, *claviform*. Club-shaped. A part of an appendage (such as article 3 of mandibular palp or an aesthetasc) with swelling towards apex along linear axis from middle of part. (Fig.39B,E.)

claw, *claw-like*. Descriptive of a talon or simple, tapering nail. [Not descriptive of chelae as used in decapod terminology.]

compressed. Flattened from side to side.

conjoint. Describing the basal amalgamation of flagellar articles on antennae. Usually associated with a callynophore. (Fig.86B.)

conical mouthparts. From lateral view mouthpart field (enclosed by prebuccal mass anteriorly and maxillipeds posteroventrally) grouped with ventral margin of maxillipeds forming tangential line at angle to anterior margin of prebuccal mass of significantly less than 90° (Fig.9 Stegocephalidae, h). Uncommon; confined principally to Iphimediidae and few genera of such families as Lysianassidae, Pardaliscidae, Stegocephalidae. (Fig.75B.) See Quadrate mouthparts.

corneal lens. A biconvex cuticular body occurring directly in or on the cephalic cuticle (particularly in Ampeliscidae);

contrasted with subcuticular ommatidia. (Fig.22C,F.) See cuticular lens.

coxa, coxal plate. [Terms used synonymously herein.] Article 1 of a pereonal appendage, expanded into a lateral lamella (Fig.1). [Terms for other articles of the appendages such as basis, ischium, merus, carpus, propodus, and dactyl are frequently but not universally used in Gammaridea; instead, the articles are simply numbered.]

cuticular lens. A brightly shining circular or ovate thickening of the cuticle on the head; one assumes the lens focuses light on the brain or pigment surrounding parts of the brain; common in Ampeliscidae, very rare in Lysianassidae. See corneal lens.

dactyl. Talon-like terminal article of pereopods (article 7) or maxillipeds (articles 3 or 4).

degraded. Severely reduced or with loss of normal structure.

dentate. A margin with tooth-like projections.

depressed. Flattened dorsoventrally.

dispariramous. Uropod 3 with rami unequal either in length, shape or armament. (Fig.16 r3 upper right.)

dominant. Used herein to denote conditions opposite to 'inferior' (q.v.); used especially where a morphological part is larger or more setose than comparative parts.

elongate urosomite 1. Five times as long as urosomite 2 and in most species concerned (such as Podoceridae and Iciliidae) at least slightly longer than pleonite 3 (exceptions however do occur). (Fig.118.)

emarginate. Descriptive of the concave posterior end of an uncleft telson (Fig.62P).

entire. Descriptive of an uncleft telson (Fig.62K).

epimeron. A lateral pleuron of pleonites 1-3; the ventrolateral plate-like extension of the body segment (Fig.1).

epistome. The anterior surface of the head above the labrum; this area is often extended ventrally to appear as a part of the labrum and may be anteriorly produced as a cusp or lobe (Fig.108I,J).

eusirid gnathopods. Carpus very narrow, with propodus attached on very narrow margin and thus propodus strongly flexible relative to axis of carpus. (Fig.63C.)

evanescent. Vanishing. Fleeting. A structure with barely recognisable definition.

faunule. The composite of species of Amphipoda in a locality, zone or region.

flagellate. Becoming attenuate or extended into thin whip-like apex.

flagellum. The distal part of either antenna 1 or 2; on antenna 1 it commences with article 4, on antenna 2 with article 6; because basal peduncular articles of antenna 2 are often difficult to resolve, the juncture may be recognised between the elongated final peduncular article and the shortened first flagellar article which is followed by similar short articles; on antenna 2, however, article 1 of the flagellum is occasionally elongate and apparently composed of non-segregated (thus conjoint) daughter articles (Fig.1).

foliaceous. Broadened, leaf-like; applied especially to plates or lobes of mouthparts and rami of uropod 3. (Fig.19 r3 upper right.)

fossorial. Associated with the habit of burrowing, often referring to the excessively spinose or setose condition of appendages used for burrowing by Gammaridea; especially applicable to Haustorioidea, Oedicerotidae, and Phoxocephalidae, with some setae of articles 4-6 of pereopods 5-7 more than half as long as those articles; and some spines in groups forming substantial submarginal or fully facial rows perpendicular to margins; long setae also occur on 'filter' feeders such as Ampeliscidae. (Fig.67A.)

galeate. Descriptive of the helmet-shaped heads of various oedicerotids and synopiids. (Figs 99, 129.)

Gammarida. A classificatory 'section' between suborder and superfamily. The derivative noun is gammaridan.

Gammaridae. A family. The derivative noun is gammarid.

Gammaridea. A suborder. The derivative noun is gammaridean.

gamopod. A gnathopod; referring to the use of gnathopods for grasping members of the opposite sex during amplexus.

geniculate. Permanently bent, usually in reference to the flexed antennae of some haustoriids, or the outer lobes of maxilla 2 in some stegocephalids in which the bend occurs between articles; or applicable to bent palps of maxilla 1 in Hyperiopsidae in which the bend occurs on one article. (Fig.67F.)

gnathopod. One member of the first two pairs of free thoracic appendages; these appendages differ in function and usually in appearance from following pereopods; often called pereopods. (Fig.1.)

hand. Article 6 or propodus of a gnathopod or pereopod.

head subglobular. A cube with rounded edges approaching the form of a sphere. (Fig.2 lower left 'globular'.)

incisor. The anterior apical part of the mandible usually formed into a toothed chewing edge or untoothed chopping plate.

inferior. Applicable to various comparisons between morphological parts which have 2 or more kinds of substates; for example, a pereopod may be smaller than another, in which case the term 'smaller' applies; a pereopod may be less setose than another, in which case 'more sparsely setose' applies; if a pereopod is both smaller and more sparsely setose than another, the shorthand term 'inferior' applies. The opposite of inferior is often 'superior' but we prefer to use the term 'dominant.'

jizz. The combination of ill-defined descriptive elements which allows a subjective impression to be formed of proportions and shape as well as positions or stance of the object. A term now widely used in avian identification and applicable to any group. See P. Harrison, 1983: Seabirds. Boston: Houghton Mifflin.

joint. The juncture between two articles of an appendage.

labrum. (See upper lip).

lacinia mobilis. An articulated accessory plate proximal to the mandibular incisor, often absent or missing on either left or right mandibles, occasionally indistinguishable from a spine of the spine-row.

lanceolate. Shaped like a lance; narrow but tapering apicad, occasionally tapering basad.

lateral shield. The combination of coxae and articular expansion of pereopods to form a broad flat side plate.

lower lip (*labium*). A fleshy complex posterior to the mandibles, always composed of at least one pair of lobes (outer), often with a medioproximal pair of inner lobes; the lateroproximal ends of the outer lobes are often attenuated as alae and are denoted as mandibular lobes. (Fig.1.)

mandible. The anterior movable appendage of the buccal group; usually composed of a body bearing a distal incisor, a lacinia mobilis, spine row, molar, and 3-articulate palp. (Fig.1.)

mandibular setae A-E. On article 3 of the mandibular palp: A, placed dorsolaterally; B, placed dorsomedially; C, subsidiary row of setae mixed into D-setae; D, the principal setae of ventral margin; E, placed apically.

massive. A term applied to the heads of Synopiidae and

Oedicerotidae; head as long as pereonites 1-3 combined and as tall as or taller than long (length not including rostrum). Heads of Ampeliscidae, Phoxocephalidae, and the 'shark-nosed' Platyischnopidae are elongate but not massive; heads of Iphimediidae are as tall as long but are not as long as pereonites 1-3 combined. (Figs 99, 129.)

maxilla 1. A pair of cephalic appendages posterior to the lower lip; for taxonomic purposes only three parts of each member are named: the medial lobe (plate) usually bearing marginal setae, the lateral and larger lobe (plate) bearing terminal spines, and, attached to the outer lobe, a palp usually composed of two articles but occasionally absent. (Fig.1.)

maxilla 2. A pair of cephalic appendages posterior to maxilla 1; for taxonomic purposes each member recognised as a pair of lobes (plates) medial and lateral, usually strongly setose. (Fig.1.)

maxillipeds. The posteriormost pair of 'cephalic' appendages, representing the primitive first thoracic segment now amalgamated with the head but in amphipod taxonomy not included in the sequential numbering of thoracic appendages; for taxonomic purposes recognised as a pair of basally amalgamated appendages, each member composed of a proximal (inner) plate, a distal (outer) plate, and a palp of four articles, rarely reduced to 3 or 2 articles or absent. (Fig.1.)

merochelate. Immovable freely projecting finger of prehensile appendage occurring on merus (article 4); example: gnathopod 1 of *Aora*. Projection along face of carpus disregarded. (Fig.45H.)

merus. Article 4 of a thoracic appendage (gnathopod, pereopod).

merusoid. Merus extended or swollen unnaturally but no produced into a tooth.

mesosome. The pereon or thorax. [term rarely used.]

metasome. Pleonites 1-3. [Term rarely used.]

molar. A process of the mandible, located on the midmedial margin; when typically developed it is a medium-sized, subcylindrical body with a surface of ridges and teeth used for grinding (triturative) (Fig.1). It evolves in 2 directions: becoming larger, less triturative and finally smooth and pubescent; becoming smaller, less triturative and finally smooth or pubescent or spiny and finally disappearing.

notched lower lip. Indentation or hollow on anterior margin of primary lobe on lower lip. (Fig.26A.)

obsolescent. Vestigial or nearly absent; sometimes used erroneously for rudimentary conditions.

ommatidium (singular), *ommatidia* (plural), *ommatidial* (adjective). Terms applying to the parts of the subintegumentary compound eye, not to be confused with the corneal lenses on the integument of Ampeliscidae.

palm. A posterior surface or margin of article 6 of a gnathopod or pereopod on which article 7 (dactyl) closes for the purpose of prehension; usually recognisable because of expansion of article 6 or by occurrence of special spines or ornamentation and usually with a proximal defining limit marked by a change in marginal slope or occurrence of special spines.

palp. Feeler. Terminal articles of a buccal appendage, in Amphipoda occurring only on mandibles, first maxillae, and maxillipeds as the stenopodous terminal articles distal to the expanded outer plates or main body.

parachelate. A rarely used term in Amphipoda applied to propodochelate gnathopods and pereopods in which the immovable finger is distinct, but article 6 is otherwise unexpanded or nonpalmate; occasionally, the dactyl strongly overlaps the apex of the immovable finger; gnathopods of various Eophliantidae are good examples but the term may also be applied to numerous other cases, such as those linear, chelate gnathopods of Sebidae, *Didymocheila* and various second gnathopods of Lysianassidae. (Fig.77B,C.)

parviramous. Uropod 3 with scale-like inner ramus shorter than one third of outer ramus. (Fig.18 r3, upper right.)

peduncle. The basal articles of a fundamentally biramous appendage; in Amphipoda applied to antennae, pleopods, and uropods; antenna 1 with three peduncular articles, antenna 2 with five peduncular articles (but appendage not biramous); pleopods with one definitive peduncular article but remnants of others occurring proximally, uropods each with one peduncular article (Fig.1).

pelagont. Referring to the condition of coxa 3 being more dominant or larger than coxa 4. (Fig.129B.)

pereon. The complex of seven free thoracic segments bearing gnathopods and pereopods, not including the maxillipeds (Fig.1).

pereonite. A segment of the pereon.

pereopod. A walking, grasping, standing, or feeding appendage attached to a pereonite; normally composed of seven articles, including coxa; in Amphipoda the first two pairs are often termed gnathopods and only the last five pairs of thoracic legs are called pereopods (Fig.1).

phoxocephalid form of pereopod 7. Article 2 of pereopod 7 very broadly expanded generally in form of a shield, remainder of appendage thin and short (Fig.107A,F,H). Coincidentally, pereopod 7 also much shorter than pereopod 6.

plate. A flattened lobe on an article of a maxilla or maxilliped.

pleopod. A biramous swimming appendage on pleonites 1-3, one pair for each pleonite (Fig.1).

pleon. The abdomen (of six free segments in Gammaridea, rarely with some segments coalesced). See metasome and urosome.

pleonite. A segment of the pleon.

pleurae. Lateral extensions of segments, most amphipods have these on pleonites 1-3 and they are called 'epimera' but the Temnophliantidae and a few Podoceridae have extended pleurae recognised by the gaps between segments dorsal to the coxae.

pluseta and plusetule. A plumose seta or setule.

prebuccal complex. The labrum and epistome together.

prehensile. Adapted for seizing or grasping, applicable to but rarely used for gammaridean pereopods; especially useful in denoting pereopods of cyphocarids Isaea, *Pleonexes*, etc., which either are subchelate or chelate, or have distinct, spinose palms or nonskid surfaces indicating their use in grasping. 'Scarcely' prehensile is a subjective opinion that a weak degree of prehensility is present.

propodochelate. Synonymous with chelate. (Fig.18K.)

propodus. Article 6 of a thoracic appendage (especially used to denote the palmar article of a gnathopod).

pubescent. Furnished with elongate, hair like extensions sufficiently dense to be noticeable as a taxonomic feature. 'Hairy' is a misuse of this condition. Sometimes misapplied to clusters of aesthetases.

quadrate mouthparts. See conical mouthparts; mouthpart field arranged in bundle with angle between anterior margin of prebuccal parts and tangent of maxillipedal palp close to 90° so that mouthparts form square or rectangular box.

raker or *raker spine*. Spines in the spine row between lacinia mobilis and molar of mandible.

scale, scale-like. Terms applied to the accessory flagellum when forming a small lamella immovably fused to article 3 of antenna 1; and to the inner ramus of uropod 3 when strongly reduced and plate-like.

scaled, scaly. Supplied with thin, flat, chitinous plates of microscopic dimension; used here mostly for gnathopod 2 of Lysianassidae and maxillae of Hyperiopsidae. See Pubescent.

segment. Compartmentalised division of the body or soma. Often misapplied to a division of an appendage; the preferred word for a division of an appendage is 'article'.

seta. A bristle; a weakly articulate chitinous extension supplied with nerve canal; in amphipods word restricted to such projections which are flexible. See Spine.

shield-shaped. Referring to expanded, usually irregular shape of article 2 on pereopod 7. Not smoothly ovate. Or, bearing a large ventral lobe projecting below the root articulation of article 2. (Figs 107A, 129B.)

simple. Used in amphipod taxonomy to denote the absence of spines or setae on appendages; or the occurrence of but a single article in the ramus of a uropod; or especially to the absence of a palm on a gnathopod or pereopod. Distinction between subchelate and simple is often weak.

spine. A thick inflexible seta. Not used in amphipods in same way as in Decapoda where spine refers to what is called tooth or denticle in amphipods.

splayed. Descriptive of the lateral spreading of coxae, especially in Phliantidae. (Fig.105A, bottom right.)

subchelate. Article 6 of a gnathopod or pereopod having a distal palm against which article 7 closes; a prehensile condition in which the palm is not produced to form a finger; intermediate in condition between chelate and simple. Often marked by presence of defining spine or tooth at proximal end of palm. Complexly subchelate or complexly chelate are terms referring to the formation of a false chela by protrusion of teeth, cusps, or lobes from articles other than the sixth and upon which article 7 impinges to form aprehensile condition; occurring especially in Aoridae, Corophiidae, and Leucothoidae (Fig.1). See 'simple'.

telson. A flap dorsal to the anus attached to pleonite 6, primitively bilobed in our concept of the basic amphipod, but usually in Amphipoda with bases coalesced and often with lobes completely coalesced to form a single plate. (Fig.1.)

tooth. A non-articulated extension of a margin. Plural = 'teeth'. Often misapplied to tooth-like spines.

triturative. Descriptive of the rasp-like surface of a mandibular molar, composed of teeth, ridges, and cusps.

torrid. See tropical.

tropical. Waters exceedings 20°C for 9 months a year.

unguiform. Claw-like. Especially applicable to dactyls of maxillipedal palps being in the form of a talon (unguiform) or in the alternative form of a stubby, uncurved, blunt body.

upper lip (*labrum*). A fleshy lobe attached to the anterior cephalic margin in front of the mandibles; occasionally the anterior surface of the labrum protrudes as a lobe or cusp; often the cephalic area to which the labrum is attached is recognizable as an 'epistome' and may also be lobed; or both labrum and epistome may be indistinguishable and produced together as a single lobe. (Fig.1.)

uropod. One member of the three pairs of terminal pleonal appendages, each formed of a peduncle and two rami (Fig.1) (occasionally rami of uropod 3 reduced or absent, rarely rami of uropods 1-2 absent or reduced).

urosome. The complex of pleonites 4, 5, 6, carrying uropods, and telson. Often numbered as urosomites 1, 2, 3 (Fig.1).

urosomite. A segment of the urosome.

variramous. Uropod 3 with inner ramus shorter than outer but longer than one third; both rami differ in setation pattern; this condition more precisely defined than 'dispariramous'. (Fig.18, second from upper right.)

warm-temperate. Waters in northern and southern hemispheres of 10-20°C for 9 months a year.

wrist. Article 5 or carpus of a gnathopod or pereopod.

APPENDIX IV

The Geographic Reporting System

Barnard & Barnard (1983) devised a coded geographic system that reports distributions of taxa by three digit numbers similar to a library Dewey decimal system. The similarity lies in the ability to decipher inherent geographic information from the numbers assigned, knowing that groups of numbers have certain similarities. Numbers ending in zeros or fives usually refer to large geographic areas, while numbers ending in other digits usually refer to small areas. For example, numbers in the 300's refer to warm-temperate zones in the northern hemisphere, the number 330 referring to a large area (warm eastern Atlantic Ocean) with 340 referring to the Mediterranean Sea in general, 344 to the Moroccan subdivision of the Mediterranean; 350 to the eastern Atlantic in general, 353 to the Biscayan province (or subdivision) and 357 specifically to the islands of Madeira. Marine numbers are explained in the list to follow and refer to maps 1-7. All are benthic unless annotated by letters.

Certain numbers are accompanied by letters explained in the list to follow. These refer to ecological positions of species not otherwise benthic or fully marine, for example F indicating freshwater and K indicating cobble-brackish or beach interstitial.

Coastal zones include depths of 0-200 m and therefore lack notation; records deeper than 200 m, even though close to the coast, are placed in the larger nearby rectangular oceanic quadrants and the notations B (201-2000 m) or A (2001+ m) are added. Sometimes 'B' is added to coastal zones with fjords deeper than 200 m; sometimes oceanic grid numbers (such as 304) have notations such as 'N' which indicates a non-benthic record; otherwise all numbers refer to the benthos. Oceanic quadrants represent the low numbers in each hundreds-series and are recognised in the list by their extensive positional definitions.

The system and reporting desiderata were designed with several protocols and the reader may find those in Barnard & Barnard (1983: 181-183).

Oceanic quadrants and many of the geographic areas have been given names, based on some feature included in the area. These names have no formal status outside this system. The 200 m line indicating coastal zone boundaries has been exaggerated on the maps.

GEOGRAPHIC NUMBERS

000-199 Northern hemisphere freshwater, terrestrial, continental or insular; not listed herein
200-299 Arctic-boreal marine
300-399 North warm-temperate marine
400-499 Tropical Atlantic marine
500-599 Tropical Pacific marine
600-699 Indo-Pacific marine (mostly Indian Ocean)
700-799 South warm-temperate marine
800-899 Antarctic-austral marine
900-999 Southern hemisphere freshwater, terrestrial, continental or insular; not listed herein

(Individual numbers of the marine zones are elaborated below).

LETTERS

A, abyssal, 2000+ m depth in the sea; B, bathyal, 200-2000 m in the sea; C, cave(s); D, continental salt water; brine; E, estuarine or brackish; F, fresh water; G, epigean; H, hypogean, phreatic, stygian, subterranean; I, inquilinous, commensal, parasitic (general and prehensile pereopods presumed); J, wells; K, cobble-brackish seashore or beach interstitial; L, lakes; M, sublittoral; N, neritic or pelagic (often combined with A or B or M); P, intertidal; Q, anchialine; V, W, widespread, meaning extended outward from cited category; X, brackish, more restricted than category E; Y, interstitial divorced from seashores; Z, sea grotto.

Area descriptions enclosed in brackets are group categories not necessarily shown on maps.

200 [Arctic-Boreal marine] a = American (= East Pacific & West Atlantic), s = Asian, e = European
201 [Polar Basin, north of 85°N at all depths]
202 Greenland quadrant: 75-85°N, 40°E-20°W, 200+ m
203 Baffin quadrant: 75-85°N, 20-80°W, 200+ m
204 Canadian quadrant: 75-85°N, 80-140°W, 200+ m
205 Fletchers quadrant: 75-85°N, 140°W westward to 160°E, 200+ m
206 Siberian quadrant: north Asia coast to 85°N, 160-100°E, 200+ m
207 Russian quadrant: 75-85°N, 100-40°E, 200+ m
208 Mohns quadrant: 65-75°N, 0-30°W, 200+ m
209 Thomson quadrant: 60-65°N, 0-45°W, 200+ m
210 [Pan Boreal]
211 Scoresby quadrant: 60-65°N, 45-65°W, 200+ m
212 Davis quadrant: 65-85°N, 50-80°W, 200+ m
213 Beaufort quadrant: 65-75°N, 120-160°W, 200+ m
214 Chukchi quadrant: 65-75°N, 160°W-160°E, 200+ m
215 [West Atlantic and East Pacific boreal together]
216 [Cold North Atlantic and Arctic together]
217 Kara quadrant: 65-75°N, 90-40°E, 200+ m
218 Scandia quadrant: 60-75°N, 40°E-0°, 200+ m
219 North Sea quadrant: 0° eastward, 60°N southward, 200+ m
220 [Arctic Basin in general]
221 Ireland quadrant: 45-60°N, 0-15°W, 200+ m
222 Reykjanes quadrant: 45-60°N, 15-30°W, 200+ m
223 Canyon quadrant: 45-60°N, 30-45°W, 200+ m
224 Newfoundland quadrant: 45-60°N, 45-60°W, 200+ m
225 Juneau quadrant: 45-60°N, 120-150°W, 200+ m
226 Kodiak quadrant: 45-60°N, 150-165°W, 200+ m
227 Bering quadrant: 60-65°N, 160-180°W, 200+ m
228 Unalaska quadrant: 45-60°N, 165°W-180°, 200+ m
229 Dateline quadrant: 45-60°N, 180°-165°E, 200+ m
230 [Boreal Pacific]
231 Petropavlovsk quadrant: 45-60°N, 165°E west to Kuril Islands, 200+ m
232 Aleksandrovsk quadrant: 43-60°N, about 155° to 135°E but inside Kuril Islands chain only, 200+ m
233 [Boreal Inland Seas and glacial relicts]
234 Gulf of Bothnia, Baltic Sea
235 Baltic Sea, including Gulf of Finland but excluding Gulf of Bothnia
236 Kattegat
237 Skagerrak and nearby areas to the south
238 Norway, from Vardö to the Skagerrak
239 Britain
240 [Boreal east Atlantic]
241 [Britain in general]
242 English Channel, including Jersey and St. Malo, Guernsey, Plymouth, Isle of Wight, Portsmouth, Dover, Calais, Lands End, Scilly Isles, Finisterre and Ile d'Duessant (Ushant Island)
243 Shetland Islands
244 Faeroe Islands
245 Iceland north of 65°N
246 Hekla: Iceland south of 65°N
247 Jan Mayen
248 Bear Island
249 Rockall Bank
250 [Amphiboreal Atlantic, west and east]
251 East Greenland, and west Greenland north to Arctic circle 252 [Arctic to Mediterranean in north-eastern Atlantic]
253 Thule: West Greenland, north of Arctic circle
254 Cod: Cape May (northern cape of Delaware Bay, New Jersey) to Cape Sable, Nova Scotia, including Bay of Fundy.
255 Breton: Cape Sable, Nova Scotia, north to Cape Bauld, Newfoundland, not including Gulf of St Lawrence
256 Gaspe: Gulf of St Lawrence
257 Labrador: Cape Bauld, Newfoundland, north to Cape Chidley, Labrador
258 Ungava: Hudson Strait from Cape Chidley west to 75°W, including Ungava Bay
259 Hudson Bay and Foxe Channel
260 [Boreal western Atlantic]
261 Franklin: East Baffin Island and east Devon Island
262 Foxe Basin and Gulf of Boothia
263 McClintock Channel south and west to Coronation Gulf
264 McClure Strait east to Lancaster Sound, including Queen Elizabeth Islands
265 Sverdrup: North-east Ellesmere Island west to Amundsen Gulf
266 Banks: Mouth of Amundsen Gulf east to north-west mouth of Coronation Gulf
267 Barrow: Mouth of Amundsen Gulf west to Bering Strait
268 Oregon: Eureka, California, north to Cape Flattery, Washington
269 Puget Sound, Strait of Juan de Fuca, Strait of Georgia, Queen Charlotte Strait
270 [Boreal eastern Pacific]
271 Vancouver: Oceanic side of Vancouver Island to Port Simpson, British Columbia
272 Sitka: Port Simpson, British Columbia, north to Cook

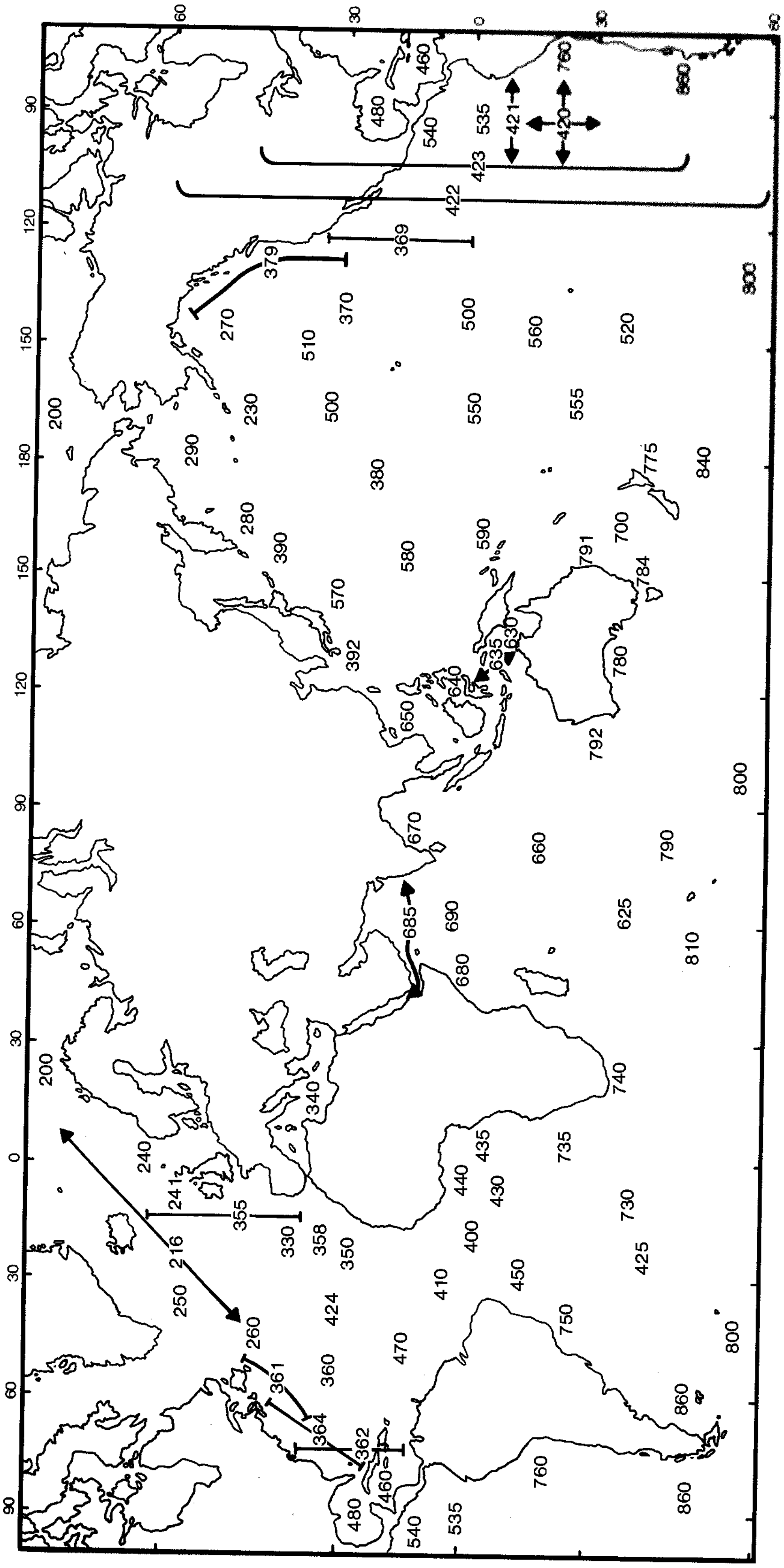
Inlet
273 Aleutian: Alaska Peninsula and Aleutian Islands, from Cook Inlet to Cape Newenham
274 Alaska, from Cape Newenham north to Bering Strait
275 Saint Lawrence Island
276 Saint Matthew Island
277 Pribilof Islands
278 Anadryski: Siberia, from Bering Strait south to Cape Olyutorskiy
279 Kamchatka Peninsula, from Cape Olyutorsky west around peninsula to Cape Utkholoskiy
280 [Boreal western Pacific]
281 Commander (or Komandorskiy) Islands (also known as Beringa)
282 Shelikov: Shelikova Gulf, from Cape Utkholoskiy west to Cape Tolstoy
283 Okhotsk: From Cape Tolstoy south-west to include Ulbanskiy Bay
284 Eastern Sakhalin
285 Tatar Straits
286 Kurile Islands
287 Northern Siberia from Bering Strait to 160°E
288 Wrangel Island
289 Novosibirskiy Islands (New Siberian Islands)
290 [Northern Siberia]
291 Lyahkovsky: Northern Siberia from 160°E west to Petra Bay, about 113°E
292 Taimyr: From Petra Bay west to Pechorskoya Sea, just south of Novaya Zemlya
293 Revolution: Oktyabrskoy Revolyutsii Ostov and Severnaya Zemlya (October Revolution Island and North Land) and nearby islands
294 Franz Joseph Land
295 Spitsbergen
296 Yeniskeyskiy Zaliv, Gydanskaya Guba and Obskaya Guba (Jenisei, Gydansk and Ob Gulfs)
297 Novaya Zemlya
298 Murmansk: From Pechorskoya Sea west to Vardö, Norway
299 White Sea
300 [Warm temperate marine]
301 Peloponneseus quadrant: Eastern Mediterranean westward to 15°E, 200+ m
302 Tropez quadrant: Western Mediterranean from 15°E westward, 200+ m
303 Portugal quadrant: 30-45°N, 15°W eastward to Gibraltar, 200+ m
304 Lusitania quadrant: 30-45°N, 15-30°W, 200+ m
305 Mid-ocean quadrant: 30-45°N, 30-45°W, 200+ m
306 Grand Banks quadrant: 30-45°N, 45-60°W, 200+ m
307 Hudson quadrant: 30-43°N, 60-75°W, westward to coast, 200+ m
309 Viscaino quadrant: 15-30°N, 120°W eastward to coast, 200+ m
310 California quadrant: 30-45°N, 135°W eastward to coast, 200+ m
311 Clarion quadrant: 15-30°N, 120-135°W, 200+ m
312 Albatross quadrant: 30-45°N, 135-150°W, 200+ m
313 Aztec quadrant: 15-30°N, 135-150°W, 200+ m
314 Murray quadrant: 30-45°N, 150-165°W, 200+ m
315 Pele quadrant: 15-30°N, 150-165°W, 200+ m
316 Seascarp quadrant: 30-45°N, 165-180°W, 200+ m
317 Laysan quadrant: 15-30°N, 165-180°W, 200+ m
318 Pacific quadrant: 30-45°N, 180-165°E, 200+ m
319 Seamount quadrant: 15-30°N, 180-165°E, 200+ m
320 Mellish quadrant: 30-45°N, 165-150°E, 200+ m
321 Necker quadrant: 15-30°N, 165-150°E 200+ m
322 Emperor quadrant: 30-45°N, 150-135°E, to Japan coast, 200+ m
323 Volcano quadrant: 15-30°N, 150-135°E, 200+ m
324 Minami quadrant: 30-45°N, 135-120°E but north and west only to Japan or continent: 200+ m
325 Formosa quadrant: 15-30°N, 135-120°E, 200+ m
326 China quadrant: 25-30°N, 120-105°E but only north and west to China coast, 200+ m
330 [Warm Eastern Atlantic including Mediterranean]
331 Aral sea
332 Caspian Sea
333 Azov Sea
334 Black Sea
335 [Caspian, Black, Azov Seas and their rivers together]
336 [Caspian and Black Seas together]
337 [Rivers or limans of Black and Azov Seas together: Don, Danube, Donets, Dniester Rivers]
338 [Rivers or limans of Caspian Sea; Volga, Ural, Emba Rivers]
339 [Mediterranean and Black Seas together]
340 [Mediterranean Sea in general]
341 Aegean: North-eastern Mediterranean coasts from north-west Peloponnisos east to Mersin, Turkey, including Aegean Sea
342 Cyprus
343 Libyan: Eastern and south-eastern Mediterranean coasts, from Mersin, Turkey, to Marsa Susah, Libya
343s Suez Canal
344 Morocco: Southern Mediterranean coast, from Marsa Susah, Libya to Strait of Gibraltar
345 Adriatic Sea
346 Coasts of Ionian Sea from north-west Peloponnisos to Strait of Messina, eastern and southern Sicily to Marsala, Malta and Pantelleria
347 Sardinia and Corsica
348 Riviera: North-western Mediterranean coast from Marsala, Sicily to Strait of Gibraltar
349 Balearic Islands
350 [Eastern Atlantic]
351 Gibraltar: Cape San Adrida, Spain, south to 31°N, west of Strait of Gibraltar
352 [Warm eastern Atlantic and Mediterranean and salty Black Seas]
353 Biscay: Cape San Adrida, Spain north to English Channel, including Bay of Biscay
355 [Eastern Atlantic warm temperate to boreal]
356 [Species escaped from one river system to another].
357 Madeira
358 [Lusitanian region: Azores, Madeira, Canary Islands to west Iberian Peninsula together]
359 Azores
360 [North-western Atlantic]
361 [Western Atlantic warm temperate to boreal]
362 [Western Atlantic warm temperate to tropical]
363 Chesapeake: Cape May, New Jersey (northern cape of Delaware Bay) south to south side of entrance to Chesapeake Bay
364 [Gulf of Maine southward to south Florida]
365 Carolina: South side of Chesapeake Bay south to Jacksonville, Florida
367 Bermuda
368 [North-eastern Pacific boreal]
369 [Eastern Pacific warm temperate to tropical]
370 [North-eastern Pacific warm temperate]
371 Mendocino: Eureka, California, south to Santa Cruz

Island
372 Monterey: Santa Cruz Island south to Point Conception, southern California
373 San Diego: Point Conception, southern California, south to Ensenada, Baja California
374 Canalino: Offshore islands, including Santa Catalina, Santa Cruz and San Clemente
375 Guadelupe Island
376 Magdalena: West coast of Baja California, from Ensenada to Punta Arena, including Cabo San Lucas
377 Cortez: Gulf of California
378 Revillagigedo Islands
379 [Eastern Pacific warm temperate to boreal]
380 [Middle Pacific]
381 Hawaiian Islands
382 Midway Islands
383 Johnston Island
384 Wake Island
385 Marcus Island
386 Bonin, Izu and Volcano Islands
387 Parece Vela
389 [Sea of Japan and Okhotsk Sea together]
390 [North-west Pacific, warm temperate and boreal]
391 Sea of Japan
392 [Western Pacific warm temperate and tropical]
394 Hokkaido: Eastern coast of Japan from north of Hokkaido south to Nakaminata, Honshu
395 Japan: Eastern coast of Japan, from Nakaminata, Honshu to southern point of Kyushu, and southern coast of Korea between Pusan and Wando, including islands of Korea Strait
396 Yellow Sea: from Wando, Korea, to 10 km south-east of Lien-yun-kang
397 China: from 10km south-east of Lein-yun-kang south to Chin-hsiang
398 Ryukyu Islands, including Okinawa
400 [Tropical Atlantic Ocean]
401 Mindelo quadrant: 15-30°N, 15-30°W or eastward to Africa, 200+ m; a = Arguin Bank
402 Atlantis quadrant: 15-30°N, 30-45°W, 200+ m
403 Vema quadrant: 15-30°N, 45-60°W, 200+ m
404 Sargasso quadrant: 15-30°N, 60-75°W but only east of Caribbean islands, 200+ m
406 Venezuela quadrant: 9-21°N, 61-83°W, but always south and west of Greater Antilles and north and east of American continent
407 Tortugas quadrant: 21-31°N, 82-100°W, 200+ m, impinging on 404 and 406
408 Leone quadrant: 0-15°N, 0-30°W, 200+ m
409 Doldrum quadrant: 0-15°N, 30-45°W, 200+ m
410 [Atlantic eurylatitudinal]
411 Guiana (Demerara) quadrant: 0-15°N, 45-60°W, 200+ m
412 Guinea quadrant: 0-15°S, 15°E-0°, 200+ m
413 Chain quadrant: 0-15°S, 0-15°W, 200+ m
414 Romanche quadrant: 0-15°S, 15-30°W, 200+ m
415 Rocas quadrant: 0-15°S, 30-45°W, 200+ m
416 Valdivia quadrant: 15-30°S, 15°E-0°, 200+ m
417 Trade quadrant: 15-30°S, 0-15°W, 200+ m
418 Ridge quadrant: 15-30°S, 15-30°W, 200+ m
419 Hotspur quadrant: 15-30°S, 30-51°W, to coast, 200+ m
420 [Cosmopolitan marine]
421 [Pantropical]
422 [Cosmopolitan in latitudes below 60°]
423 [Cosmopolitan in latitudes below 45°]
424 [North Atlantic]
425 [South Atlantic]
426 [North and South Atlantic]
427 [Tropical to boreal East Atlantic]
428 [South-east Atlantic]
430 [Islands of the South Atlantic]
431 Islands of Saint Peter and Saint Paul (Sao Pedro and Sao Paulo)
433 Ascension
434 Saint Helena
435 [Tropical East Atlantic]
437 Martin Vaz Islands
439 Fernando de Noronha Island
440 [West Africa]
441 Sengal: West African coast from 31°N south to Cape Roxo, Senegal
442 Canary Islands
443 Cape Verde Islands
444 Liberia: West African coast from Cape Roxo, Senegal, to Douobe River mouth (Liberia/Ivory Coast border)
445 Nigeria: West African coast from Douobe River mouth to Bolondo, Equatorial Guinea
446 Sao Tomé (Santo Antonio) and Principe
447 Gabon: West African coast from Bolondo, Equatorial Guinea, south to Punta das Palmeirinhas, Angola (includes Luanda)
448 [Gulf of Guinea: areas 445, 446, 447 and 449 together]
449 Angola: West African coast from Punta das Palmeirinhas, Angola, south to Swakopmund, Namibia
450 [East South America]
453 Brazil: Cabo Frio north to Ponta do Calcanhar (just north of Natal)
455 Maranho: Brazil, from Ponta do Calcanhar, north-west to Curuca (north-east of Belém and east of Baia de Marajó)
458 Surinam: Curuca, Brazil, north-west to Boca Grande (mouth of Orinoco River), Venezuela
460 [Caribbean region]
462 Bonaire: Mouth of Orinoco River, west to Cabo San Roman, Venezuela, including Aruba, Curaçao and Bonaire
464 Lago de Maracaibo,
465 Cartagena: Cabo San Roman, Venezuela, west to Cabo Tiburon, (Colombia/Panama border)
466 Colon: Southern border of Panama north to Trujillo, Honduras (86°W)
469 [Amphi-Atlantic, warm-water]
470 [Tropical West Atlantic]
471 Yucatan: Trujillo, Honduras north-west to 22°N (just south of Tampico, Mexico, including Yucatan Peninsula
473 Vera Cruz: Gulf of Mexico from 22°N to mouth of Rio Grande River (Mexico/USA border)
474 Texas: Gulf of Mexico from mouth of Rio Grande River north-east to South Point, Mississippi Delta
476 Gulf: Gulf of Mexico from South Point, Mississippi Delta, south-east to Mullet Key (north side of Tampa Bay)
478 Florida, from Mullet Key, north side of Tampa Bay south, east and north to Jacksonville, Florida, including Florida Keys and Dry Tortugas Islands
480 [Gulf of Mexico]
481 Bahama Islands
483 Cuba
484 Cayman Island
486 Jamaica
488 Haiti and Dominican Republic (Hispaniola)
489 Puerto Rico and Virgin Islands
491 Leeward Islands
500 [Pacific Ocean]

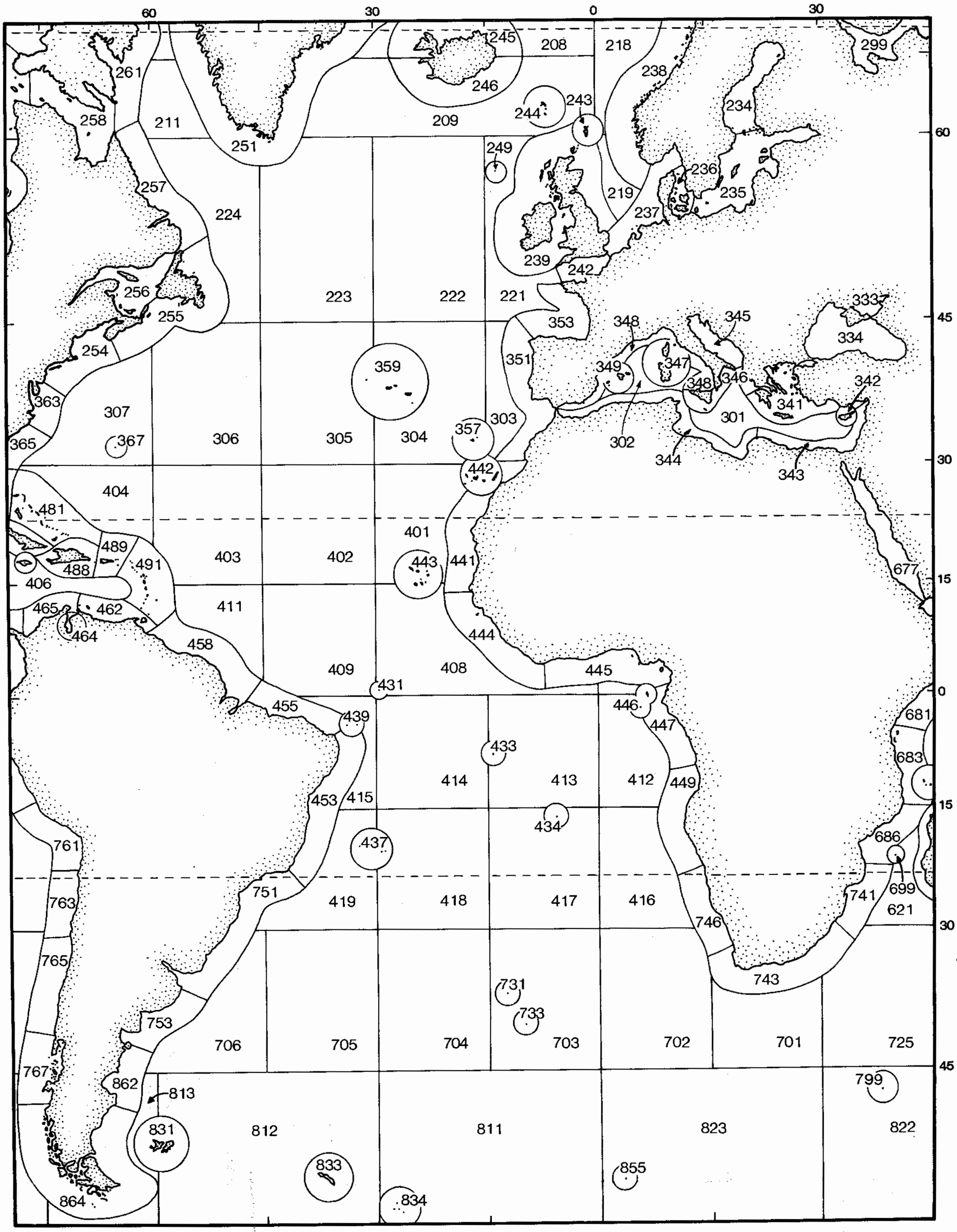
501 Balboa quadrant: 0-15°N, 75-90°W but west of America, 200+ m
502 Ecuador quadrant: 0-15°S, 70-90°W, 200+ m
503 Nazca quadrant: 15-30°S, 70-90°W, 200+ m
504 Guatemala quadrant: 0-20°N, 90-105°W, 200+ m
505 Fernandina quadrant: 0-15°S, 90-105°W, 200+ m
506 Current quadrant: 15-30°S, 90-105°W, 200+ m
507 Fracture quadrant: 0-15°N, 105-120°W, 200+ m
508 Counter quadrant: 0-15°S, 105-120°W, 200+ m
509 Pascua quadrant: 15-30°S, 105-120°W, 200+ m
510 [North Pacific]
511 Clarion quadrant: 0-15°N, 120-135°W, 200+ m
512 Mohotani quadrant: 0-15°S, 120-135°W, 200+ m
513 Ducie quadrant: 15-30°S, 120-135°W, 200+ m
514 Pacific quadrant: 0-15°N, 135-150°W, 200+ m
515 Hatuta quadrant: 0-15°S, 135-150°W, 200+ m
516 Gambier quadrant: 15-30°S, 135-150°W, 200+ m
517 Fanning quadrant: 0-15°N, 150-165°W, 200+ m
518 Danger quadrant: 0-15° S, 150-165°W, 200+ m
519 Hervey quadrant: 15-30°S, 150-165°W, 200+ m
520 [South Pacific]
521 Wilder quadrant: 0-15°N, 165-180°W, 200+ m
522 Baker quadrant: 0-15°S, 165°-180°W, 200+ m
523 Capricorn quadrant: 15-30°S, 165°-180°W, 200+ m
524 Keats quadrant: 0-15°N, 180°-165°E, 200+ m
525 Vitjaz quadrant: 0-15°S , 180-165°E, 200+ m
526 Conway quadrant: 15-30°S, 180-165°E, 200+ m
527 Truk quadrant: 0-15°N, 165-150°E, 200+ m
528 Rennell quadrant: 0-15°S, 165-150°E, 200+ m
529 Barrier quadrant: 15-30°S, 165-150°E, 200+ m
530 [Tropical Pacific]
531 Yap quadrant: 0-15°N, 150-135°E, 200+ m and south to New Guinea
532 Reef quadrant: 0-15°N, 150-135°E, 200+ m and south to Australia
535 [East Pacific eurylatitudinal]
537 Mexico: Gulf of California south-east to Puerto Angel
539 Nicaragua: Puerto Angel, Mexico, south-east to Cabo Blanco (west cape of Golfo de Nicoya), Costa Rica
540 [East Tropical Pacific]
541 Panama: Cabo Blanco, Costa Rica, south-east to Punta Cruces, Colombia
542 Cocos Island
543 Malpelo Island
544 Perlas Islands, Gulf of Panama
545 Gorgona: Punta Cruces, Colombia, south to Punta Parina, Peru
546 Galapagos Archipelago
548 Nino: Punta Parina, Peru, south to Peninsula de Paracas, Peru
549 Clipperton Island
550 [Mid Tropical Pacific]
551 Easter Island and Sala y Gomez
553 Pitcairn and Henderson Islands
554 Marquesas Islands
555 [South Tropical Pacific]
556 Tuamotu Archipelago and Gambier Islands
558 Tubuai Islands (= Austral Islands)
559 Society Islands
560 [Polynesia]
561 Caroline, Vostok and Flint Islands
562 Malden and Starbuck Islands
563 Kingman, Palmyra, Teraina (= Washington), Tabuaeran (= Fanning) and Kirimati (= Christmas) Islands
564 Jarvis Island
566 Cook: Northern Cook Islands
567 Rarotonga: Southern Cook Islands
568 Baker and Howland Islands
570 [West Pacific eurylatitudinal]
571 Phoenix Islands (including Kanton Atoll)
572 Tokelau Islands
573 Samoan Islands
574 Niue Island
575 Tonga Islands, including Tongatapu Group
576 Fiji Islands
577 Tuvalu (= Ellice Islands)
578 Gilbert Islands
579 Ratak Chain of the Marshall Islands (including Majuro Atoll)
580 [Micronesia]
581 Ralik Chain of the Marshall Islands (including Bikini Atoll)
582 Eniwetok Atoll
583 Kosrae (= Kusaie) Island
584 Nauru
585 Vanuatu (= New Hebrides)
586 New Caledonia and the Loyalty Islands
587 Coral Sea islands
588 Norfolk Island
589 Lord Howe Island
590 [Melanesia]
591 Caroline Islands (including Ifalik (= Ifaluk) and Kapingamarangi Atolls)
592 Solomon Islands
593 Marianas Islands
594 Palau and Yap Island
595 Bismarck Archipelago
597 New Guinea, including Aru and Waigeu (= Waigeo) Islands
599 [Indonesia and south-east Asia]
600 [Indo-Pacific]; w = not east of New Guinea
601 Davao quadrant: 0°-15°N, 135-120°E, 200+ m
602 Banda quadrant: 0°-15°S, 135-120°E, 200+ m
603 Siam quadrant: 0°-15°N, 120-105°E, 200+ m
604 Sunda quadrant: 0°-15°S, 120-105°E, 200+ m
605 Shark quadrant: 15-30°S, 120-105°E, 200+ m
606 Malacca quadrant: 0°-15°N, 105-90°E, 200+ m
607 Keeling quadrant: 0-15°S, 105-90°E, 200+ m
608 Wharton quadrant: 15-30°S, 105-90°E, 200+ m
609 Bengal quadrant: 0°-15°N , 90-75°E, 200+ m
610 [Northern Indian Ocean]
611 India quadrant: 0°-15°S, 90-75°E, 200+ m
612 Central quadrant: 15-30°S, 90-75°E, 200+ m
613 Arabian quadrant: 15-25°N, 75-60°E, 200+ m
614 Carlsberg quadrant: 0-15°N, 75-60°E 200+ m
615 Equatorial quadrant: 0-15°S, 75-60°E, 200+ m
616 Mascarene quadrant: 15-30°S, 75-60°E, 200+ m
617 Somali quadrant: 0-15°N, 60-45°E, 200+ m
618 Farquar quadrant: 0-15°S, 60-45°E to Africa, 200+ m Includes Comoros Deep, deep records off Iles Glorieuses, deep Geyser Bank, Leven Bank
619 Malagasy quadrant: 25-30°S, 60-45°E, 200 m
621 Channel quadrant: 15-30°S, 45-30°E, 200+ m
625 [Southern Indian Ocean]
630 [Tropical Australia]
631 Brisbane: North-east Australia from Port Macquarie north to Curtis Island (just south of Tropic of Capricorn)
633 Barrier: North-east Australia from Curtis Island north to Cape York, including Great Barrier Reef
634 Carpenteria: Northern Australia from Cape York west to Cape Arnhem (includes islands of Torres Strait`
635 [Australia to South-east Asia]

637 Arnhem: Northern Australia from Cape Arnhem west to Cape Londonderry
638 Broome: North-western Australia from Cape Londonderry south-west to Point Quobba (north-west of Carnarvon)
640 [Greater Indonesia]
641 Philippines (including most of Sulu Sea)
642 Sulawesi (= Celebes)
643 Northern Islands of Moluccas, including Kepulauan Obi
644 Southern Islands of Moluccas, including Seram and Palau Buru
645 [Australia to Indonesia]
646 Sumbawa, Sumba, Flores, Timor and surrounding islands east to Tanimbar
647 Borneo
648 Java, Bali, Lombok and surrounding islands, including Tengah or Tenggaja (= Iles Paternoster)
649 Sumatra and Palau Belitung
650 [South-east Asia]
651 Taiwan
652 Macao: South-east China, from Chin-hsiang south to Macau
653 Tongking: From Macau, China, south to Da Nang, Viet Nam
654 Hainan Dao
655 Viet Nam, from Da Nang to Gulf of Thailand (Pointe de Cau Mau or Mui Bai Bung)
656 Siam: Gulf of Thailand, from Mui Bai Bung to border between Thailand and Malaysia near Tumpat
657 Malay Peninsula, from Thailand/Malaysia border around into Straits of Malacca to Pelabohan Kelang
658 Christmas Island
659 Cocos (Keeling) Islands
660 [Indian Ocean]
661 Martaban: Western Malay Peninsula, from Pelabohan Kelang north-west to Cape Negrais, Burma (western mouth of the Irrawaddy)
662 Andaman and Nicobar Islands
663 Burma: From Cape Negrais, Burma, west to False Point, India, near Mahanadi River
664 Madras: Eastern India from False Point, India, south-west to Cape Comorin (includes Chilka Lake)
665 Sri Lanka (= Ceylon)
666 Mysore: Western India, from Cape Comorin north-west to Diu (west side of Gulf of Khambhat)
667 Maldive and Laccadive Islands
668 Chagos Archipelago
670 [Indian Subcontinent]
671 Indus: From Diu, India, north-west to Gwadar, Pakistan
672 Oman: From Gwadar, Pakistan, west to Strait of Homuz and south to Al Hadd, including Gulf of Oman
673 Persian (Arabian) Gulf
674 Muscat: South Arabian coast from Al Hadd to Sayhut, South Yemen
675 Gulf of Aden
676 Socotra Island and outliers
677 Red Sea
678 Moga: From Cape Guardefui at mouth of Gulf of Aden to Mogadishu, Somalia
680 [East Africa]
681 Kenya: From Mogadishu, Somalia, south-west to Chale Point, Kenya
683 Tanzania: From Chale Point, Kenya, south to 15°S
685 [Tropical Indian Ocean and Red Sea]
686 Mozambique: from 15°S to Ponta da Barra Falsa, Mozambique
690 [West Indian Ocean]
691 Seychelles, Amirante and Coetivy Islands
692 Agalega Islands
693 Aldabra Islands and shallow areas of Iles Glorieuses
694 Comoro Islands, Geyser Bank and Mayotte
695 Cargados Islands
696 Rodriguez Island
697 Mauritius and Reunion Island
698 Madagascar
699 Bassas da India and Europe Island
700 [South warm temperate]
701 Cape quadrant: 30-45°S, 30-15°E, 200+ m
702 Agulhas quadrant: 30-45°S, 15-0°E, 200+ m
703 Zenker quadrant: 30-45°S, 0-15°W, 200+ m
704 Grande quadrant: 30-45°S, 15-30°W, 200+ m
705 Argentine quadrant: 30-45°S, 30-45°W, 200+ m
706 Plata quadrant: 30-45°S, 45-65°W, 200+ m
707 Concepcion quadrant: 30-45°S, 70-90°W, 200+ m
708 Chile quadrant: 30-45°S, 90-105°W, 200+ m
709 Cordillera quadrant: 30-45°S, 105-120°W, 200+ m
710 [South-eastern Pacific Ocean]
711 Oeno quadrant: 30-45°S, 120-135°W, 200+ m
712 Eltanin quadrant: 30-45°S, 135-150°W, 200+ m
713 Legouve quadrant: 30-45°S, 150-165°W, 200+ m
714 Pitt quadrant: 30-45°S, 165-180°W, 200+ m
715 Van Diemen quadrant: 30-45°S, 180-165°E, 200+ m
716 Tasman quadrant: 30-45°S, 165-150°E, 200+ m
717 Hobart quadrant: 30-45°S, 150-135°E, 200+ m
718 Bight quadrant: 30-45°S, 135-120°E, 200+ m
719 Diamantina quadrant: 30-45°S, 120-105°E, 200+ m
720 [South-eastern Indian Ocean]
721 Naturaliste quadrant: 30-45°S, 105-90°E, 200+ m
722 Horse quadrant: 30-45°S, 90-75°E, 200+ m
723 Indian quadrant: 30-45°S, 75-60°E, 200+ m
724 Apotres quadrant: 30-45°S, 60-45°E, 200+ m
725 Durban quadrant: 30-45°S, 45-30°E, 200+ m; w = Walters Bank
730 [South Atlantic islands]
731 Tristan da Cunha
733 Gough Island
735 [South-east Atlantic]
740 [Southern Africa]
741 Beira: From Ponta da Barra Falsa, Mozambique, south to Richards Bay, Natal
743 Natal: Southern African apex from Richards Bay to Olifants
745 [Southern Africa and Madagascar]
746 Walvis: From Swakopmund, Namibia, south to Olifants, South Africa
750 [East South America]
751 Uruguay: From Cabo Frio, Brazil (just north of Rio de Janeiro), south to south cape of Bahia Samborombon (= Punta Norte del Cabo San Antonio), Argentina (just south of Rio de la Plata)
753 Matias: from Punta Norte del Cabo San Antonio south to Puerto Lobos (south-west side of Golfo San Matias), Argentina
755 [Moved by human means to]
757 [Throughout southern oceans]
760 [East Pacific]
761 Peru: From Peninsula de Paracas, Peru, south-east to Punta Tetas, Chile (just north-west of Antofogasta)
763 Atacama: Chile from Punta Tetas south to Cabo de Juan Soledad (north side of Bahia de Coquimbo)
765 Santiago: Chile from Cabo de Juan Soledad south to Cabo de Quedal (north-west of Puerto Montt)

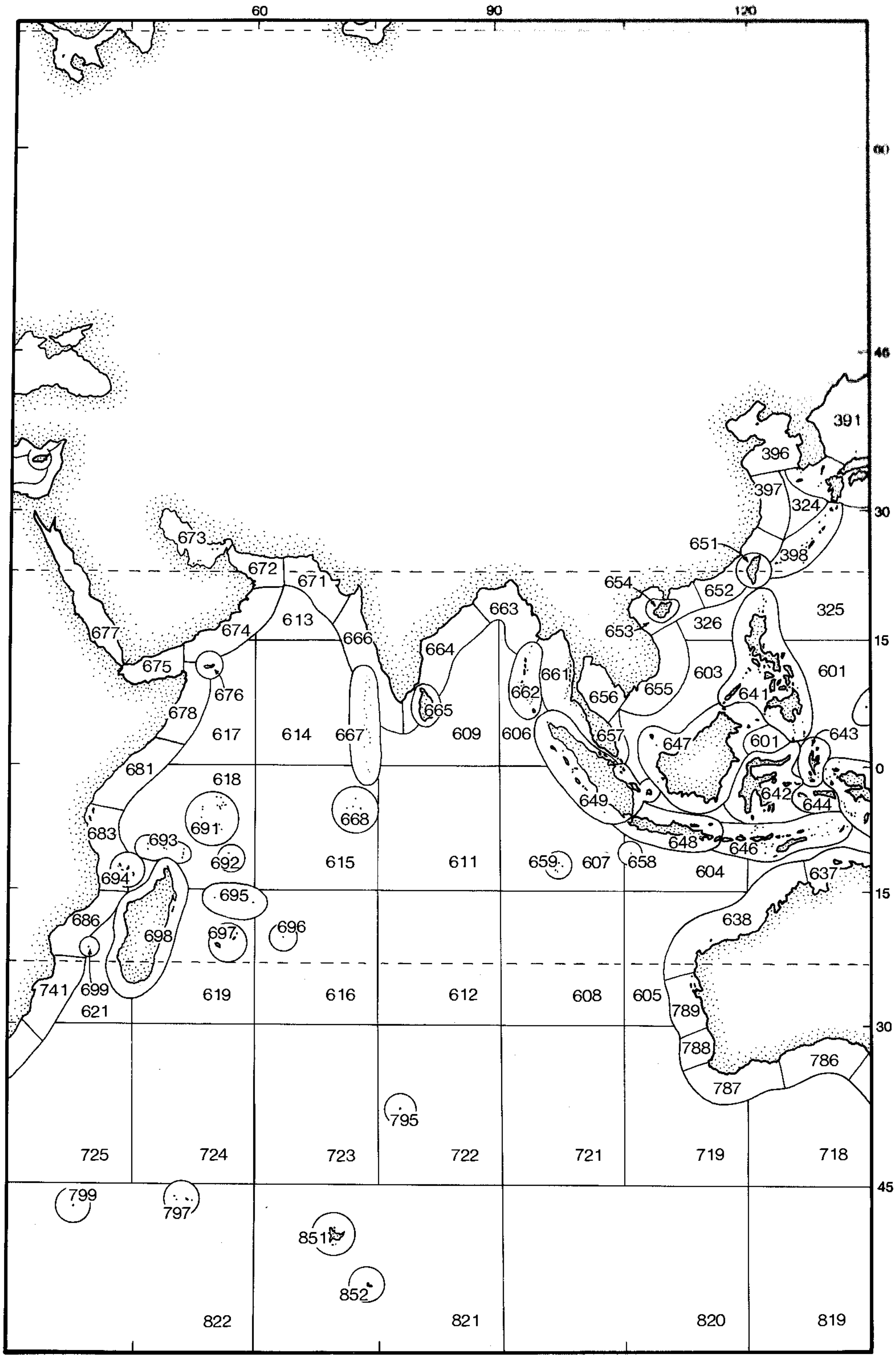
767 Chiloe: Chile from Cabo de Quedal south to south side of Golfo de Penas
768 Felix: Islas de Los Deventurados (including Felix Island)
769 Juan Fernandez Islands
770 [Australia]
771 Kermadec Islands
772 Chatham Islands
773 Hauraki: North-east side of North Island, New Zealand from North Cape south to Cape Kidnappers
774 Cook: New Zealand, from Cape Kidnappers south to south root of Banks Peninsula, including Cook Strait west to Cape Terawhiti
775 [New Zealand]
776 Stewart: New Zealand: from south side of Banks Peninsula south-west to Windsor Point (south cape of Southern Island), including Stewart Island; s = The Snares
777 Nelson: Western New Zealand, from south cape of South Island north to Cape Egmont, North Island
779 Auckland: North-west New Zealand from Cape Egmont north to North Cape, North Island, including Three Kings Islands
780 [Southern Australia]
781 Sydney: Eastern Australia, from Port Macquarie south to Cape Howe at New South Wales/Victoria border
782 Victoria: south-eastern Australia from Cape Howe west to Cape Nelson
783 Tasmania and all island outliers (including Hogan Group)
784 [South-east Australia]
785 Adelaide: southern Australia from Cape Nelson west to Cape Wondoma (southern cape of Streaky Bay), South Australia
786 Eucla: From Cape Wondoma, South Australia, west to Rocky Point (north point of Israelite Bay), Western Australia
787 Flinders: South-western Australia from Rocky Point, Israelite Bay, west and north to include Cape Naturaliste
788 Perth: South-western Australia from Cape Naturaliste to Green Head (almost 30°S)
789 Shark: Western Australia from Green Head north to Point Quobba
790 [Southern warm temperate islands]
791 [East Australia]
792 [West Australia]
793 [Circum-Australia]
794 [South-west Australia]
795 Amsterdam and Saint Paul Islands
797 Crozet Islands
799 Prince Edward and Marion Islands
800 [Antarctic-austral marine]
801 Weddell quadrant: 55-90°S, 20-60°W, 200+ m
802 Drake quadrant: 55-90°S, 60-100°W, 200+ m
803 Amundsen quadrant: 55-90°S, 100-140°W, 200+ m
804 McMurdo quadrant: 55-90°S, 140-180°W, 200+ m
805 Adelie quadrant: 55-90°S, 180-140°E, 200+ m
806 Wilkes quadrant: 55-90°S, 140-100°E, 200+ m
807 Mawson quadrant: 55-90°S, 100-60°E, 200+ m
808 Olav quadrant: 55-90°S, 60-20°E, 200+ m
809 Maud quadrant: 55-90°S, 20°E-20°W, 200+ m
810 [Austral islands]
811 Merz quadrant: 45-55°S, 0-30°W, 200+
812 Shag quadrant: 45-55°S, 30-60°W, 200+ m
813 Horn quadrant: 45-55°S, 60-75°W, 200+ m
814 Mornington quadrant: 45-55°S, 75-90°W, 200+ m
815 Menard quadrant: 45-55°S, 90-120°W, 200+ m
816 Udintsev quadrant: 45-55°S, 120-150°W, 200+ m
817 Maori quadrant: 45-55°S, 150-180°W, 200+ m
818 Iselin quadrant: 45-55°S, 180-150°E, 200+ m
819 Kangaroo quadrant: 45-55°S, 150-120°E, 200+
820 Shackleton quadrant: 45-55°S, 120-90°E, 200+ m
821 Leopold quadrant: 45-55°S, 90-60°E, 200+ m
822 Enderby quadrant: 45-55°S, 60-30°E, 200+ m
823 Astrid quadrant: 45-55°S, 30-0°E, 200+ m
830 [Antarctica plus Magellanic region of South America]
831 Falkland Islands
833 South Georgia; s = Shag Rocks, w = Burdwood Bank
834 South Sandwich Islands
835 [Circum-austral]
836 South Orkney Islands
840 [Austral islands near New Zealand]
841 Bounty Islands
842 Antipodes Islands
843 Auckland Islands
844 Campbell Island
845 Macquarie Island
849 [New Zealand and all austral islands together]
850 [New Zealand and nearby austral islands together]
851 Kerguelen Islands
852 Heard and Macdonald Islands
855 Bouvet Island
860 [Austral South America]
862 Comodoro: Argentina from Puerto Lobos south to Cape Guardian (just south of Deseado)
864 Magellan: Apex of South America between Golfo de Penas, Chile and Cape Guardian, Argentina
865 [Antarctica plus South Georgia]
866 [Austral South America plus Falkland Islands]
867 [Austral South America plus Falkland Islands plus South Georgia]
868 [South Atlantic deep water]
870 [Antarctica]; e = east only
871 South Shetland Islands
872 Palmer: Antarctic Peninsula, from Carroll Inlet (73°S, 80°W) east to Cape Fiske (74°S, 60°E) including all of peninsula and islands
874 Byrd: Antarctica from Carroll Inlet west to Ruppert Coast (141°W)
875 [Antarctica and outliers of the Antarctic Archipelago]
876 Ross: Antarctica from Ruppert coast (141°W) west to Cape Adare (170°E), including Ross Sea and Ice Shelf
878 Oates: Antarctica from Cape Adare west to Dibble Iceberg Tongue (135°E, not including Davis Bay just to west), including Hut Point, and winter quarters of "Discovery" Expedition 1902
880 [Antarctica and Austral islands]
881 Shackleton: Antarctica from Dibble Iceberg Tongue (135°E) west to Cape Darnley (70°E) (Gauss Station = 66°S, 89°E)
883 Enderby: Antarctica from Cape Darnley (70°E) west to west end of Princess Astrid Coast (5°E)
885 Coates: Coates Land, Antarctica, from west end of Princess Astrid coast (5°E) west to Cape Fiske (60°E)
890 [Antarctic islands]
891 Peter I Island
892 Scott Island
893 Balleny Islands
895 [Magellan to Palmer + outliers]



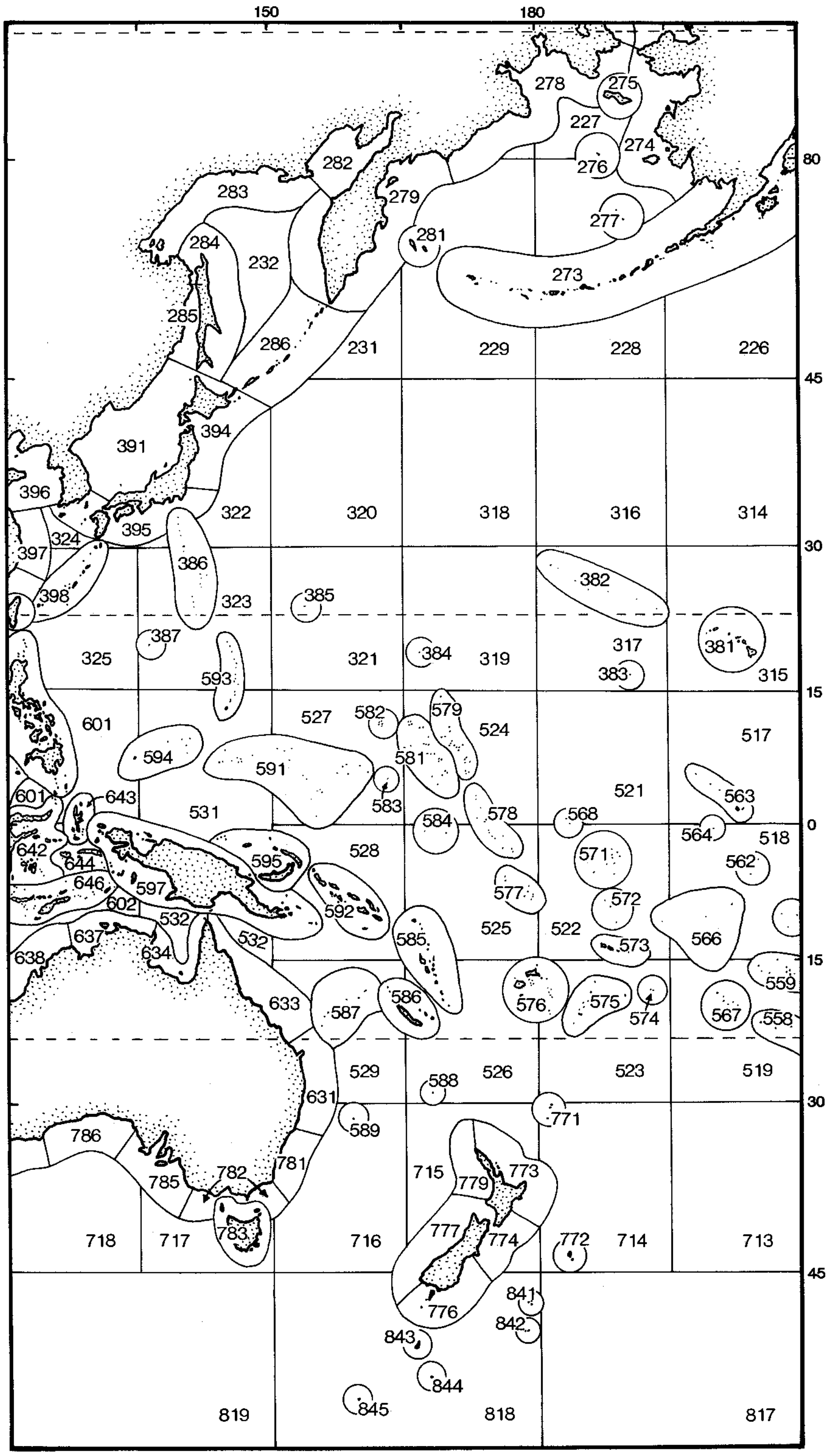
Map 1. General world geographic zones.



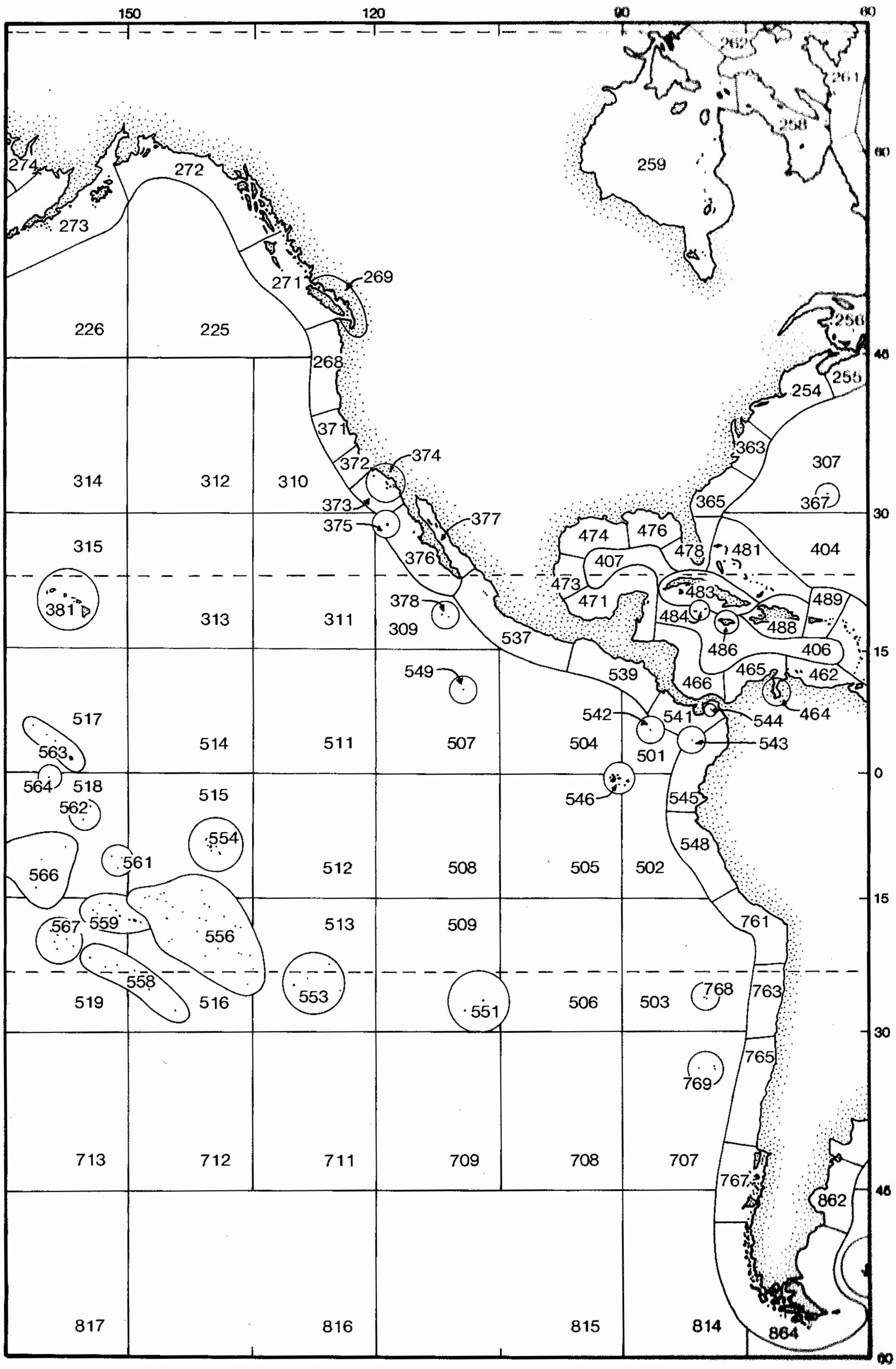
Map 2. Atlantic region geographic zones.



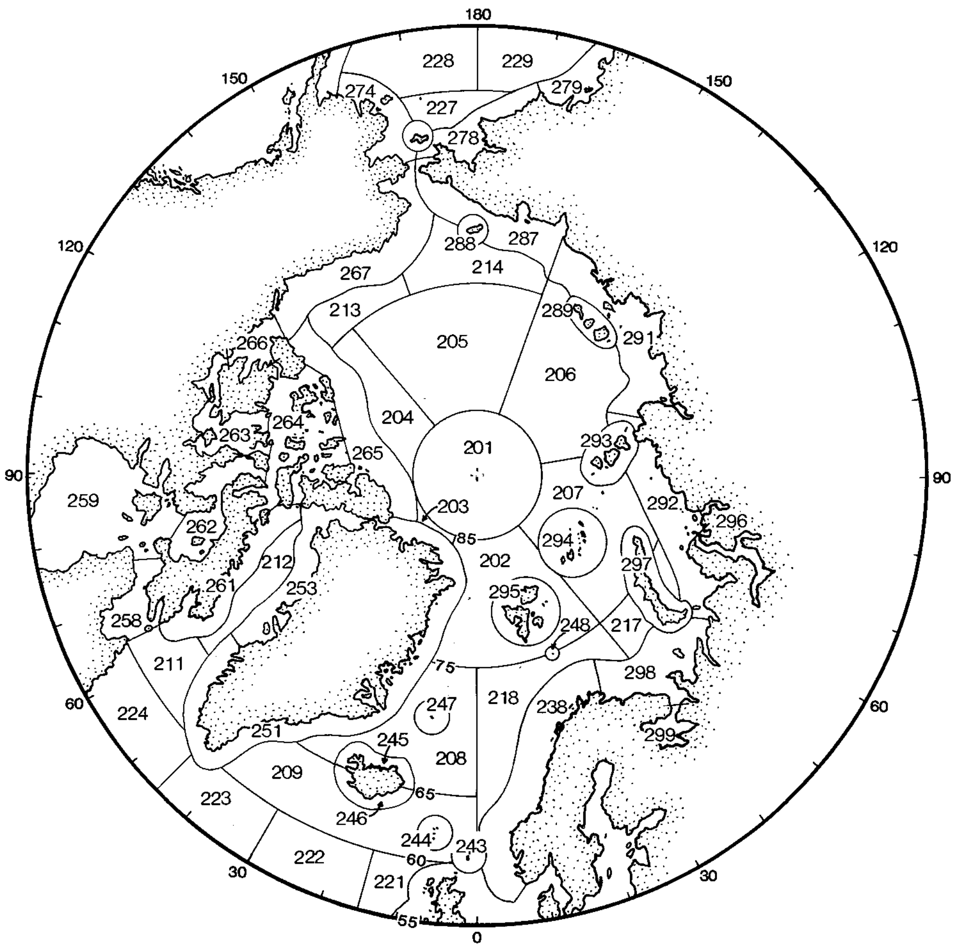
Map 3. Indian Ocean region geographic zones.



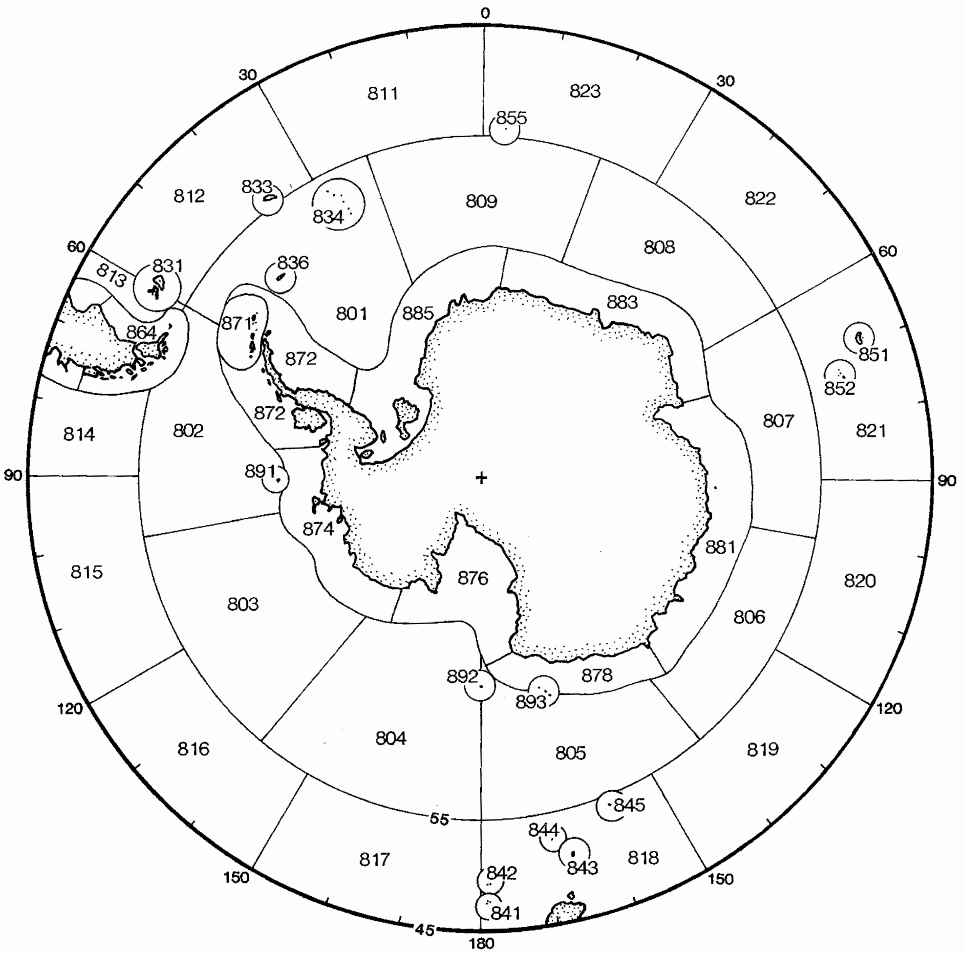
Map 4. Western Pacific region geographic zones.



Map 5. Eastern Pacific region geographic zones.



Map 6. North Polar region geographic zones.



Map 7. South Polar region geographic zones.

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Full-text PDF of each one of the works in this volume are available at the following links :

Barnard and Karaman, 1991, *Rec. Aust. Mus., Suppl.* 13(1): 1–417
http://dx.doi.org/10.3853/j.0812-7387.13.1991.91

Barnard and Karaman, 1991, *Rec. Aust. Mus., Suppl.* 13(2): 419–866
http://dx.doi.org/10.3853/j.0812-7387.13.1991.367