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ISOPOD CRUSTACEA

PART II. THE SUB-ORDER VALVIFERA. FAMILIES: IDOTEIDAE, PSEUDIDOTHEIDAE AND XENARCTURIDAE FAM.N.

WITH A SUPPLEMENT TO ISOPOD CRUSTACEA, PART I. THE FAMILY SEROLIDAE

BY

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(Plates VIII and IX; text-figs. 1–22)

INTRODUCTION

This paper deals with the Valvifera collected during the years 1925–36 by the Discovery Investigations, with the exception of the family Astacillidae (Arcturidae).

The suborder Valvifera, according to Barnard's (1920, p. 381) analytical key of the principal families, includes the Idoteidae, Pseudidotheidae, Amesopodidae and Astacillidae. Nordenstam (1933, p. 93) pointed out that Barnard did not mention the two families Chaetiliidae and Holognathidae, the former proposed by Dana (1852) to contain his species *Chaetilia ovata*, the latter proposed by Thomson (1904) for his species *Holognathus stewarti* (Filhol). Nordenstam suggested that these two species should be included in the family Idoteidae, the former in his new subfamily Macrochiridotheinae, the latter in the subfamily Idoteinae. To the families included in this suborder must now be added the new family Xenarcturidae, formed to contain the new genus *Xenarcturus* from the Discovery collections.

In the classification of the Valvifera which follows, only those genera have been included to which reference is made in this report:

Suborder Valvifera
- Family Idoteidae
  - Subfamily Idoteinae, Dana, 1852
    - Genera *Idotea* Fabricius, 1798
      - *Paridotea* Stebbing, 1900
      - *Synidotea* Harger, 1878
      - *Edotia* Guérin-Méneville, 1844
      - *Holognathus* Thomson, 1904
  - Subfamily Mesidoteinae, Racovitza and Sevastos, 1910
    - Genus *Mesidotea* Richardson, 1905
  - Subfamily Glyptonotinae, Miers, 1881
    - Genus *Glyptonotus* Eights, 1852
  - Subfamily Macrochiridotheinae, Nordenstam, 1933
    - Genera *Macrochiridothea* Ohlin, 1901
      - *Chaetilia* Dana, 1849
      - *Chiriscus* Richardson, 1911

Family Pseudidotheidae, Ohlin, 1901
Genera *Arcturides* Studer, 1882
Pseudidothea Ohlin, 1901
Holidotea Barnard, 1920

Family Amesopodidae, Stebbing, 1905
Genus *Amesopous* Stebbing, 1905

Family Xenarcturidae fam.n.
Genus *Xenarcturus* g.n.

The Discovery collections contain specimens taken in South African waters as well as from stations in the region of the Patagonian Shelf and from within the Antarctic Convergence. The following species are recorded:

Idotea indica Milne-Edwards, 1840
I. metallica Bosc., 1802
Paridotea ungulata (Pallas), 1772
Synidotea hirtipes (Milne-Edwards), 1840
Edotia bilobata Nordenstam, 1933
E. oculata Ohlin, 1901
E. oculopetiolata sp.n.
E. corrugata sp.n.
Glyptonotus antarcticus Eights, 1852
Macrochiridothea stebbingi Ohlin, 1901
M. kruimeli Nierstrasz, 1918
Pseudidothea bonnieri Ohlin, 1901
P. scutatus sp.n.
Arcturides acuminatus sp.n.
Xenarcturus spinulosus g.n., sp.n.

The holotypes of the new species are in the British Museum (Natural History).

ACKNOWLEDGEMENT

I should like to record my grateful appreciation and thanks to Dr H. Bargmann who read the first draft of this paper and made many helpful suggestions.

STATION LIST

In the following list of stations those made by R.R.S. 'Discovery' and R.R.S. 'Discovery II' have no letters prefixed to the station number; those made by R.R.S. 'William Scoresby' have the prefix WS and those of the Marine Biological Station the prefix MS. Besides these there are certain localities with no station number; these are grouped together at the end of the list.

St. 5. 31. i. 1926. Tristan da Cunha, Quest Bay, medium rectangular net, frame 4 ft. long and $2\frac{1}{4}$ ft. wide, with bag of 7 mm. each; depth 7–12 m.; several short hauls inside Macrocystis belt.

Paridotea ungulata (Pallas).

St. 123. 15. xii. 26. Off mouth of Cumberland Bay, South Georgia. From 4·1 miles N. 54° E. of Larsen Point, to 1·2 miles S. 62° W. of Merton Rock, large otter trawl, 230–250 m., also net with mesh of 4 mm. attached to trawl 230 m., and tow-net of coarse silk attached to trawl, 220 m., grey mud.

Edotia oculopetiolata sp.n.

St. 140. 23. xii. 26. Stromness Harbour to Larsen Point, South Georgia. From 54° 02′ S., 36° 38′ W. to 54° 11′ 30″ S., 36° 29′ W., net with mesh of 4 mm. attached to trawl, green mud and stones, 122–136 m.

Edotia oculopetiolata sp.n.

St. 141. 29. xii. 26. East Cumberland Bay, South Georgia, 200 yards from shore, under Mt Duse, small beam trawl, 17–27 m., two short hauls on steeply shelving ground at edge of kelp.

Glyptonotus antarcticus Eights.

St. 144. 5. i. 27. Off mouth of Stromness Harbour, South Georgia. From 54° 04′ S., 36° 27′ W. to 53° 58′ S., 36° 26′ W., tow-net of coarse silk attached to trawl, green mud and sand, 155–178 m.

Edotia oculopetiolata sp.n.

St. 161. 12. iii. 27. Schollaert Channel, Palmer Archipelago, 64° 20′ 00″ S., 63° 01′ 00″ W., net with mesh of 4 mm. attached to trawl, 335 m.

Edotia oculopetiolata sp.n.

St. 164. 18. ii. 27. East end of Normanna Strait, South Orkneys, near Cape Hansen, Coronation Island, small beam trawl, 24–36 m.

Glyptonotus antarcticus Eights.

St. 170. 23. ii. 27. Off Cape Bowles, Clarence Island, 61° 25′ 30″ S., 53° 46′ 00″ W., large dredge, heavy pattern, 4 ft. in length, 342 m.

Pseudidothea scutatus (Stephensen).

St. 178. 9–11. iii. 27. Melchior Harbour, Schollaert Channel, Palmer Archipelago, large fish trap, 17 m.

Glyptonotus antarcticus Eights.

St. 180. 11. iii. 27. 1·7 miles west of north point of Gand Island, Schollaert Channel, Palmer Archipelago, net with mesh of 4 mm. attached to trawl, mud and stones, 160–330 m.

Edotia oculopetiolata sp.n.

St. 195. 30. iii. 27. Admiralty Bay, King George Island, South Shetlands, 62° 07′ 00″ S., 58° 28′ 30″ W., net with mesh of 4 mm. attached to trawl (trawl hitched as soon as shot), mud and stones, 391 m.

Edotia oculopetiolata sp.n.

St. 366. 6. iii. 30. 4 cables south of Cook Island, South Sandwich Islands, large dredge, black sand, 155–322 m., also large otter trawl, 77–152 m.

Glyptonotus antarcticus Eights.

St. 370. 10. iii. 30. 2 miles north-east of Bristol Island, South Sandwich Islands, large otter trawl, 80–18 m.

Glyptonotus antarcticus Eights.

St. 371. 14. iii. 30. 1 mile east of Montagu Island, South Sandwich Islands, large otter trawl, 99–161 m., also net with mesh of 4 mm. attached to trawl, 99–161 m.

Glyptonotus antarcticus Eights.

St. 673. 25. iv. 31. 38° 10½′ S., 30° 10¼′ W. to 38° 03¾′ S., 29° 48′ W., young fish trawl, oblique haul, 340–0 m.

Idotea metallica Bosc.

St. 700. 18. v. 31. 20° 21½′ N., 22° 32½′ W., hand net, at the surface.

Idotea metallica Bosc.

St. 1489. 17. i. 35. Port Lockroy, Wiencke Island, Palmer Archipelago, found on motor-boat anchor.

Glyptonotus antarcticus Eights.

St. 1562. 7. iv. 35. 46° 51·7′ S., 37° 56·5′ E. to 46° 54·8′ S., 37° 53·8′ E., 97–104 m.

Arcturides acuminatus sp.n.

St. 1564. 7. iv. 35. 46° 36·5′ S., 38° 02·3′ E., large dredge, heavy pattern, 4 ft. in length, 110–113 m. (heavy south-west swell).

Arcturides acuminatus sp.n.

St. 1652. 23. i. 36. 75° 56·2′ S., 178° 35·5′ W., rectangular dredge bag bent on a Russell frame with skids to raise it clear of deep mud on the sea floor in the neighbourhood of the Ross Ice Barrier, 567 m.

Glyptonotus antarcticus Eights.

St. 1941. 29. xii. 36. Leith Harbour, South Georgia, small rectangular dredge, 38 m.

Glyptonotus antarcticus Eights.

St. WS. 25. 17. xii. 26. Undine Harbour (North), South Georgia, small beam trawl, mud and sand, 18–27 m.

Edotia oculopetiolata sp.n.

St. WS. 88. 6. iv. 27. 45° 00′ 00″ S., 64° 57′ 30″ W., from 54° 00′ 00″ S., 65° 00′ 00″ W. to 54° 00′ 00″ S., 64° 55′ 00″ W., commercial otter trawl, sand, shells and stones, 118 m.

Macrochiridothea stebbingi Ohlin.

St. WS. 123. 9. vi. 27. Shore, Gough Island, under stones in rock pools.

Paridotea ungulata (Pallas).

St. WS. 212. 30. v. 28. 49° 22′ 00″ S., 60° 10′ 00″ W., tow-net of coarse silk with 16 meshes to the linear inch, attached to trawl, green sand, mud and pebbles, 242–249 m.

Pseudidothea bonnieri Ohlin.

St. WS. 214. 31. v. 28. 48° 25′ 00″ S., 60° 40′ W., tow-net of coarse silk with 16 meshes to the linear inch, attached to trawl, fine dark sand, 208–219 m.

Pseudidothea bonnieri Ohlin.

St. WS. 215. 31. v. 28. 47° 37′ 00″ S., 60° 50′ 00″ W., tow-net of coarse silk (16 meshes to the linear inch) attached to trawl, fine green sand, 219–146 m.

Edotia oculata Ohlin.

St. WS. 219. 3. vi. 28. 47° 06′ 00″ S., 62° 12′ 00″ W., dark sand, tow-net as above 116–114 m.

Edotia oculata Ohlin.

St. WS. 220. 3. vi. 28. 47° 56′ 00″ S., 62° 38′ 00″ W., brown sand, tow-net as above, 108–104 m.

St. WS. 222. 8. vi. 28. 48° 23′ 00″ S., 65° 00′ 00″ W., coarse brown sand and shells, tow-net as above, 100–106 m.

Edotia oculata Ohlin.

St. WS. 237. 7. vii. 28. 46° 00′ 00″ S., 60° 05′ 00″ W., coarse brown sand and shells, tow-net of coarse silk attached to trawl, 150–256 m.

Xenarcturus spinulosus g.n., sp.n.

St. WS. 245. 18. vii. 28. 52° 36′ 00″ S., 63° 40′ 00″ W., net with mesh of 4 mm. attached to trawl, dark green sand, madrepore sand, pebbles and shells, 304–290 m.

Edotia bilobata Nordenstam.

St. WS. 756. 10. x. 31. From 50° 53′ S., 60° 00′ W. to 50° 56·3′ S., 59° 56′ W. to 50° 59·5′ S., 59° 52′ W., tow-net of coarse silk (16 meshes to the linear inch) attached to trawl, black gravel, green mud and sand, 119 m.

Xenarcturus spinulosos g.n., sp.n., *Pseudidothea bonnieri* Ohlin.

St. WS. 766. 18–19. x. 31. 44° 58′ S., 60° 05·5′ W., net attached to trawl, fine dark grey sand, 545 m.

Pseudidothea bonnieri Ohlin.

St. WS. 772. 30. x. 31. From 45° 13′ S., 60° 00′ W. to 45° 13·8′ S., 60° 00·5′ W., 309–162 m., nets attached to trawl, grey sand; also with nets with mesh of 4 mm. attached to trawl.

Macrochiridothea stebbingi Ohlin.

St. WS. 782. 4. xii. 31. From 50° 30′ S., 58° 19′ W. to 50° 27′ S., 58° 31′ W. (haul B), tow-net of coarse silk (16 meshes to the linear inch) attached to trawl, green sand and rock, 141–146 m.

Xenarcturus spinulosus g.n., sp.n.

St. WS. 787. 7. xii. 31. From 48° 44′ S., 65° 24·5′ W. to 48° 48′ S., 65° 25′ W., seine net attached to trawl, coarse brown speckled sand, 106–110 m.

Edotia oculata Ohlin.

St. WS. 797. 20. xii. 31. From 47° 44′ S., 64° 22′ W. to 47° 45·2′ S., 64° 18′ W. (haul B), nets attached to trawl, 115–111 m.

Edotia oculata Ohlin.

St. WS. 806. 7. i. 32. From 49° 51′ S., 65° 01′ W to 50° 03′ S., 64° 23′ W., seine net attached to trawl, dark green speckled sand and shells, 129–122 m.

Edotia oculata Ohlin.

St. WS. 808. 8. i. 32. From 49° 41′ S., 65° 40′ W. to 49° 39·5′ S., 65° 44′ W., seine net attached to trawl, brown and green sand, 109–107 m.

Edotia oculata Ohlin.

St. WS. 809. 8. i. 32. From 49° 29′ S., 66° 27′ W. to 49° 27·5′ S., 66° 31′ W., seine net attached to trawl, brown speckled sand, 107–104 m.

Edotia corrugata sp.n., *Macrochiridothea kruimeli* Nierstrasz.

St. WS. 814. 13. i. 32. From 51° 44·5′ S., 66° 38′ W. to 51° 46′ S., 66° 42′ W., seine net attached to trawl, coarse dark speckled sand, 111–118 m.

Edotia oculata Ohlin.

St. WS. 816. 14. i. 32. From 52° 09·5′ S., 64° 58′ W. to 52° 10′ S., 64° 54′ W., net of 4 mm. mesh attached to trawl, shingle, 150 m.

Edotia oculata Ohlin.

St. WS. 818. 17. i. 32. From 52° 30·5′ S., 63° 27′ W. to 52° 32′ S., 63° 23′ W., commercial otter trawl., haul A, dark speckled sand, from Cidarid spines, 272 m.

Pseudidothea bonnieri Ohlin.

St. WS. 825. 28–29. i. 32. From 50° 50′ S., 57° 13′ W. to 50° 50′ S., 57° 17·5′ W., net attached to trawl, green sand, mud and shells, 135 m.

Pseudidothea bonnieri Ohlin.

St. WS. 839. 5. ii. 32. From 53° 29·5′ S., 63° 31′ W. to 53° 31′ S., 63° 27′ W., commercial otter trawl, fine sand and mud, 503 m.

Pseudidothea bonnieri Ohlin.

St. WS. 871. 1. iv. 32. 53° 16′ S., 64° 12′ W., small beam trawl, 336–341 m.

Edotia bilobata Nordenstam, *Pseudidothea bonnieri* Ohlin.

St. MS. 25. 13. iv. 25. East Cumberland Bay, South Georgia, 4½ cables north-east to 1¼ cables north-west of Hobart Rock, small beam trawl, 36 m.

Glyptonotus antarcticus Eights, *Pseudidothea bonnieri* Ohlin.

St. MS. 71. 9. iii. 26. East Cumberland Bay, South Georgia, 9¼ cables east-by-south to 1·2 miles east-by-south of Sappho Point, small beam trawl and tow-net of coarse silk, 110–60 m.

Edotia oculopetiolata sp.n.

MS. 3. viii. 26. Crawling on female Blue Whale, Saldanha Bay, South Africa.

Paridotea ungulata (Pallas).

9. ix. 26. Walvis Bay, ectoparasitic on *Trigala capensis*.

Idotea indica Milne Edwards.

1927. Brought up on anchor chain S.S. 'Saragossa', Admiralty Bay, King George Island.

Glyptonotus antarcticus Eights.

Jan. 1927. Borge Bay, South Orkneys, fish trap (W. C. Rumboles).

Glyptonotus antarcticus Eights.

28. x. 28. Picked up on beach of King Edward's Point, South Georgia.

Glyptonotus antarcticus Eights.

25. v. 30. At Anchor, Houtjes Point, Saldanha Bay, hand lines, 12 m.

Idotea indica Milne Edwards, *Paridotea ungulata* (Pallas), *Synidotea hirtipes* (Milne Edwards).

1. x. 30. Capetown Docks, on ship's side.

Paridotea ungulata (Pallas).

17. ii. 31. Leith Harbour, South Georgia, hand line, 5 m., from fish stomach, found in boat after fishing with lines, probably *Notothenia rossii*.

Glyptonotus antarcticus Eights (incomplete specimen).

MORPHOLOGY OF THE VALVIFERA

There are several morphological characters in the Valvifera which need further elucidation.

(1) In 1939 I pointed out that in the Isopoda the 'only type of coxal plate so far recognized is one developed on the outer side of the joint and extending to the lateral and even dorsal surfaces of the body....Apart from the development of brood lamellae, the possibility of a corresponding coxal expansion of the inner border of the joint appears to have been overlooked, and yet examination of a number of Isopod types suggests that such a development does occur.'

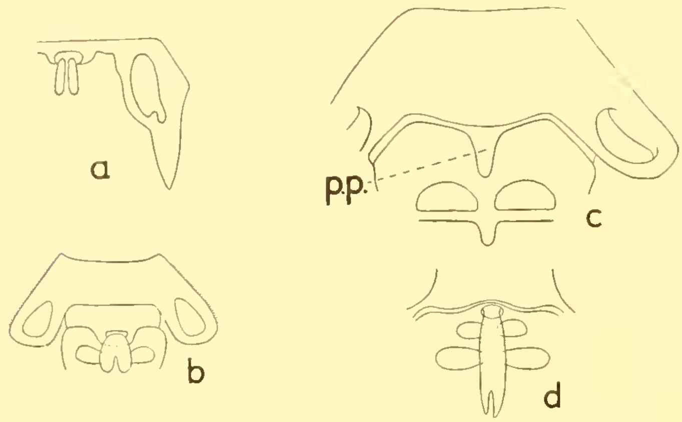
Subsequent work has confirmed and amplified this statement. Ventral coxal plates seem to be characteristic of all the known families of the suborder Valvifera, with the possible exception of the Amesopodidae.* These plates are present in both sexes on the inner ventral side of the coxal joint of each of the thoracic limbs; they extend inwards towards the mid-ventral line, where each meets and may become fused with the corresponding plate from the opposite limb. Their development may be correlated with the typical flattening of the body, the cylindrical shape of the Astacillidae being undoubtedly secondary (Sheppard, 1939, p. 173).

In the breeding females, however, ventral coxal plates as such appear to be absent from the limbs bearing brood lamellae, although a specialized condition is met with in some species of *Edotia* (see

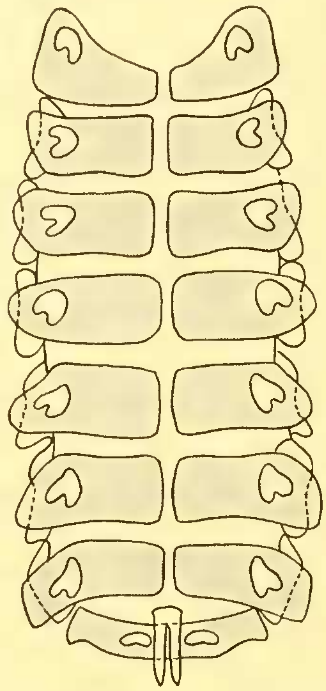
* I have been unable to identify them in *Amesopous richardsonae* Stebbing, the only species of the family, but this may have been due to the small size of the specimen.

pp. 155–157). In the region of the brood-pouch, chitinized rods are present in the ventral integument, but there is also a broad unchitinized central area in the integument, which presumably ensures adequate space for the development of the young. The thoracic limbs not involved in the formation of the brood-pouch carry ventral coxal plates and occasionally accessory supporting plates as well.

(2) Barnard, in the key already referred to, stated that the second ramus of the uropod is absent in the members of the family Idoteidae; this, however, is not the case, for while the absence of this ramus may be a fairly general character among members of the subfamily Idoteinae, it is not universal; it is present, for example, in *Cleantis linearis* Dana and *C. granulosa* (Heller). In the remaining three subfamilies of the Idoteidae, namely, Glyptonotinae, Macrochiridotheinae and Mesidoteinae, its presence, rather than its absence, is characteristic.



Text-fig. 1. Series of diagrams to show the change of position of the penis. (*a*) *Glyptonotus antarcticus*, ×2. (*b*) *Edotia oculata*, ×13. (*c*) *Edotia oculopetiolata*, ×17. (*d*) *Pseudidothea bonnieri*, ×13. *p.p.* position of penis.



Text-fig. 2. *Idotea indica* ♂, ×6, ventral view.

(3) A further point must be mentioned in connexion with Barnard's paper, namely, his discussion of the position of the openings of the vasa deferentia in the male. The normal position of these openings in members of the Isopoda is on the ventral surface of the last thoracic somite, either about the middle of the somite, or on its posterior margin. According to Barnard (1920, p. 380), in the members of the Valvifera, the openings have shifted on to the first pleon segment; this certainly seems to be the case in members of the Asticillidae, Pseudidotheidae and Amesopodidae, where the pair of penial filaments are fused to form a single process which, in members of the Pseudidotheidae, are distally cleft (Text-fig. 1, *d*). But the condition in the family Idoteidae as a whole does not agree with Barnard's statement, for the position of the penial filaments is variable, though it is always posterior to the ventral coxal plates of the last thoracic somite. In *Glyptonotus antarcticus* (Text-fig. 1 *a*), for example, the penial filaments spring from the articular membrane immediately behind the fused coxal plates of the last thoracic somite; there is, in this species, a slight excavation of the plates in which the bases of the filaments are lodged.

(4) Barnard also made a point of the fact that the penial filaments are separate in the Idoteidae and united into a single process in the Astacillidae. This, however, is not true of all the members of the Idoteidae, for in the species of *Edotia* the basal portions of the two filaments are fused together (Text-fig. 1 *b*, *c*).

The following evolutionary series illustrates the way in which the change in form and position of the penis may have occurred.

(i) In *Idotea indica* (Text-fig. 2) the penes are united at their base and spring from the articular membrane between the last thoracic and the first abdominal segments.

(ii) In *Edotia oculata* (Text-fig. 1 *b*) the fusion of the penes is more complete, and their base is nearer the abdominal segment, the anterior margin of which is slightly excavated to receive it.

(iii) In *E. oculopetiolata* (Text-fig. 1 *c*) the excavation is much deeper and narrower and the fused base of the penes (indicated in the figure) is reduced in size.

(iv) In *Pseudidothea bonnieri* (Text-fig. 1 *d*) the penis issues from a median aperture in the sternum of the first abdominal segment, just anterior to the appendages. The double nature of the penis is still indicated by the presence of two ducts and the distal cleft. I have been able to examine a male specimen of *Amesopous richardsonae* Stebbing and find that in this species from another family the penis is single.

(v) In members of the Astacillidae the penis is single though the vasa deferentia remain paired and open separately at its distal extremity.

This series of modifications appears to be due to the narrowing of the body, and, in particular, the narrowing of the abdominal region. A small portion of the articular membrane between the last thoracic and first abdominal segment has gradually become pinched in, and finally cut off by lateral compression of the sternum of the first abdominal segment. This has resulted in a consequent narrowing and fusion of the penial filaments.

SYSTEMATIC ACCOUNT

Family IDOTEIDAE Dana

Subfamily Idoteinae, Dana 1852; Miers, 1881

Genus Idotea Fabricius, 1798

Idotea indica Milne Edwards, 1840 (Text-figs. 2, 3 *a–d*)

I. indica Milne Edwards, 1840, p. 131.
I. latreillii Guérin Méneville, 1843, p. 32.
I. indica Miers, 1881, p. 50, pl. 2, figs. 4 and 5; Stebbing, 1902, pp. 62–3; Stebbing, 1910, p. 432.

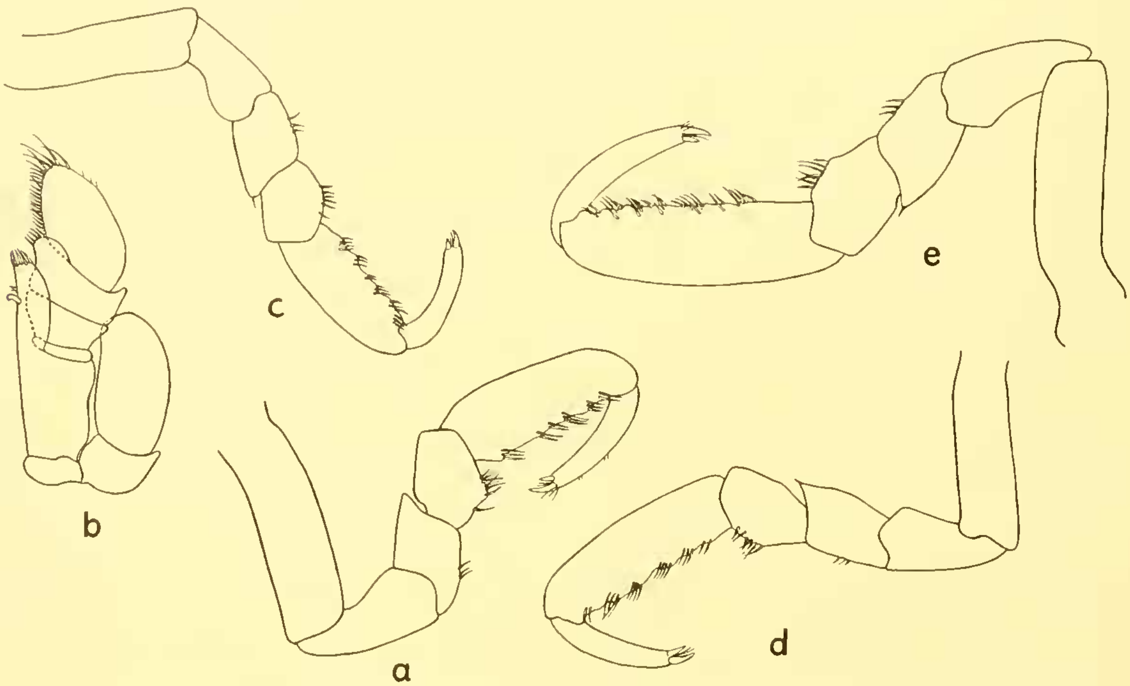
Occurrence. At anchor, Houtjes Point, Saldanha Bay, 25. v. 30, 12 m., 1♂ and 1♀ (non-breeding); ectoparasitic on *Trigla capensis*; Walvis Bay, 9. ix. 26, 1♂.

Remarks. Judging by the measurements given for this species in Stebbing's paper (1902, p. 63), the specimens in this collection are not full grown; the larger of the two males measures 19 mm. in length and 7 mm. in greatest breadth, the female is considerably larger, being 24 mm. in length and 7·5 mm. in breadth. The female is in the non-breeding condition and bears five pairs of small brood-plates on the coxal plates of the second to the sixth thoracic limbs.

There is little to add to the already published accounts of this species; Miers (1881, p. 50) stated that the last pair of thoracic appendages have 'their penultimate joints thickened and considerably elongated'; Stebbing (1902, p. 63), on the other hand, considered that 'the last peraeopods are not very strikingly larger than the penultimate pair' and suggested that this may be a character of the male sex. My own observations agree with those of Miers, namely, that in both sexes the last pair of thoracic limbs (Text-fig. 3 *a*, *e*) are considerably longer than the penultimate pair (Text-fig. 3 *c*, *d*). The longitudinal medio-dorsal furrow on the metasome mentioned by Guérin-Méneville (1843, p. 32) is present but not very deep.

The form of the coxal plates agrees with Miers's description as far as it goes, but the median ventral extensions (Text-fig. 2), already referred to as a character of the members of the suborder Valvifera, were overlooked by him. The penes are placed on the articular membrane between the last thoracic and first abdominal segment, near the anterior margin of the latter. The palp of the maxilliped (Text-fig. 3*b*) is, according to Stebbing, only very indistinctly four-jointed. On p. 63 (1902) he said: 'the dividing line between its second and third joints is only faintly discernible, except at the edges.' In my preparation this suture is quite well defined.

DISTRIBUTION. This species appears to be a shallow-water form, it has been recorded from depths ranging from 12 to 36 m. With the exception of Milne-Edwards's type specimen collected off the coast of Malabar, all the records are from off the coast of South Africa. Méneville's specimen occurred at the Cape of Good Hope, Stebbing's was collected in Hout Bay, and those of the Discovery collections from Houtjes Point, Saldanha Bay and Walvis Bay.



Text-fig. 3. Appendages of *Idotea indica*. (*a*) Seventh pereiopod, ♂, × 12. (*b*) Left maxilliped, ♂, × 12. (*c*) Sixth pereiopod, ♂, × 12. (*d*) Sixth pereiopod, ♀, × 12. (*e*) Seventh pereiopod, ♀, × 12.

Idotea metallica Bosc., 1802

I. metallica Bosc. 1802, p. 179, pl. xv, fig. 6; Latreille, 1803, p. 373.
I. peloponesiaca Roux, 1828, pl. xxx, figs. 10–12.
I. atrata Costa, 1838, pl. xl. fig. 3.
I. rugosa Milne-Edwards, 1840, p. 131.
I. robusta Kroyer, 1846, p. 108, pl. xxvl, fig. 3; Harger, 1880, p. 349, pl. 6, figs. 30–32.
I. compacta White, 1847, p. 95.
I. algirica Lucas, 1849, p. 61, pl. vi, fig. 2.
I. argentea Dana, 1852, p. 698, pl. 46, fig. 1.
I. metallica Miers, 1881, p. 35; Dollfus, 1895, p. 8, fig. 24; Norman, 1904, p. 443; Tattersall, 1904, p. 50; Stebbing, 1910, p. 108; Tattersall, 1911, p. 224, fig. 116; Barnard, 1914*a*, p. 203; Vanhoffen, 1914; Collinge, 1917, p. 746.
Idothea metallica Richardson, 1905, p. 362, 3 figs.; Nordenstam, 1933, p. 94; Gurjanowa, 1933, p. 434.

Occurrence. St. 673: 25. vi. 31. 38° 10½′ S., 30° 10¼′ W. to 38° 03¾′ S., 29° 48′ W., 340–0 m., 1 ♂. St. 700: 18. v. 31. 20° 21½′ N., 22° 32½′ W., 0 m., 2 ♂♂, 1 ♀ (breeding).

REMARKS. The Discovery collections contain four specimens of this species, three males and one female; the largest of the males measures 13 mm. in length and 4·5 mm. in greatest breadth; the female, which is in the breeding condition, measures 13·5 mm. in length and 6 mm. in greatest breadth. The female is broader in proportion than the male, the length: breadth ratio of the former being 2·25:1, that of the latter 2·8:1.

There is little to add to the already existing descriptions and figures of this species; Stephensen (1915, p. 13) figured a character also noted in the males of the Discovery collections, namely, the presence of a thick coating of long delicate setae on the inner edge of the 2–5 joints of the second pereiopod; this sexual difference does not appear in other descriptions of the species.

Collinge (1917, p. 747) suggested that Stephensen's figure of *I. metallica* is really of a new and allied species, presumably because of the narrowness of the body (length:breadth ratio, 3·17:1). I fail to agree with this suggestion because this is the only character in which Stephensen's *I. metallica* differs from those in the Discovery collections, and Miers (1881, p. 37) had already pointed out that there was 'considerable variation in the degree of prominence of the epimera and in the width of the thoracic segments. In some adult examples the epimera do not project at all, and the serrated appearance of the sides of the thorax is lost. The younger individuals are generally narrower, with the sides more nearly parallel.'

Stephensen (p. 12, fig. 4) did not show the dense fringe of delicate setae which is present on all the peduncular joints of the antennae as well as on the joints of the flagellum, and on the peduncle of the antennule; these setae are exceptionally long in the specimen collected at St. 673.

DISTRIBUTION. This species is apparently cosmopolitan and so far has been recorded from surface waters only. The Discovery specimens were collected some distance off the west coast of Africa.

Genus Paridotea Stebbing, 1900

Paridotea ungulata (Pallas), 1772 (Text-fig. 4*a–e*)

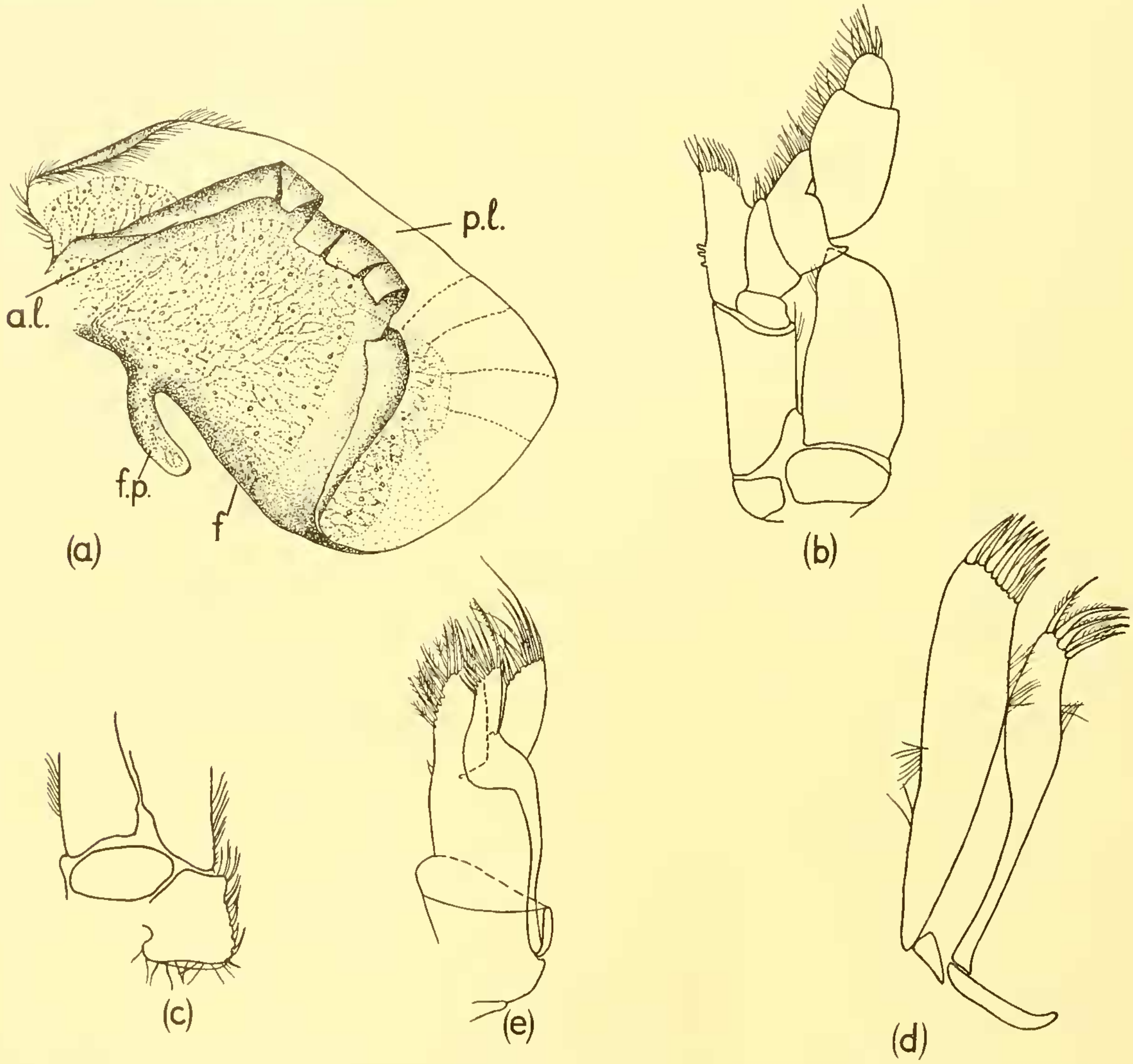
Oniscus ungulatus Pallas, 1772, p. 62.
Idotea ungulata Lamarck, 1818, p. 160.
I. edwardsii Guérin-Méneville, 1843, p. 33.
I. lalandii Milne-Edwards, 1840, p. 132.
I. affinis Milne-Edwards, 1840, p. 133.
I. lalandii Krauss, 1843, p. 61.
I. affinis Krauss, 1843, p. 61.
I. nitida Heller, 1861, p. 497.
I. affinis Heller, 1868, p. 130; Miers, 1876*a*, p. 93; Thomson, 1879, p. 232.
I. ungulata Miers, 1881, p. 52.
Paridotea ungulata Stebbing, 1900, pp. 53–5; Chilton, 1909, p. 660; Stebbing, 1902, p. 50; Barnard, 1914*b*, pp. 425–6; Nierstrasz, 1917, pp. 113–14, pl. xiv, figs. 43–48; Vanhoffen, 1914, p. 527; Collinge, 1918, pp. 81–2, pl. 8, figs. 24, 25.

Occurrence. St. 5: Tristan da Cunha, Quest Bay, 31. i. 26, 7–12 m., several short hauls inside *Macrocystis* belt, 2 specimens. Crawling on a female Blue Whale, Saldanha Bay; 1 immature specimen. 33° 01′ S., 17° 58′ E., 5. x. 26, found crawling on shark line; Houtjes Point, 8 m.–0, 1 ♂ and 1 ♀ (breeding); Houtjes Point, 25. v. 30, at anchor, depth 12 m., 1 ♀ (breeding); Capetown Docks, 1. x. 30, on ship's side, 1 ♂. St. WS. 123: 9. vi. 27, shore collection, Gough Island, under stones in rock pools, 3 immature specimens.

REMARKS. The largest male in this material measures 59 mm. in length and 15 mm. in greatest breadth and was collected in Capetown Docks, from the ship's side; the largest female measures 38 mm. in length and 10·5 mm. in greatest breadth; this specimen is in the breeding phase.

There is little to add to the existing descriptions of this species, though it should be pointed out that too much stress seems to be laid on small variations in detail.

The maxillula (Text-fig. 4*d*), for example, was first described by Stebbing (1900, p. 54). He stated there were 'six strongly plumose setae on the narrow inner plate'; in a subsequent paper, published in 1902, he altered this number to five. Nierstrasz (1917, p. 113), discussing this point, said that in his specimens the number of plumose setae varied, some specimens having four and others five. Collinge (1918), not having seen Nierstrasz's paper, disagreed with Stebbing and said (p. 82) that the inner lobe has 'four stout setose spines terminally, and a small setule on the middle of the ventral surface close to the anterior margin'; further, he stated that all his nine specimens were alike in this respect. It is unfortunate that Collinge gave no indication of the size of his specimens; those of Stebbings measured 51 mm. and 48 mm. in length.



Text-fig. 4. *Paridotea ungulata*. (*a*) First brood lamella (left) of breeding female, ×18. *a.l.* anterior lobe; *p.l.* posterior lobe; *f*, fold; *f.p.* finger-like projection. (*b*) Left maxilliped, ♂, ventral view, ×18. (*c*) Base of right maxilliped (breeding ♀), dorsal view, ×18. (*d*) Maxillula (right), ×21. (*e*) Maxilla (left), ×21.

In the Discovery collections the specimens vary considerably in size, and an examination of the maxillula of a large, a medium and a small individual shows that the number of setae is definitely correlated with the size of the individual:

Large specimen: body length 52 mm. Number of spines 5.
Medium specimen: body length 22·5 mm. Number of spines 4.
Small specimen: body length 10 mm. Number of spines 3.

Thus it may be assumed that Collinge's specimens were of a medium size.

A description and figure of the maxilliped was given by Collinge (p. 82 and pl. 8, fig. 25). A figure of this appendage taken from a male specimen is included in the present paper (Text-fig. 4*b*), together with the basal portion of one taken from a breeding female (Text-fig. 4*c*). These figures illustrate a sexual difference in the form of the coxopodite characteristic of many isopods, that is, the development in the breeding female of a coxal 'lobe' which is curved and fringed with setae.

A figure (Text-fig. 4*a*) of the first brood lamella of the left side is also included to show another characteristic isopod feature of the breeding female. This is the folding of the plate, the anterior half of which partially overlies the mouthparts, the posterior half forming the anterior boundary of the marsupium. It also shows the characteristic finger-like projection which extends inwards from near the point of attachment of the lamella on to the coxopodite of the limb.

DISTRIBUTION. This species appears to be a fairly shallow-water form. Its range includes Table Bay, the Cape of Good Hope, the Indian Ocean, South Australia, Auckland, New Zealand, Chile, and Rio de Janeiro.

Genus Synidotea Harger, 1878

In the definition of this genus, both Stebbing (1902, p. 60) and Richardson (1905, p. 376) gave the fusion of the epimera of the thoracic somites with their respective somites as a diagnostic character. Stebbing pointed out that the last three thoracic somites were considerably shorter than the rest and the 'demarcation of the side plates was very faint'.

If only the dorsal surface of a species such as *Synidotea hirtipes* (Milne Edwards) is examined, this definition might appear to be correct. Examination of both surfaces, however, shows that the 'epimera' of the last three thoracic somites are coxal in origin, whereas those of the anterior somites are pleural expansions of the terga. In the first four free somites the coxal joints of the limbs are clearly defined, the outer margin of each is ring-like and, except in the first, is clearly marked off from the ventral surface of the pleuron by a suture; the inner margin is produced as a coxal plate which extends to the mid-ventral line.

I have examined specimens of two other species of this genus, *S. nodulosa* (Kroyer) and *S. bicuspida* (Owen), and in both the form of coxae agrees with the condition found in *S. hirtipes*. It is probable that this character may prove to be common to all members of the genus.

Synidotea hirtipes (Milne-Edwards, 1840)

Idotea hirtipes Milne-Edwards, 1840, p. 134; Krauss, 1843, p. 61.
Edotia hirtipes Miers, 1881, p. 68.
Synidotea hirtipes Benedict, 1897, p. 403; Stebbing, 1902, pp. 59–62; Stebbing, 1910, p. 434; Omer-Cooper, 1926, p. 205.

Occurrence. Houtjes Point, Saldanha Bay, at anchor, 25. v. 30, 12 m., 1 immature specimen.

REMARKS. The Discovery collections contain a single specimen measuring 19 mm. in length and 8·5 mm. in greatest breadth.

The description of this species is already well known; my observations with regard to the second pair of thoracic appendages agree with those of Stebbing (1902, p. 60); he pointed out that they 'are shorter and stouter than the rest and the penultimate joint is considerably expanded to form with the terminal one a prehensile hand'. To a lesser extent an expansion of the penultimate joint is also noticeable on the next three pairs of limbs.

DISTRIBUTION. This species is a shallow-water form recorded from depths varying from 12 to 69 m. The original specimens described by Milne-Edwards were collected from the coast of the Cape of Good Hope; Stebbing's material was collected from the coastal waters around Cape St Blaize and that of the Discovery collections from Houtjes Point, Saldanha Bay; Omer-Cooper (p. 205) recorded from the Suez Canal specimens which he assigned to this species, though admitting their identification to be doubtful. Except for this last record, the species has only been collected in South African waters.

Genus Edotia Guérin-Méneville, 1844

Edotia Guérin-Méneville, 1844, p. 34; Miers, 1881; Nordenstam, 1933, p. 94.
Desmarestia Nicolet, 1849, p. 284.
Epelys Dana, 1849, p. 426; Harger, 1880, p. 357.
Edotea Ohlin, 1901, p. 292; Richardson, 1905, p. 394.

REMARKS. The diagnosis of this genus was given by Richardson (1905, p. 394). She stated that 'epimera of all the segments of the thorax are firmly and perfectly united with the segments'. Richardson used the term 'epimera' to describe the coxal plates which are developed as outgrowths from the coxal joints and which may extend on to the dorsal surface and fuse with the terga of their respective somites. Nordenstam (1933, p. 95), commenting on this statement, said that 'in some species, however, the pereion is traversed by two lateral and parallel grooves on each side; the most laterally situated of these grooves marks off the epimera. This is the case in *E. bilobata* and *E. oculata*.... These grooves are indistinct in *E. tuberculata*, and usually they are entirely absent in *E. lilljeborgi*, *acuta*, *triloba*, *montosa*, *magellanica* and *doello-juradoi*.' Further on (p. 100), he said that '*Edotia bilobata* differs from the other species of the genus in having the coxal plates of the last three pereion segments demarcated by very distinct suture-like grooves. These grooves or sutures are not in a line with those grooves which mark off the coxal plates of the anterior segments.' I have examined eight of the eleven species of this genus, four species in the Discovery collections: *E. oculata* Ohlin, *E. bilobata* Nordenstam, *E. oculopetiolata* (Nordenstam's *E. tuberculata*) and *E. corrugata* n.sp.; and four in the British Museum collection, *E. magellanica* Cunningham, *E. montosa* (Stimpson), *E. triloba* (Say) and *E. tuberculata* Guérin-Méneville; none of them conforms to Richardson's diagnostic character, and in none of them do the lateral grooves mentioned by Nordenstam bear any relation to the 'coxal plates of the anterior segments'.

In all these eight species, the coxae of the limbs of the first four free thoracic segments are *not* expanded dorsally into coxal plates. As in *Synidotea*, the outer margin of each coxa is ring-like and (except for the first pair) is clearly marked off from the ventral surface of the pleuron by a suture, *but* ventral coxal plates are present as extensions of the inner margins of the coxae and almost meet in the middle line. In the first pair of limbs, the coxae are fused with the undersurface of the pleura of the first segment.

The coxae of the last three thoracic segments, on the contrary, *are* expanded dorsally into coxal plates and are either fused with or separated by faint sutures from the terga of their respective segments; where fusion has occurred, the position is indicated by a groove. The inner margins of these coxae are also expanded into ventral plates, but these plates are fused in the middle line.

Thus Richardson's diagnostic character is not valid for *Edotia*, while the demarcation of the coxal plates of the last three thoracic segments, regarded by Nordenstam as characteristic only of *E. bilobata*, is common to all eight species and may prove to be present in the remaining three, *lilljeborgi* Ohlin, *acuta* Richardson and *doello-juradoi* Giambiagi. The similar development of coxal plates in the species of *Edotia* and *Synidotea* (see p. 153) emphasizes the close relationship between these two genera; this relationship is indicated by their inclusion previously in the single genus *Edotia*. The coxal joints play an important role in the development of the marsupium or brood pouch. This is formed by overlapping brood lamellae, developed as outgrowths from the coxae of some of the thoracic appendages. In the majority of the Valvifera the marsupium is of the normal isopod type. For example, in *Idotea emarginata* (Fabr.) the rudiments of the lamellae appear as four pairs of buds on the inner ventral margins of the coxae of the first four free thoracic segments. In the breeding female these buds develop into large, partly chitinized lamellae, lying ventrally to the coxae and overlapping one another to form a complete marsupium (Sheppard, 1939); there are no ventral coxal plates to the coxae of those limbs bearing lamellae, these appear to replace them.

With one exception, the published descriptions of the species of *Edotia* make no mention of any variation from this type of marsupium, but the breeding females of this genus in the Discovery collections all show some modification of the normal form. This modification is most marked in *E. oculata* Ohlin, where a condition is reached, the nearest parallel to which is seen in the Sphaeromidae, where brood pouches are formed by involution of either the ventral or the lateral integument. The single exception just mentioned is found in Nordenstam's (1933) description of *E. tuberculata* Guérin-Méneville (=*E. oculopetiolata* of this paper).

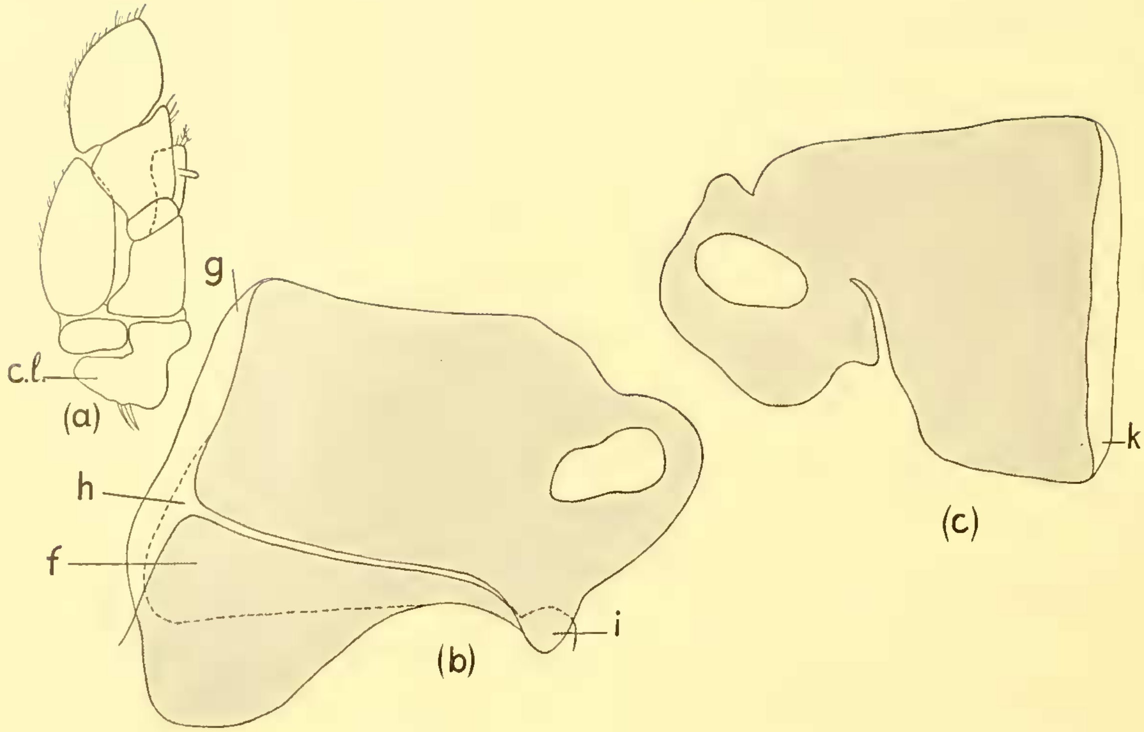
Nordenstam (1933, p. 95), in describing the four pairs of brood lamellae of this species, said: 'they are all fused with each other by a thin chitinous tegument', and 'the anterior margin of the small first pair (belonging to the first pereiopods) is not fused anteriorly with the sternum'. Finally, of the fourth pair he said: 'its posterior margin is fastened to the sternum by a thin chitinous tegument.'

From this statement it would appear that the brood pouch, in this species, was a closed pouch communicating with the exterior by a small anterior opening only; this, however, is not the case. I have examined a breeding female of *E. oculopetiolata* and find that contrary to Nordenstam's observations the four pairs of brood lamellae are quite distinct, though modified. They differ from the common isopod type of large overlapping, partially chitinized, lamellae. Each lamella, when viewed from below, can be seen to be highly chitinized and appears to meet its fellow in the mid-ventral line. The posterior chitinized edge of one meets the anterior chitinized edge of the one immediately behind, each of the first three pairs of lamellae possessing, in addition, non-chitinous extensions of the posterior margins, which lie underneath (dorsally to) the chitinous anterior part of the succeeding pair (Text-fig. 5*b*).

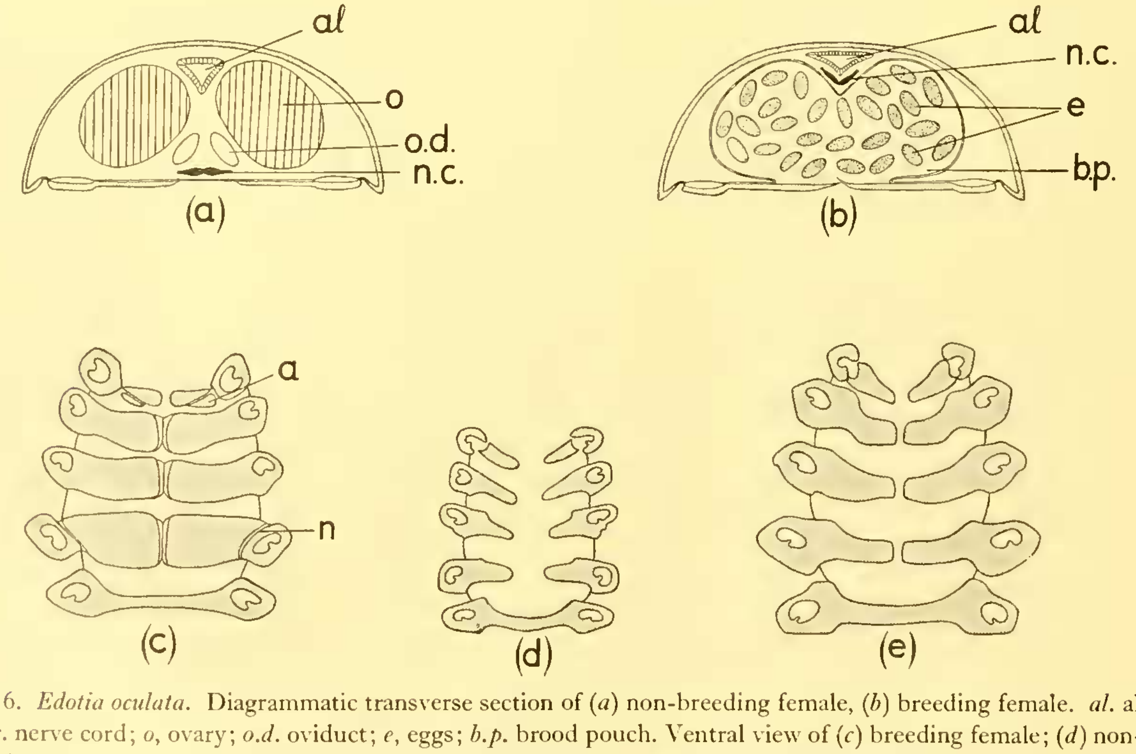
The fourth pair of lamellae are chitinized throughout and are longer than broad (Text-fig. 5*c*). The inner margins of the lamellae also possess non-chitinized extensions, which are short and bent dorsally upwards at right angles. The outer posterior angle (Text-fig. 5*b*, *i*) in each of the three anterior pairs of lamellae is produced into a strong lobe, which lies over the outer corner of the anterior margin of the lamella immediately behind, and forms an interlocking device. The strongly chitinized lamellae, together with the added rigidity produced by this interlocking, appear to be sufficient to prevent ventral sagging of the pouch and the consequent escape of its contained young, which develop between the lamellae and the ventral body wall. This wall is soft and becomes pushed up dorsally to lie very close to the dorsal body wall, carrying the ventral nerve cord with it into close proximity with the alimentary canal. A similar type of marsupium to that of *E. oculopetiolata* is also found in the breeding female of *E. corrugata* sp.n.

In the females of *E. oculata* Ohlin the modification of the brood pouch is carried farther than in other species of the genus. Among the Discovery specimens of this species there are a number of breeding and non-breeding females. In the breeding females the first four pairs of coxal plates (Text-fig. 6*c*), when viewed from below, very closely resemble those of the male (Text-fig. 6*e*); that is, they are large and nearly meet in the mid-ventral line. As in the male, the outer parts of these plates support the ventral integument, but the inner distal ends take on the function of acting as brood lamellae.

In the non-breeding females on the other hand, the first four pairs of coxal plates are short and comparatively narrow, with a broad unchitinized area of ventral integument between their distal ends



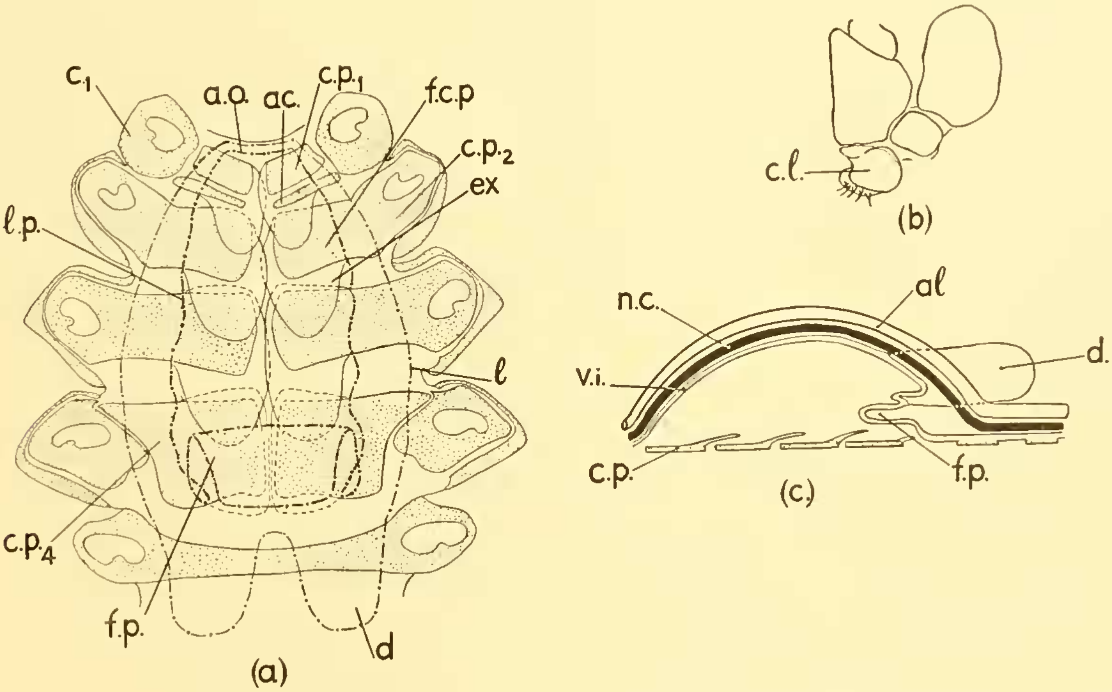
Text-fig. 5. *Edotia oculopetiolata* sp.n. (*a*) Maxilliped (right) of breeding female, showing coxal lobe, *c.l.*, × 30. (*b*) Coxa and brood lamella of second free thoracic somite (left), × 30. *f*, anterior part of next lamella; *g*, dorsally directed non-chitinous extension of lamella (extending to dotted line); *h*, non-chitinous area covered by *f*; *i*, projection of lamella fitting over corner of *f*. (*c*) Coxa and lamella of fourth free thoracic somite (right), × 30. *k*, dorsally directed non-chitinous extension of lamella. Chitinous areas stippled.



Text-fig. 6. *Edotia oculata*. Diagrammatic transverse section of (*a*) non-breeding female, (*b*) breeding female. *al.* alimentary canal; *n.c.* nerve cord; *o*, ovary; *o.d.* oviduct; *e*, eggs; *b.p.* brood pouch. Ventral view of (*c*) breeding female; (*d*) non-breeding female; (*e*) male. *a*, accessory plate; *n*, non-chitinous integument between the coxal joint and coxal plate. Chitinous areas stippled.

(Text-fig. 6*d*). Some of the specimens are of full size; it therefore seems reasonable to assume that this is the normal condition in non-breeding females of this species. The wide band of unchitinized integument indicates that the development of these plates proceeds as an inward extension of the coxae and lends support to the view, expressed elsewhere (Sheppard, 1939), that the plates are coxal in origin.

In the fully developed brood pouch in *E. oculata* only the distal inner half of each plate is free; the outer parts are all connected together by the ventral integument, which, at about the middle of the plate, becomes pushed up dorsally to form a large pouch, almost entirely filling the thoracic region of



Text-fig. 7. *Edotia oculata*. (*a*) Brood pouch from above, dorsal integument removed (diagrammatic). *a.c.* accessory coxal plate; *a.o.* anterior opening of brood pouch; c_1, coxa of first pereiopod; $c.p._1$, coxal plate of first pereiopod, unfused; $c.p._2$, coxal plate of second pereiopod, fused; $c.p._4$, coxal plate of fourth pereiopod, unfused; *d*, diverticulum of brood pouch; *ex*, soft extension of coxal plate; *f.c.p.* free part of coxal plate; *f.p.* fold of posterior wall of brood pouch; *l*, limit of brood pouch –·–·–·–·–; *l.p.* line showing displacement of ventral integument, –·–·–·– dorsally and laterally. (*b*) Base of left maxilliped to show coxal lobe, *c.l.* (*c*) Longitudinal section through brood pouch (diagrammatic). *al.* alimentary canal; *c.p.* coxal plate; *d*, diverticulum of brood pouch; *f.p.* fold of posterior wall of brood pouch; *n.c.* nerve cord; *v.i.* ventral integument. Chitinous areas stippled.

the body (Text-fig. 6*b*). The free inner margins of the coxal plates (Text-fig. 7*a*) are produced into membranous extensions; the posterior margins of the first three pairs of plates form large lobes which overlie the plates immediately behind. The extensions of the inner margins are narrow and curved upwards and overlap one another, alternately left over right, and right over left; in the text-figure the plates are slightly pulled apart in the mid-ventral line. The inner edges of the main part of the plates bear microscopic projections, while those of the last two pairs, in addition, are fringed with setae, the whole forming an interlocking device. Thus, a firm ventral wall to the pouch is formed from the distal ends of the coxal (brood) plates. The area of the ventral integument primarily involved in the formation of the rest of the pouch is limited to the region between the free portions of the coxal plates; it extends from just in front of the first pair of plates to the posterior border of the fourth pair. It has become greatly increased in size and is pushed dorsally towards the terga, carrying with it the nerve cord which may be seen folded below the alimentary canal (Text-fig. 6*b*). All signs of the reproductive system have disappeared except for the posterior ends of the oviducts.

The posterior opening of the pouch, extending transversely immediately behind the free distal portions of the fourth pair of plates, is protected by a fold of the posterior wall of the pouch. This fold is double and is directed forwards to cover about three-quarters of the free surface of the plates; only the middle portion of the wall is involved, resulting in the formation of a pair of lateral diverticula to the pouch (Text-fig. 7*a*, *c*). The ventral portion of the fold is somewhat thickened and presumably acts as a valve, closing the opening and preventing the escape of eggs and developing young. The anterior opening of the pouch, which is much smaller, is protected by the coxal lobes which are developed on the coxae of the maxillipeds. Some idea of the size of the pouch may be gathered from the fact that a breeding female, measuring only 7 mm. in length, and 4 mm. in greatest breadth, contained 24 young specimens which varied in length from 1·5 to 2 mm.

The significance of these modifications of the brood pouch cannot be discussed without some reference to the habits of the species concerned. The only clue—if it can be called such—lies in the fact that they all appear to live in a 'dirty' environment, their bodies being invariably covered with particles of different types. This mode of life would expose the young, developing in a comparatively soft ventrally directed pouch, to serious damage, either by actual contact with the surroundings, or by infiltration of particles into the marsupium itself. The two kinds of brood pouch met with in *E. oculopetiolata* and *E. oculata* obviously afford greater protection than does the typical form of pouch.

Edotia bilobata Nordenstam, 1933 (Text-fig. 8*a–e*)

Edotia bilobata Nordenstam, 1933, pp. 98–100, pl. 1, fig. 6; text-figs. 23*c*, 24*a–c*.

Occurrence. WS 245: 18. vii. 28, 52° 36′ 00″ S., 63° 40′ 00″ W., 304–290 m., 1 ♂. WS 871; 1. iv. 32, 53° 16′ 00″ S., 64° 12′ W., 336–341 m., 1 ♀.

REMARKS. This species was instituted by Nordenstam (1933) from examination of a single immature specimen. The Discovery collections contain two specimens, an adult male measuring 7·8 mm. in length and 3 mm. in greatest breadth, and a breeding female, measuring 10 mm. in length and 3·5 mm. in breadth.

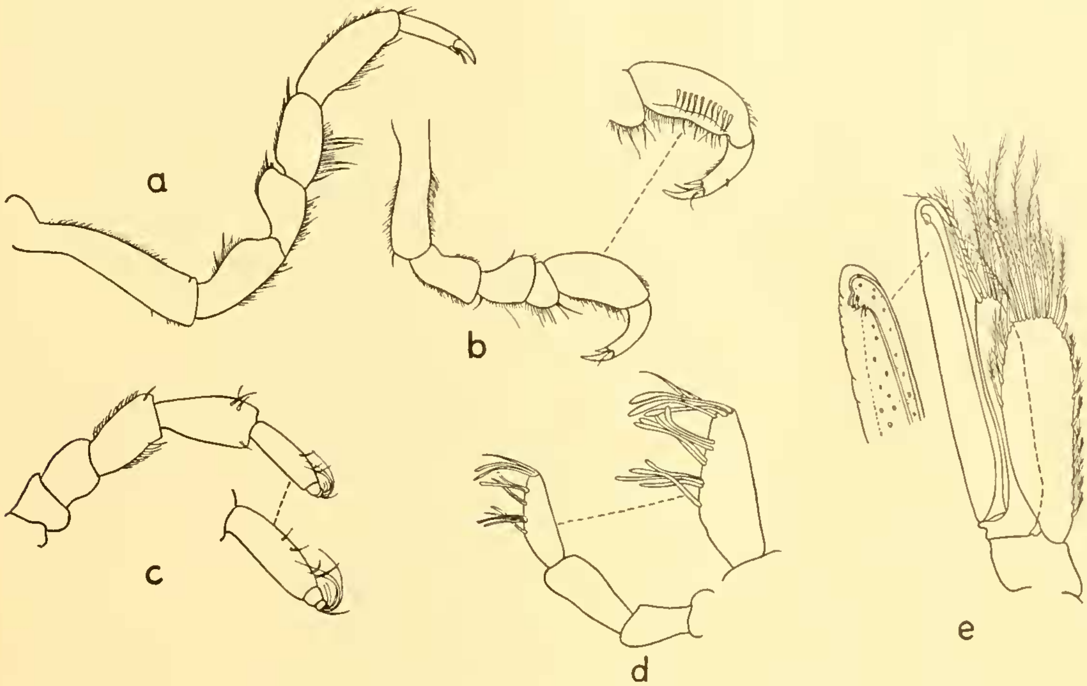
These specimens agree with the description given by Nordenstam except for the coxal plates of the anterior thoracic somites; this point has already been discussed (p. 154) in the introduction to the genus. Before passing on to the consideration of certain details, the general hairiness of the body and its appendages is worth noting. The detailed structure of the antennules and antennae cannot be seen in the figure given by Nordenstam. The sensory setae present on the flagellum of the antennule are more numerous in the male than in the female; in the latter they are six in number and occur near the distal extremity. The arrangement in the male is shown in Text-fig. 8*d*, and the structure of the antenna in Text-fig. 8*c*.

Except for the maxillipeds Nordenstam makes no mention of the form of the thoracic appendages. The second pair of pereiopods (Text-fig. 8*b*) is shorter than the remaining ones, but all have the propodus somewhat dilated to form, with the dactylus, a prehensile limb. The remaining six pairs are all very similar in structure (Text-fig. 8*a*).

The brood pouch of the breeding female is of the modified type described in the introduction to the genus (pp. 154–155).

In the male, the penis is single, very broad and distally cleft; its base lies in a shallow depression on the front margin of the first abdominal segment; the form and position of the penis bears a close resemblance to that of *E. oculata* (Text-fig. 1*b*). The appendix masculina is shown in Text-fig. 8*e*.

Distribution. The type specimen was collected in shallow water off New Year Island, Falkland Islands; those of the Discovery collections were collected in slightly deeper water (between 341 and 290 m. as compared with 36 m. in practically the same locality).



Text-fig. 8. *Edotia bilobata*, ♂. (*a*) Third pereiopod, ×25. (*b*) Second pereiopod, ×25. (*c*) Right antenna, ×35. (*d*) Right antennule, ×32. (*e*) Second pleopod, ×30.

Edotia oculata Ohlin, 1901

Edotia oculata Ohlin, 1901, pp. 298–301, pl. xxiv, fig. 13; Nordenstam, 1933, p. 93.

Occurrence. WS. 215, 31. v. 28, 47° 37′ S., 60° 50′ W., 219–146 m., 1 ♀. WS. 219, 3. vi. 28, 47° 06′ S., 62° 12′ W., 116–114 m., 3 ♂♂, 9 ♀♀. WS. 220, 3. vi. 28, 47° 56′ S., 62° 38′ W., 108–104 m., 3 specimens. WS 222, 8. vi. 28, 48° 23′ S., 65° 00′ W., 100–106 m., 2 ♀♀. WS 787, 7. xii. 31, 48° 44′ S., 65° 24·5′ W., 106–110 m., 1 ♂, 1 ♀, 3 juv. WS. 797, 20. xii. 31, 47° 44′ S., 64° 22′ W., 115–111 m., 1 ♂. WS 806, 7. i. 32, 49° 51′ S., 65° 01′ W. to 50° 03′ S., 64° 23′ W., 129–122 m., 1 ♂. WS. 808, 8. i. 32, 49° 41′ S., 63° 40′ W., 109–107 m., 3 ♀♀, 2 juv. WS. 814, 13. i. 32, 51° 44·5′ S., 66° 38′ W., 111–118 m., 2 ♀♀. WS. 818, 17. i. 32, 52° 09·5′ S., 64° 58′ W. to 52° 10′ S., 64° 54′ W., 150 m., 1 ♀.

Remarks. This species has not been recorded since it was first described by Ohlin in 1901 from a single female, measuring 7 mm. in length and 4 mm. in greatest breadth. The Discovery collections contain a number of mature specimens of both sexes; of these, the males are the larger, measuring 9 mm. in length and 5 mm. in greatest breadth; the mature females are approximately the same size as Ohlin's specimen.

Ohlin's estimate of the length of the eye-stalks (p. 298) is too high; they are not 'nearly as long as the peduncle of the antennules' as he suggested, but about the length of the first two joints.

The form of the coxae and of the brood pouch in the breeding female has already been dealt with in the introduction to the genus (pp. 154–158).

The male characters are very like those already described for *E. bilobata*, the flagellum of the antennule bears many more sensory setae than does that of the female. The penis (Text-fig. 1*b*) is single, broad, rounded and distally cleft; the appendix masculina bears a very close resemblance to that of *E. bilobata* (Text-fig. 8*e*).

DISTRIBUTION. The Discovery specimens are all recorded from an area between 47° S., 60° W. and 51° S., 66° 45′ W., at depths ranging from 219 to 100 m. Ohlin's specimen came from 38° S., 56° W. at a depth of 52 fathoms (approximately 93·6 m.). Thus the localities from which this species has been collected are all close together and all of them are outside the Antarctic Convergence.

Edotia oculopetiolata sp.n. (Text-fig. 9*a–g*)

Edotia tuberculata Guérin-Méneville, Nordenstam, 1933, pp. 95–7, figs. 22–23*a*.

Occurrence. St. 123: 15. xii. 26, off mouth of Cumberland Bay, South Georgia, 230–250 m., 1 ♀; 230 m., 2 immature specimens; 220 m., 1 immature specimen. St. 140: 23. xii. 26, Stromness Harbour, South Georgia, 122–136 m., 1 ♀. St. 144: 5. i. 27, off mouth of Stromness Harbour, South Georgia, 155–178 m., 3 ♀♀ (breeding), 4 ♂♂. St. 180: 11. iii. 27, Schollaert Channel, Palmer Archipelago, 160–330 m., 1 ♂. St. 161: 12. iii. 27, Schollaert Channel, Palmer Archipelago, 64° 20′ 00″ S., 63° 01′ 00″ W., 335 m., 1 ♂ (damaged). St. 195: 30. iii. 27, Admiralty Bay, King George Island, South Shetlands, 391 m., 1 ♂ and 1 ♀. St. WS 25: 17. xii. 26, Undine Harbour (North), South Georgia, 18–27 m., 1 ♂. St. MS 71: 9. iii. 26, East Cumberland Bay, South Georgia, 110–60 m., 1 ♀.

The holotypes are from St. 195.

REMARKS. Nordenstam (1933, p. 95) identified some specimens from the Swedish Antarctic Expedition as *E. tuberculata*, but he was incorrect in his diagnosis. His specimens differed from Guérin-Méneville's description of the type in a number of characters, and I consider that they should be included in a new species, *E. oculopetiolata*.

Perhaps the most obvious difference between the two forms is that of size. Ohlin (1901, p. 292) gives the length of *E. tuberculata* as 29 mm. and breadth as 11 mm.; Miers (1881, p. 73) gives the length as 30 mm. and breadth also as 11 mm. Nordenstam's specimens, on the other hand, were considerably smaller, a mature male measuring 10 mm. in length and a mature female 9–10 mm. The specimens of the Discovery collections are approximately the same size as those of Nordenstam; the largest male is 11 mm. in length and 4 mm. in greatest breadth. The true *E. tuberculata* is therefore about three times as large as *E. oculopetiolata*.

Apart from size, there are other important differences between the two species. Nordenstam himself (p. 96) noticed that in his specimens 'the eyes are placed on large tubercles, lateral margins of the head are somewhat concave, and dorsal side of head has four tubercles'. The tubercles bearing the eyes (Text-fig. 9*f*) are so obvious that, if present, they cannot be overlooked, yet none of the descriptions of *E. tuberculata* contains any mention of such a feature; for this reason Nordenstam's identification seems open to doubt.

An examination of the British Museum specimens of *E. tuberculata* has finally settled the point, for in these the eyes are small, lateral in position, and not on tubercles. The apical segment of the uropod in *E. tuberculata* (Miers, 1881, pl. iii, 6) is longer and very much more acute than that of Nordenstam's species (1933, p. 97, fig. 23*a*). In the introduction to the genus, reference has already been made to the form of coxae and the modification of the brood pouch in this species (p. 155).

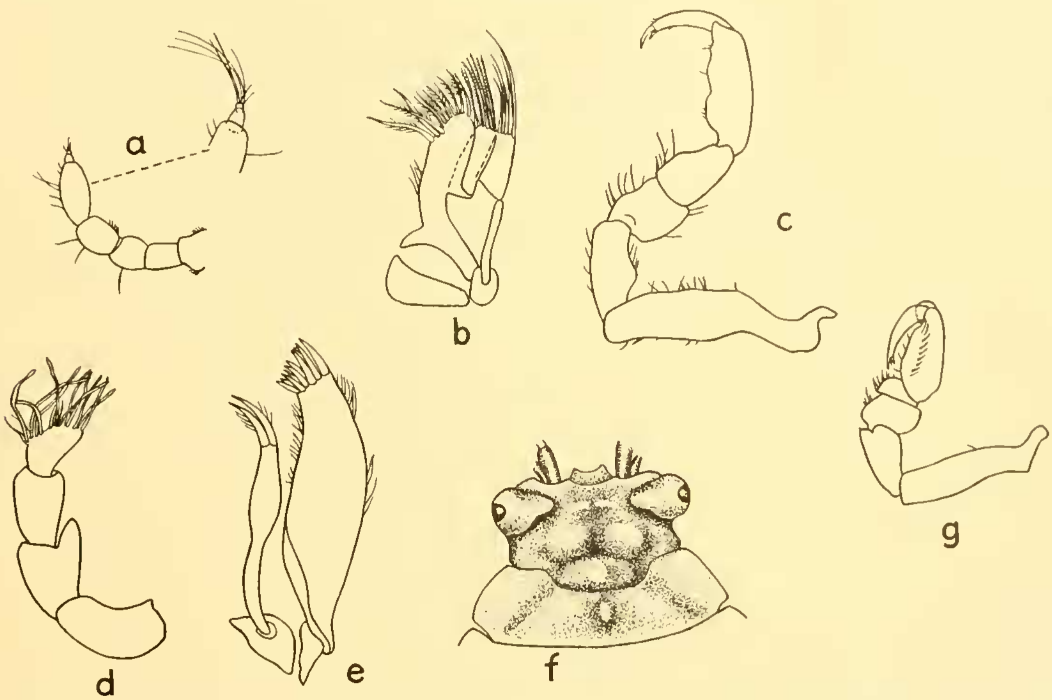
These structural differences are further supported by differences in distribution. The true *E. tuberculata* is found in waters around the south of South America and the shores of the Falkland Islands, that is, in areas outside the Antarctic Convergence; on the other hand, Nordenstam's *E. tuberculata* and the corresponding specimens in the Discovery collections occur in shallow waters off South Georgia, the South Shetland Islands and the Palmer Archipelago—all within the Convergence.

Evidence is accumulating to show that shallow-water species of both isopods and amphipods occur in localities *either* outside, *or* inside, the Antarctic Convergence, but that any one species does not occur in both areas. If Nordenstam's identification were correct, then *E. tuberculata* would be an exception to this rule.

The differences listed above appear sufficient to justify the removal of Nordenstam's *E. tuberculata* from the species and to institute a new one, *E. oculopetiolata*, to receive it, together with similar specimens from the Discovery collections.

Description. The *antennule* (Text-fig. 9*d*) is considerably longer and stouter than the antenna (cf. the published figures of *E. tuberculata* of Ohlin, 1901, pl. iii, figs. 10*a*, 2, where the antenna is much longer than the antennule).

The first peduncular joint is slightly longer than the other two, which are of approximately equal length, the inner distal angle of the second joint is produced to form a well-marked projection. The clavate flagellar joint is slightly shorter than the third peduncular joint, and bears, in the male, a number of long sensory setae on its anterior margin. In the female these are fewer in number and are restricted to a small tuft at the distal extremity of the joint.



Text-fig. 9. *Edotia oculopetiolata* sp.n. (*a*) Antenna, ×22. (*b*) Left maxilla, ×42. (*c*) Fifth pereiopod, ×15. (*d*) Antennule, ♂, ×22. (*e*) Left maxilla, ×42. (*f*) Head and first pereion segment, ×12. (*g*) First pereiopod, ×15.

The *antenna* (Text-fig. 9*a*) consists of a peduncle of five joints and a flagellum of two very short ones (cf. Ohlin, 1901, p. 293 and pl. xxiii, fig. 10*a*2, where the flagellum consists of three joints, the first one of which is of considerable length). The first four peduncular joints are short and subequal, the fifth is nearly twice as long as the fourth. The flagellum is extremely short; the distal joint is much smaller than the basal one, and bears a tuft of long setae.

The *mandibles* are described and figured by Nordenstam (1933, p. 95, fig. 22*a*, *b*).

The outer lobe of the *maxillula* (Text-fig. 9*e*) has ten spines on its obliquely truncated extremity, and a few scattered setae both on its inner and outer borders. The distal extremity of the inner lobe bears two strong, curved, sparsely plumose setae. The outer lobe of the maxilla (Text-fig. 9*b*) bears six long setae on its extremity, the middle lobe bears seven pectinate setae, and the innermost lobe has its rounded distal end fringed with eleven plumose setae, of which the three innermost are much the stronger and are curved inwards.

The palp of the *maxilliped* (Text-fig. 5*a*) is three jointed, the distal joint is broad and bears a fringe of short setae on its outer margin (cf. Ohlin, 1901, for *E. tuberculata*, pl. xxiii, fig. 10*mxp*, where setae are present all round this lobe and also on the outer margin of the lamella). The coxopodite bears a coxal lobe in the breeding female.

The second *thoracic appendage* is shown in Text-fig. 9*g*. It is considerably smaller and shorter than the remaining appendages which increase in length from before backwards. The second, third, fourth and fifth pairs are all subchelate, the last three pairs, which are directed backwards, are ambulatory (Text-fig. 9*c* of sixth thoracic appendage).

The *pleopods* are of the usual type, the form of the second pleopod of the male is shown by Nordenstam (1933, p. 96, text-fig. 22*c*, *d*). Mention has already been made of the form of the uropod.

DISTRIBUTION. Nordenstam's specimens were collected off the coast of South Georgia; those of the Discovery collections from South Georgia; Schollaert Channel, Palmer Archipelago; and Admiralty Bay, King George Island, South Shetlands.

Edotia corrugata n.sp. (Plate VIII, figs. 1, 2; Text-fig. 10*a–l*)

Occurrence. St. WS 809: 8. i. 32, 49° 29′ S., 66° 27′ W., 107–104 m., 2 ♂♂ and 2 ♀♀, one breeding and the other non-breeding.

The holotypes are from St. WS. 809.

DESCRIPTION. The *body* of the male (Plate VIII, fig. 1) is longer and narrower than that of the female (Plate VIII, fig. 2), which is compact and strongly arched; the male measures 6·5 mm. in length and 2·6 mm. in greatest breadth; the female 5·5 mm. in length and 2·75 mm. in greatest breadth, the length: breadth ratio of the male is 2·5:1 as compared with a 2:1 ratio in the female.

The *head* (Plate VIII, figs. 1, 2) is almost rectangular, broader than long, with the posterior margin slightly longer than the anterior; the antero-lateral angles are rounded and the anterior margin is excavated for the reception of the antennules. The eyes, which are small and contain little pigment, are situated on either side midway between the anterior and posterior margin of the head, some distance in from the lateral border. The posterior part of the head is raised and separated from the anterior part by a groove; in the middle of the latter is a single large, rounded protuberance, which does not show clearly in the photographs of the entire animal.

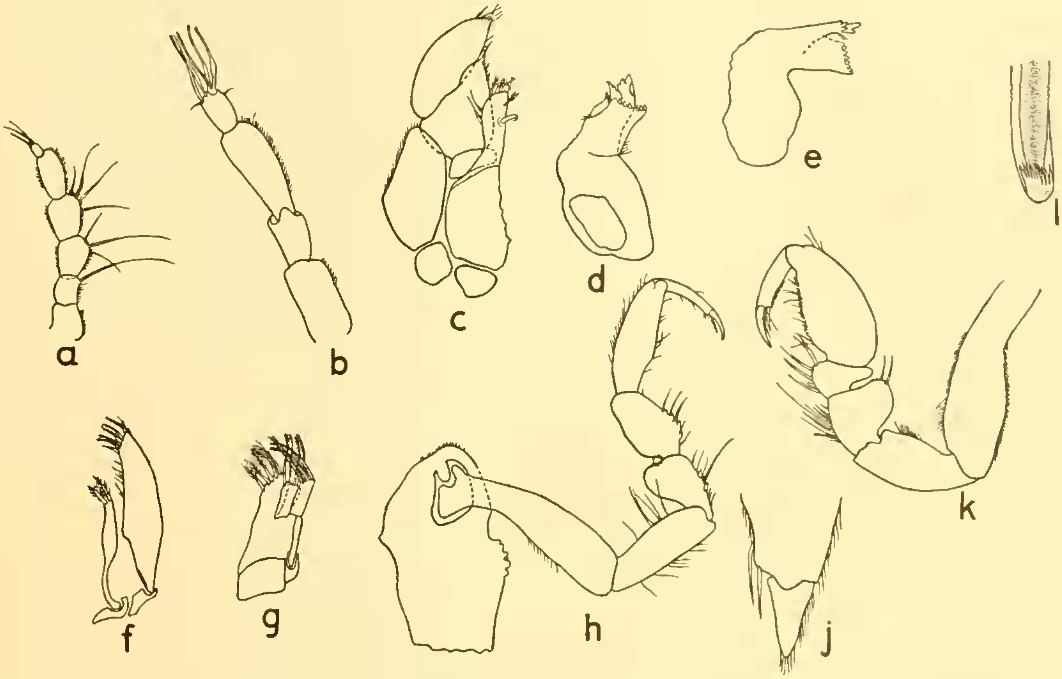
The pereion somites in the male are subequal in length, except for the first which is only half the length of the second. They are all supplied with well-developed pleura which, in the first four somites, overhang the bases of the limbs. In the last three they are fused with the dorsal extensions of the coxal plates of their respective limbs. The posterior half of each somite is raised in a pronounced transverse ridge, which extends over the complete width of the somite and its pleura. The crests of the ridges are rounded and give the animal a corrugated appearance when viewed from the side. Each pleuron is broad, being a little over half the width of the tergum from which it is separated by a slight groove; a further groove is present on the pleuron itself. In the hinder three somites these grooves represent the line of fusion of the pleura with the coxal plates.

The pleura, the outer margins of which are rounded, are curved slightly forwards on the first three pereion somites, on the fourth they are straight and the posterior three are directed slightly backwards. In the female (Plate VIII, fig. 2) the first five pereion somites are considerably broader than those of the male and are strongly arched, but the arrangement of the ridges and grooves is similar in both sexes. The form of the coxal joint and its outgrowths has been considered in the introduction to the genus (p. 155).

The abdomen, which is somewhat elliptical in shape and slightly broader in the female than in the male, is about a third of the length of the body; its posterior tip is rounded. A small anterior segment is indicated by a transverse groove. Behind this groove the whole of the dorsal surface is elevated, but the anterior third is separated by a fairly deep groove from the posterior part. In the anterior third the raised area forms a large central protuberance with a smaller one on either side of it.

The *antennules* (Text-fig. 10*b*) are longer than the antennae. The peduncle consists of three joints, the middle one of which is the shortest and the distal one the longest. The flagellum consists of a single joint, about half the length of the third peduncular joint; it bears at its distal extremity five or six sensory setae, three of which arise together from what may be regarded as a minute second joint.

The *antenna* (Text-fig. 10*a*) is extremely short, its five peduncular joints are not much longer than broad; the flagellum, which consists of a single joint, is very small, only about a third of the width of the fifth joint of the peduncle, and less than a third of its length; it bears three long setae at its distal extremity.



Text-fig. 10. *Edotia corrugata* sp.n. (*a*) Antenna, × 50. (*b*) Antennule, × 50. (*c*) Maxilliped (right), × 50. (*d*) Left mandible, × 50. (*e*) Right mandible, × 50. (*f*) Maxillula (left), × 50. (*g*) Maxilla (left), × 50. (*h*) Second pereiopod (with coxa), × 30. (*j*) Distal portion of protopodite and endopodite of uropod, × 20. (*k*) First pereiopod, × 20. (*l*) Appendix masculina.

The *maxillula* (Text-fig. 10*f*) is of the usual type; the truncated end of the outer lobe bears six or seven pectinate setae and the delicate inner lobe bears two strong plumose ones. Both the outer and middle lobe of the maxilla (Text-fig. 10*g*) bears five pectinate apical setae; the fixed inner lobe has three delicate and three strong plumose setae on its truncated extremity. The form of the cutting edges of the *mandibles* and the *maxillipeds* can be seen from Text-fig. 10*c*, *d* and *e*.

All the *pereiopods* are prehensile, the anterior four pairs are directed forwards, the posterior three pairs backwards; the first pair (second thoracic) (Text-fig. 10*f*) is shorter and stouter than the remaining ones, and is subchelate. The propodus is broad and bears, on its inner margin, a double row of short, closely set spines; the dactylus is also armed with a row of short spines. The remaining six pairs are all very similar to each other, both in form and size (Text-fig. 10*h*).

The second pair of *pleopods* is modified in the male, the appendix masculina is long and its distal extremity (Text-fig. 10*l*) is hollowed out on its inner side, the edge being armed with eight or nine spines.

The protopodite of the *uropod* is hollowed out, so that when viewed from the ventral side of the body the uropods together form a convex surface. The inner margin of the protopodite is bent upwards to form a dorsally directed flange which is continuous with a similar one on the endopodite. The endopodite (Text-fig. 10*j*) is nearly twice as long as it is broad.

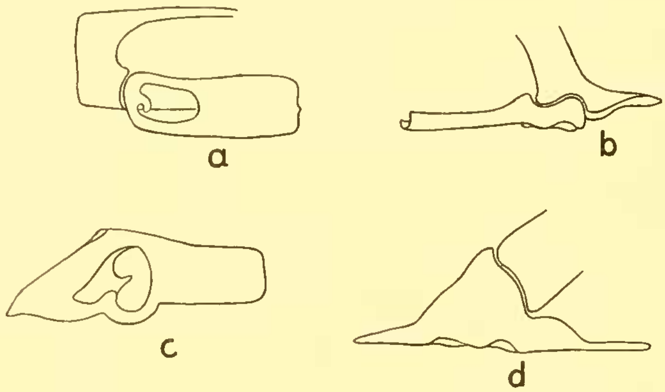
DISTRIBUTION. The specimens were collected at 49° 28′ 25″ S., 66° 29′ 00″ W., that is to say, in an area of shallow water outside the Antarctic Convergence, off the coast of the southern part of South America.

Subfamily GLYPTONOTINAE Miers, 1881

This subfamily was instituted by Miers (1881) to contain the single genus *Glyptonotus* with its five species: *G. antarcticus* Eights, *G. entomon* Linn., *G. sabini* Kroyer, *G. caecus* Say and *G. tuftsii* Stimpson.

The diagnostic characters of the subfamily were: 'Sides of the head emarginate or cleft and laterally produced beyond the eyes, which thus are situated upon its dorsal surface. The three anterior pairs of legs with the penultimate joint or propodus dilated and forming with the reflexible dactylus a prehensile hand. Species more or less ovate.'

At the present time the only species from the above list remaining in the genus is *G. antarcticus*, but a new species *G. acutus* Richardson was added in 1906, and new genus *Symmius*, with one species *S. caudatus* by Richardson in 1904. The diagnostic character, 'sides of head emarginate or cleft', no longer holds for this subfamily. Although Collinge (1916, p. 114) used this character as diagnostic in separating the two genera, in a later paper (1918, p. 64) he pointed out that the margins are entire both in the existing species of *Glyptonotus* and in *Symmius caudatus*.



Text-fig. 11. *Glyptonotus antarcticus*. (*a*) Ventral view of coxa and plate of second pereiopod and a portion of the tergum, × 2. (*b*) Posterior view of (*a*). (*c*) Ventral view of sixth coxa and plate, × 2. (*d*) Posterior view, showing the relationship with the tergum.

Nordenstam (1933, p. 103), in his diagnosis of the subfamily, mentioned that the coxal plates are 'marked off by dorsal sutures on the last three pereion segments'. It is strange that he makes no reference to the coxae of the anterior segments until his discussion on the affinities of the subfamily Macrochiridotheinae; here, on p. 110, he says 'the coxae on these segments are very small in *Glyptonotus*, though distinctly delimited from the segments'. This is an important point, since most authors state that the coxal plates of the anterior thoracic somites are completely fused with their respective somites. Actually, the terga of the second to the fifth thoracic somites inclusive are produced into broad pleura which extend laterally over the bases of the limbs (Text-fig. 11*b*). On the ventral surface of these somites each coxal joint is clearly defined, its outer margin is ring-like, and except for that of the second, is separated from the ventral surface of the pleuron by a suture. The inner part of the joint is produced as a coxal plate which partly covers the ventral integument and extends almost to the mid-ventral line (Text-fig. 11*a*). In the hinder three somites the pleura are replaced by coxal plates which extend on to the dorsal surfaces of their respective somites. As in the anterior somites, coxal plates also extend from the inner borders of the joints to the mid-ventral line; those of the last segment in species of *Glyptonotus* are fused together (Text-fig. 11*a*).

According to Richardson (1904, pp. 39–40) *Symmius caudatus* has 'epimera present and developed on only the last three segments of the thorax as in *Glyptonotus* Eights, the epimera of the three anterior segments being perfectly united with the segments and with no trace of suture lines'. If this statement were true, there would be an important morphological difference between these two genera, but an examination of the British Museum specimen shows that this statement is incorrect, the form of the coxa is the same in both genera.

Genus **Glyptonotus** Eights, 1852

Glyptonotus antarcticus Eights, 1852 (Plate IX, figs. 1–5; Text-fig. 11*a–d*)

G. antarcticus Eights, 1852, pp. 331–4, 2 pls.; Miers, 1881, p. 11; Pfeffer, 1887, pp. 115–25, pl. 2, fig. 7; pl. vi, figs. 13–27; Tait, 1917, p. 246, 22 text-figures; Collinge, 1918, p. 65, pls. 1, 2, figs. 1–12; Tattersall, 1921, pp. 232–3; Calabrese, 1931, pp. 323–6, 2 text-figures; Monod, 1931, p. 27; Nordenstam, 1933, pp. 104 and 110.

G. antarcticus var. *acutus* Tattersall, 1921, pp. 233–5, pl. ix, figs. 3, 4; Pesta, 1928, pp. 78 and 81; Calabrese, 1931, pp. 323–6; Nordenstam, 1933, p. 104.

G. acutus Richardson, 1906, p. 10, pl. 1, figs. 2–4; Hodgson, 1910, p. 45, pl. vii; Richardson, 1913, p. 17; Vanhoffen, 1914, p. 527.

Occurrence. St. 141, 29. xii, 26, East Cumberland Bay, South Georgia, 17–27 m., 1 ♂ and 1 ♀ (non-breeding). Jan. 1927, Borge Bay, South Orkneys, fish trap, 1 ♂. St. 164: 18. ii. 27, East end of Normanna Strait, South Orkneys, 24–36 m., 1 ♂, 2 immature. St. 178: 9–11. iii. 27, Melchior Harbour, Schollaert Channel, Palmer Archipelago, 17 m., 1 ♂. 1927, Admiralty Bay, King George Island, South Shetlands, brought up on anchor chain, 1 ♂. 28. x. 28, King Edward's Point, South Georgia, picked up on beach, 1 ♂. St. 366: 6. iii. 20, 4 cables south of Cook Island, South Sandwich Islands, 155–322 m., 1 immature specimen; 77–152 m., 3 immature and 1 immature ♂. St. 370: 10. iii. 30, 2 miles north-east of Bristol Island, South Sandwich Islands, 80–18 m., 1 ♀ (non-breeding). St. 371 14. iii. 30, 1 mile east of Montagu Island, South Sandwich Islands, 99–161 m., 2 immature specimens, 99–161 m.: ♀ (breeding), 1 ♀ (non-breeding) and 2 ♂♂. 17. ii. 31, Leith Harbour, South Georgia, 5 m., from fish stomach, probably from *Notothenia rossii*, 1 incomplete ♂. St. 1489: 17. i. 35, Port Lockroy, Palmer Archipelago, found on motor-boat at anchor. St. 1652: 23. 1. 36, 75° 56·21′ S., 178° 35·5′ W., 567 m., 1 ♀ (non-breeding). St. 1941: 29. xii. 36, Leith Harbour, South Georgia, 38 m., 2 young specimens. St. MS 25: 13. iv. 25, East Cumberland Bay, South Georgia, 36 m., 1 immature ♂.

Remarks. The only additional points of interest concerning the anatomy of this species have already been dealt with in the general discussion on the characters of the suborder Valvifera and the subfamily Glyptonotinae (pp. 148–164).

The separation of *G. acutus*, even as a variety from *G. antarcticus*, seems to be a matter of great difficulty, if a series of specimens is examined; for it is almost impossible to draw a dividing line between the types, the grading is so complete.

The species *G. acutus* was formed by Richardson (1906) to contain a type which differed from *G. antarcticus* only in proportion. According to Richardson the length of the body of *G. antarcticus* is less than twice as long as it is broad, and the terminal segment is broader than long; on the other hand, the length of *G. acutus* is two and a half times its breadth, and the terminal segment is longer than broad (10–6 mm.). Richardson obtained the proportions given for *G. antarcticus* from the published descriptions and figures of Eights (1852), Miers (1881) and Pfeffer (1887); Miers's description is based on that of Eights, and he gives the size of a specimen as length 90 mm., breadth 45 mm., a ratio of 2:1; a similar ratio is obtained by measuring Pfeffer's figures.

Measurements taken from Richardson's specimen of *G. acutus* show a ratio of length to breadth of 2·1:1 and not 2·5:1, so that the actual difference in the length: breadth ratio of the two species is very small.

The terminal segment of *G. antarcticus* in Eights's figure is certainly slightly broader at the base than it is long, but measurements taken from Pfeffer's figure show a ratio of length to breadth of 1·16:1; in other words, Pfeffer found that the terminal segment was longer than broad. The length to breadth ratio of the terminal segment of Richardson's *C. acutus* is 1·66:1. From these facts it is obvious that the differences between the two species stressed by Richardson are not as marked as she supposed.

The differences between the species have also been discussed at some length by Tattersall (1921) and further by Calabrese (1931), and both authors agree that the two forms represent varieties of a single species and not two distinct species.

Tattersall pointed out the inaccuracy of Miss Richardson's statements of the dimensions of the two species. There is one point in connexion with his remarks which needs correction; in referring to the measurements of Pfeffer's figure, he said (p. 234) that 'the metasome is 1·16 times as long as broad'. 'Metasome' should read 'terminal segment'; the ratio of length to breadth of the metasome is 1·3:1. Tattersall also drew attention to the differences in the proportions of the joints of the posterior limbs of the two varieties, the limbs of *G. antarcticus* being shorter and broader than those of *G. acutus*.

An examination of a number of specimens in the Discovery collections showed that the ratio of body length to breadth, and metasome length to breadth did vary within a comparatively narrow range, and this was most marked in the case of a specimen collected in deeper water (567 m.); the ratio of the most typical 'antarcticus' specimen, however, was linked by a number of intermediate types with the 'acutus' form (Plate IX, fig. 2).

Table I, which includes measurements of specimens described by other authors as well as of some from the Discovery collections, brings out this feature very clearly. In Table I the ratio of carpus length to propodus length is not given, the carpus being either equal to, or slightly longer than, the propodus.

Apart from the localities cited above, *G. antarcticus* has been recorded by Monod (1931) from South Georgia, and Nordenstam from Cumberland Bay, South Georgia (the specimen was dead and found far up the shore).

G. acutus is recorded from South Georgia (Pesta, 1928) from Gauss Station (Vanhoffen, 1917), from Seymour Island, off Graham Land, and off Paulet Island, Graham Land (Nordenstam, 1933) in 100–150 m. The specimens (18 in number) obtained from Seymour Island were living and collected on the ebb-shore.

Table 1 shows:

(1) That a number of specimens described as *G. antarcticus* have the same body ratio as the type *G. acutus*.

(2) That the difference in the body ratio between a typical specimen of *G. antarcticus* and the type specimen of *G. acutus* is considerably less than between the latter and the most 'acute' form.

(3) That the metasome ratio obtained from Eights's figure is probably inaccurate, because measurements taken from other specimens show the length of the terminal segment to be greater than the breadth, indicating that the difference between Richardson's *G. acutus* and a typical specimen of *G. antarcticus* is less than she supposed.

(4) That the limb joints as exemplified by the carpus, propodus and dactylus of the last pair of thoracic limbs are longer and narrower in the more 'acute' forms.

(5) That, excluding Richardson's type specimen, the more 'acute' forms tend to occur in slightly deeper water.

(6) That both 'species' have a similar distribution, both occurring within the Antarctic Convergence; the majority of specimens have been collected between 25 and 65° W.

Table 1

Author	*Ratio of body length:breadth*	*Ratio of metasome length:breadth*	*Depth at which specimens were were obtained*	*Remarks*
Tattersall	2·2:1 (small) to 1·9:1 (large) Length of specimens from 20 to 59 mm.	1·5:1 to 1·2:1	Less than 27 m.	From measurements given. Joints of last thoracic limb. Carpus length to breadth, 2·24:1. Propodus length to dactylus length, 2:1. *G. antarcticus*, Cumberland Bay, South Georgia
Pfeffer	2:1 Length 62 mm.	1·3:1	?	From figure, *G. antarcticus*, South Georgia
Collinge	2:1 Length 88 mm. Breadth 43 mm. (♂ specimen)	1·48:1	16–27 m.	From figure, *G. antarcticus*, Graham Land
Sheppard	1·9:1 Length 89 mm. Breadth 46 mm. (♂ specimen)	1·49:1	24–36 m.	From specimen, *G. antarcticus*, see Pl. IX, 3. Joints of last thoracic limb. Carpus length to breadth, 2·7:1. Propodus length to dactylus length, 2:1. South Orkneys, near Cape Hansen, Coronation Island
	2:1 (small) Length 8 mm. Breadth 4 mm. (immature specimen)	1·8:1		
Eights	1·9:1	1·07:1		From figure, *G. antarcticus* (type). South Shetland Islands
Miers	2:1	—	—	From measurements given, *G. antarcticus* (Eights)
Sheppard	1·97:1 Length 63 mm. Breadth 32 mm. (♀, non-breeding)	1·5:1	17–27 m.	From specimen, *G. antarcticus*, see Pl. IX, 1. Joints of last thoracic limb. Carpus length to breadth, 3:1:1. Propodus length to dactylus length, 2:1. East Cumberland Bay, South Georgia
Calabrese	2·1:1	1·5:1	?	From photograph, *G. antarcticus*
Sheppard	2:1 Length 118 mm. Breadth 58 mm. (♂ specimen)	1·61	Fish trap? 17 m.	From specimen, *G. antarcticus*, see Pl. IX, 5. Joints of last thoracic limb. Carpus length to breadth, 2·5:1 (dactylus missing). Borge Bay, South Orkneys
Richardson	2:1	1·66:1	Shore to 36 m.	From figure, type specimen, *G. acutus*, Graham Land
Sheppard	2·16:1 Length 91 mm. Breadth 42 mm. (♂ specimen)	1·67:1	77–152 m.	From specimen, *G. antarcticus*. Joints of last thoracic limb. Carpus length to breadth, 2·57:1. Propodus length to dactylus length, 2:1. Off South Sandwich Islands
Sheppard	2·23:1 Length 105 mm. Breadth 47 mm. (♂ specimen)	1·8:1	99–161 m.	From specimen, *G. antarcticus*, see Pl. IX, 4. Joints of last thoracic limb. Carpus length to breadth, 3:1. Propodus length to dactylus length, 2:1. East of Montagu Island, South Sandwich Islands
Hodgson	2·27:1 Length 119 mm. Breadth 42 mm. (♂ specimen)	1·8:1	36–225 m.	From figure, *G. acutus*, Victoria Land
Tattersall	2·45:1 (small) to 2·2:1 (large) Length 20–99 mm. (♂ and ♀ specimen)	2·1:1 to 1·55:1	81–540 m.	From measurements given, *G. acutus*. Joints of last thoracic limb. Carpus length to breadth, 5·25:1. Propodus length to dactylus length, 1·17:1. McMurdo Sound, etc.
Sheppard	2·4:1 Length 53 mm. Breadth 22 mm. (♀ non-breeding)	1·88:1	567 m.	From specimen, *G. antarcticus*, see Pl. IX, 2. Joints of last thoracic limb. Carpus length to breadth, 5:1. Propodus length to dactylus length, 1·6:1. 75° 56′ 2″ S., 178° 35′ 5″ W.

Note. Sex and measurements not given by authors in some cases.

The most 'acute' forms recorded by Hodgson (1910) and Tattersall (1921) and some in the Discovery collections were obtained from deeper water, between 165 and 175° E.

In reviewing the above facts, including an examination of the series of specimens illustrated on Plate VIII, I have come to the conclusion that it is impossible to separate *G. acutus*, even as a variety, from *G. antarcticus*. The individuals representing the opposite ends of the series appear markedly different in proportion, but when the intermediate forms are introduced, the differences become comparatively small. Apart from these differences in the adult individuals, the young are usually more acute than the adult.

Glyptonotus antarcticus appears to be a species which is in an unstable condition; it is a typical shallow-water form which may be invading deeper water. It is possible that it represents a species which is susceptible to the influence of its environment, and that the two forms, though having the same distribution may live in different habitats, dependent, for example, upon the kind of substratum on which they live; there may be a certain amount of overlapping between the two.

There is one further point to which reference must be made, namely, the *relative* size at which the male reaches maturity. Tattersall (1921, p. 235) states that *G. acutus* appears to mature later than *G. antarcticus*. In a specimen of the latter measuring 58 mm. in length, the appendix masculina on the second pleopod as well as the penial appendages were developed, whereas a male of *G. acutus*, measuring 62 mm. was still without the appendix masculina. The least 'acute' specimen in the Discovery collections, though 10 mm. longer than Tattersall's specimen referred to above, has the penial appendages present, but the second pleopod has no appendix masculina; a more 'acute' form measuring 82 mm. in length was also without an appendix masculina. It is possible that the more acute forms mature later, but there appears to be a certain amount of individual variation.

Subfamily Macrochiridotheinae Nordenstam, 1933 (Text-figs. 12, 13)

This subfamily was instituted by Nordenstam (1933, p. 104) to contain two genera, *Macrochiridothea* Ohlin and *Chiriscus* Richardson, with a possible third genus, *Chaetilia* Dana. A review of the characters on which the diagnosis of the subfamily is based, shows a number of inaccurate observations.

(1) The antennule is said to be longer than the antenna. This is true for *Chiriscus australis* Richardson, but not for the species of *Macrochiridothea*; the antenna is longer in both *M. stebbingi* Ohlin (fig. 12*a*, *d*), and *M. kruimeli* Nierstrasz (fig. 13*f*, *g*), and measurements taken from Ohlin's figures show that this is also true for *M. michaelseni* Ohlin.

(2) 'Coxal plates marked off by dorsal sutures on the last three segments of the pereion, those on the second to the fourth segments distinctly delimited from the tergites, but not visible from above.' The first part of this statement is correct, but, as far as the species of *Macrochiridothea* are concerned, there are no coxal plates developed on the outer margins of the coxal joints of the limbs of the second, third and fourth pereion segments; the joints themselves are seen in lateral view.

(3) The abdomen is said to be built up of 'three free abdominal segments anteriorly from the pleotelson'. According to Richardson's description (1911, p. 169) of *Chiriscus australis*, the abdomen consists of three segments only, two short ones anterior to the long terminal one. In both *Macrochiridothea stebbingi* and *M. kruimeli*, a fourth segment is present which is free laterally, but fused in the centre with the pleotelson (Text-fig. 13*a*).

(4) '*Maxillipeds* with a three-jointed palp.' This is so in *Chiriscus australis* if Richardson's figure of this appendage is accurate (she shows no endite to the basipodite), but in *Macrochiridothea stebbingi* and *M. kruimeli* four are present (see Text-figs. 12*e*, 13*e*).

In his discussion on the position of this subfamily amongst the Idoteidae, Nordenstam stresses the systematic value of the morphology of the coxal plate; he points out that the type of plate found in members of the Macrochiridotheinae does not occur in members of the other subfamilies. I cannot agree with this statement, for, in some of the species of *Edotia* belonging to the subfamily Idotheinae, coxal plates are developed on the coxal joints of the last three pairs of thoracic limbs and these extend on to the dorsal surface where they are separated from their respective terga by sutures. The coxal joints of the second, third and fourth pairs of pereiopods can be seen in lateral view of *Edotia*, as well as in the species of *Macrochiridothea*. In *Glyptonotus* (subfamily Glyptonotinae), a similar arrangement occurs, but the bases of the limbs of the first four pereion somites are hidden by the development of the pleura. As has already been pointed out, in members of all the subfamilies coxal plates are developed on the inner sides of the coxal joints; these cover the ventral surfaces of their respective somites, and meet and sometimes fuse in the mid-ventral line.

A character peculiar to the species of *Macrochiridothea* is that the coxal joint of the first pereiopod is only partially fused with the tergum of its somite; a similar condition can be observed, though to a less extent, in *Pseudidothea bonnieri* Ohlin.

It is difficult to understand why Nordenstam placed the two genera *Chiriscus* and *Macrochiridothea* together in a new subfamily, the only character which they have in common being the 'markedly subchelate (seroliform)' first pereiopods. The second and third pairs in the species of *Macrochiridothea* are prehensile, but considerably weaker than the first pair, whereas in *Chiriscus australis* the second and third pairs are not prehensile, and are very similar to the fourth, fifth and seventh pairs. According to Richardson (1911, p. 169), the sixth pair of legs is much longer than the others and is the only pair in which a dactylus is present.

The genus *Macrochiridothea* appears to be more closely allied to *Mesidotea* than to any other form. The two genera have the following characters in common:

(1) The head is laterally expanded, and the lateral margins are cleft.

(2) The eyes when present are dorsal and submarginal.

(3) The antennule is shorter than the antenna and its flagellum consists of one or two joints.

(4) The first three pairs of pereiopods are prehensile. In *Macrochiridothea* the first pair is markedly subchelate (seroliform) and the second and third pairs are considerably weaker, whereas in *Mesidotea* the three pairs are approximately of equal size. The remaining pairs of limbs are ambulatory.

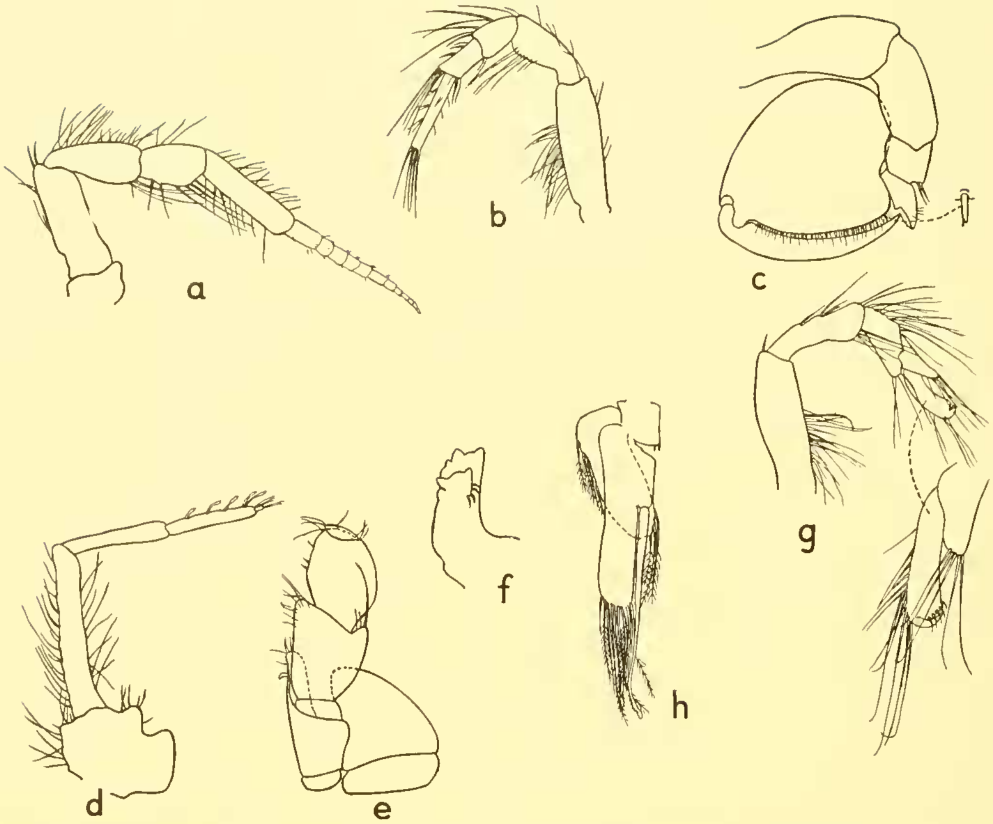
(5) The abdomen consists of four free segments (fourth partially fused with the pleotelson in *Macrochiridothea*) and a pleotelson.

(6) Uropods with both an exopod and an endopod; the former in *Mesidotea* is always more or less rudimentary.

The two genera differ from each other in the number of joints to the maxillary palp; this number is five in *Mesidotea* and four in *Macrochiridothea*. They also differ in the coxal joints of the pereiopods, which in *Mesidotea*, with the exception of the first, are expanded into coxal plates which extend on to the dorsal surface and are separated from their respective terga by sutures; in *Macrochiridothea* these plates are only developed on the last three pairs of pereiopods; they also are separated from their respective terga by sutures.

The family Idoteidae is in much need of revision; its members, taken as a whole, are closely related to each other, consequently it is difficult to select the morphological characters on which a classification should be based.

Whether or not the two genera *Chiriscus* and *Macrochiridothea* should remain together in the subfamily Macrochiridotheinae is doubtful, but it seems wisest to leave them in their present position until a revision of the whole family can be undertaken.



Text-fig. 12. *Macrochiridothea stebbingi*. (*a*) Antenna, ×20. (*b*) Third pereiopod, ×12. (*c*) First pereiopod, ×12. (*d*) Antennule, ×20. (*e*) Maxilliped (left), ×30. (*f*) Cutting edge of left mandible, ×30. (*g*) Second pereiopod, ×12. (*h*) Second pereiopod, ×17.

Genus Macrochiridothea Ohlin, 1901

Macrochiridothea stebbingi Ohlin, 1901 (Text-fig. 12, *a–h*)

Macrochiridothea stebbingi Ohlin, 1901, pp. 289–91, pl. xxii, fig. 9.

M. stebbingi var. *multituberculata*, Nordenstam, 1933, pp. 106–8 and 112, pl. 1, fig. 7.

Occurrence. St. WS 88: 6. iv. 27, 54° 00′ 00″ S., 64° 57′ 30″ W., 118 m., 1 ♀. St. WS 772: 30. x. 31, 45° 13′ S., 60° 00′ W. to 45° 13·8′ S., 60° 00·5′ W., 309–162 m., 5 specimens, 1 ♀ (non-breeding).

The genus has the characters of the subfamily.

The largest specimen in this collection is a female measuring 9·5 mm. in length and 4 mm. in greatest breadth; the tubercles on the dorsal surface of the body, though similar in distribution, were less pronounced than those on the remaining specimens.

This species was first described by Ohlin (1901, p. 289) from a single female measuring 7 mm. in length. In this description he stated that the head is nearly as long as the first three segments of the mesosome, and that the pereion segments are of 'about the same length', but his figure (pl. xxii, 9*a*) shows the second pereion somite to be twice as long as the middle of the first, and the lateral margins of the first about three times the length of its centre. Assuming that Ohlin's figure is inaccurate, then the length of the middle of the first pereion somite should be doubled to make it equal to that of the second somite. This would result in a reduction in the ratio, length of the middle of the somite: its lateral margins, i.e. from 1:3 to 1:1·5; this change would bring the proportions more or less into line with those given by Nordenstam for his variety *multituberculata*, and also with the specimens in the Discovery collections. If the length of the central part of the head in Ohlin's figure was shortened to allow for the necessary increase in the length of the first pereion segment, this would lessen the amount of immersion of the head in that segment and then it would conform to Nordenstam's variety. The general shape of this variety agrees with 'that of the main species', but its posterior part is 'not so deeply immersed into the first segment of the pereion as is the case in the main species'.

The extreme similarity between the main species and the variety *multituberculata* suggests that the above assumption is correct, especially when the remaining differences described by Nordenstam are reviewed:

(1) The eyes of *M. stebbingi* are described as small and black while in Nordenstam's variety they are totally lacking. A very small amount of pigment is present in the eyes of some of the specimens in the Discovery collections, in others it is absent and the eyes are almost invisible. The presence or absence of a small amount of pigment appears to be a variation within the species.

(2) Nordenstam described nine tubercles on each of the first four pereion segments, whereas in the main species there are only seven. In specimens of the Discovery collections, the same arrangement of tubercles is found, but one pair is very small and may easily have been overlooked by Ohlin, especially as his specimen was only 13 mm., a little over half the length of Nordenstam's.

(3) In the variety *multituberculata*, the second peduncular joint of the antennule is longer than the combined length of the third one and the flagellum, whereas, according to Nordenstam (1933, p. 112) in the main species it is only as long as the third peduncular joint plus half the length of the flagellum. Ohlin says that the second joint is nearly equal in length to the combined lengths of the third peduncular joint and the flagellum, but figures it considerably longer. In the specimens of the Discovery collections the length of the second joint is less than that of the third and flagellum together (Text-fig. 12*d*). The flagellum bears an extremely short terminal joint similar to that noted by Nordenstam.

Nordenstam admits that the characters on which he based his new variety may represent individual variations within the species, and I am convinced that this is so. I have therefore included the variety *multituberculata* in the species *M. stebbingi*.

There are certain other points which require clearing up in both Ohlin's and Nordenstam's descriptions; both authors state that the antennule is longer than the antenna, yet measurements of the two appendages show that this is not so (see Text-fig. 12*a*, *d*). The apparent shortness of the antenna is due to the sharpness of the angle between the second and third peduncular joints.

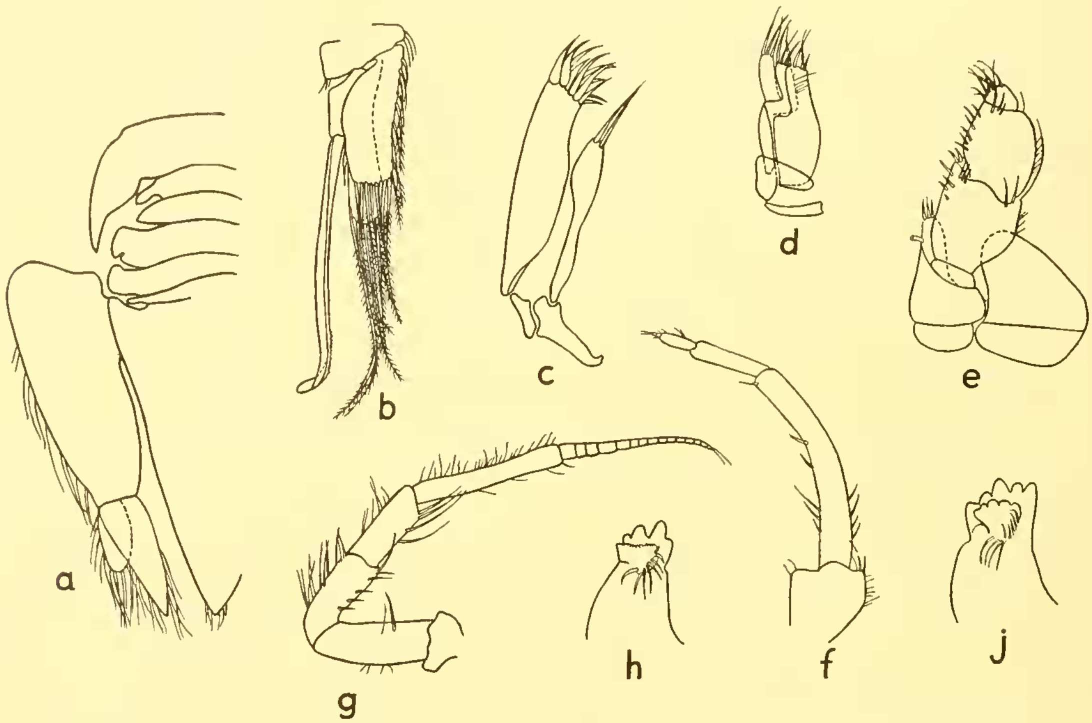
Ohlin gives the number of joints of the palp of the maxilliped as three, and Nordenstam says that the maxillipeds of his variety *multituberculata* are 'as in the main species'. Actually there are four joints to the palp (Text-fig. 12*e*), the first one of which is short.

According to Ohlin the abdomen consists of four free segments and a telson, while Nordenstam describes the abdomen of his variety as being built up of three free segments and a pleotelson. In specimens of the Discovery collections there are four segments and a telson, but the fourth segment is only free laterally (see Text-fig. 13*a* of *M. kruimeli*, in which a similar arrangement occurs). From this figure it can be seen that the last thoracic somite is very small and has much reduced coxal plates; that the first abdominal segment, which is normally hardly visible in a dorsal view of the animal, bears practically no pleural extensions; that these extensions are well developed on the second and third segments, where they are bent downwards laterally at a sharp angle; and that the fourth segment is very narrow, and fused in the mid-dorsal region with the telson, but is free laterally and bears delicate pleural processes.

Nordenstam's statements concerning the abdomen are extremely confused. On p. 111 he says that 'the first two segments are bent downwards laterally in a sharp angle to the dorsal surface. Their posterior angles are pointed and directed backwards. The third segment is enclosed by the second and the pleotelson; laterally, it is not bent downwards, unlike the other two free segments.'

It seems probable that Nordenstam overlooked the presence of the first segment, since his description more or less applies to the second, third and fourth segments; this would explain his statement that the abdomen consists of three free segments and a pleotelson. The form of the limbs have been described by Ohlin (1901, p. 291 and pl. xxii, figs. 9, pl. 1, *p. 2*, and *p. 5*); as his figures of these limbs are very small, some have been illustrated in the present paper (Text-fig. 12*b*, *c* and *g*). The second pair of pleopods is modified in the male (Text-fig. 12*h*).

Distribution. Ohlin's specimen was collected from between Isla Neuva and Navarino, in 30 fathoms of water; specimens have also been collected at Port Harriet, Falkland Islands (Stebbing, 1914), and from rocks at Port Williams, Falkland Islands (Nordenstam, 1933). Specimens in the Discovery collections came from some distance north of Le Maire Strait, South America, and also from waters due north of the Falkland Islands.



Text-fig. 13. *Macrochiridothea kruimeli.* (*a*) Left half of last two pereion somites, abdominal segments, telson and left uropod, × 5. (*b*) Second pleopod, ♂, × 17. (*c*) Maxillula (right), × 30. (*d*) Maxilla (right), × 60. (*e*) Left maxilliped, × 30. (*f*) Antennule, × 25. (*g*) Antenna, × 25. (*h*) Cutting edge of left mandible. (*j*) Cutting edge of right mandible.

Macrochiridothea kruimeli Nierstrasz, 1918 (Text-fig. 13*a–j*)

M. kruimeli, Nierstrasz, 1918, pp. 130–2, figs. 13, 54–64; Nordenstam, 1933, p. 112.

Occurrence. St WS 809: 8. i. 32, 49° 29′ S., 66° 21′ W., 107–104 mm., 2 ♂♂.

The larger of the two specimens in the Discovery collections is a male measuring 8 mm. in length and 3 mm. in greatest breadth. This is approximately half the size of the female described by Nierstrasz, the length: breadth ratio of which was 5:2. The corresponding ratio of the male is 5·2:2, so that the female is slightly broader in proportion to its length than is the male.

The Discovery specimens agree in most details with the description given by Nierstrasz.

The eyes are very small and contain a little pigment. A few short hairs are present along the anterior margin of the head; these were not present on Nierstrasz's specimen. In the type specimen, the length of the head is said to be as great as that of the second and third thoracic (first and second pereion) somites together, but a measurement taken from Nierstrasz's photograph of this specimen (Plate IX, fig. 13) shows that the length of the two somites together is undoubtedly the greater, and in this it agrees with the specimens in the Discovery collections.

The form of the coxal joint has already been dealt with under the characteristics of members of the subfamily; the abdomen is illustrated in Text-fig. 13*a*, the only point in which it differs from the description of the type specimen is in having the middle part of the fourth segment fused with that of the telson.

The antenna (Text-fig. 13*g*) is considerably longer than the antennule (Text-fig. 13*f*), and its flagellum consists of fifteen joints, the first of which is the longest. In Nierstrasz's specimen the flagellum, which he says was probably broken, exhibited eight joints. The form of the cutting edges of the mandibles (Text-fig. 13*h*, *i*) does not agree with Nierstrasz's description. The left mandible has, in addition to the five teeth on the lateral edge and four on the median, nine curved spines. The right mandible is very similar to that of *M. stebbingi*, the median lobe, which is said to be straight in the type specimen, is finely crenulated and eight curved spines are present on its inner side.

The inner lamella of the maxillula (Text-fig. 13*c*) which is missing in the type specimen, is slightly expanded distally and bears two plumose setae; the maxilla (Text-fig. 13*d*) differs from the type specimen in having three instead of five spines at the distal end of the outer lamella.

The maxilliped (Text-fig. 13*e*) is very similar to that of *M. stebbingi*, and has, like that species, four joints to the palp. The modification of the second pleopod in the male is shown in Text-fig. 13*b*, the form of the uropods in Text-fig. 13*a*.

Distribution. The type specimen was collected by Dr J. H. Kruimel from waters off Punta Arenas on the east coast of the southern tip of Chile; the specimens in the Discovery collections come from an area between the Falkland Islands and the mainland of South America, but considerably nearer to the latter.

Family Pseudidotheidae, Ohlin

The members of this family, consisting of three genera *Arcturides* Studer, *Pseudidothea* Ohlin and *Holidotea* Barnard, are intermediate in position between those of the Idoteidae on the one hand and the Astacillidae on the other, that is to say, they possess the idoteid shape and the form of the first four pairs of pereiopods with the astacillid uropod and modified first male pleopod.

The diagnostic characters of the family are given by Ohlin (1901, p. 274), and reference is also made to them by Barnard (1920, p. 381), Nordenstam (1933, p. 113) and Hale (1946, p. 168).

Ohlin (1901), in his diagnosis of the family, stated that the peduncle of the antenna consisted of four joints. Studer (1884), in his description of *Arcturides cornutus*, also gave this number; in *Holidotea*, however, there are five (Barnard, 1920). Nordenstam (1933, p. 113) considered that in *Pseudidothea* the peduncle is better described as consisting of five joints, but that the first joint 'is indistinctly marked off on the ventral side from the second' (cf. Ohlin, 1901). I have examined specimens of both *P. bonnieri* Ohlin and *P. scutatus* (Stephensen) and find that five joints are present. Hale (1946) described a new species, *Arcturides tribulis*, which is very similar to *A. cornutus* Studer, and he gave the number of joints of the peduncle as five. In the Discovery collections in another species, *A. acuminatus*, there is a five-jointed peduncle. It would appear that Studer's observation on this point is incorrect, and that a five-jointed peduncle to the antenna is common to all members of the family so far described. According to Hale (1946, p. 168), the only characters separating the genera *Pseudidothea* from *Arcturides* are (1) the number of joints to the flagellum of the antenna which are two in the former and three in the latter genus; (2) the 'secondary ramus' of the uropod is as long as the 'lateral ramus' in *Arcturides*, whereas in *Pseudidothea* the 'secondary ramus' is only about three-quarters the length of the 'lateral ramus'; and (3) the coxae are distinctly marked off on the second to the seventh pereion somites in *Arcturides*, whereas in *Pseudidothea* they are developed as not very distinct rings around the basis of the second to fifth pereiopods.

Hale's third point requires some amplification. In the species of both *Pseudidothea* and *Arcturides*, the coxal development of the *first* four pairs of pereiopods is exactly similar, the coxal joints of the second, third and fourth pereiopods can be seen in a lateral view of the animal as small rings which, on their inner sides, extend as flat coxal plates over the ventral surface of their respective somites as far as the mid-ventral line. The coxal joint of the first pereiopod is fused with tergum, but its coxal plate does not fuse with that of its fellow in the mid-ventral line.

In the species of *Arcturides* the coxae of the *last* three pairs of pereiopods are fused with the terga of their respective somites, but the suture lines are visible; ventrally the coxal plates of each pair are fused in the mid-ventral line. In the species of *Pseudidothea* the condition has gone a stage further and the suture lines between the coxae and terga are lost and fusion is complete. In neither genus are these posterior coxal joints separate units in contrast to the second, third and fourth pairs of limbs.

In *Holidotea*, the remaining genus of the family, according to Barnard (1920, p. 381) the 'side plates' (presumably coxal in origin) are distinct on all except the first segment; thus, the three genera form a graded series in which the coxae of the last three pairs of pereiopods are free in *Holidotea*, fused to their respective terga but with suture lines distinct in *Arcturides* and completely fused in *Pseudidothea*.

A further character which is common to the three genera is the form of the first pleopod in the male, the modification being similar to that met with in members of the Astacillidae, except that the distal portion of the exopodite is curved outwards as a tapering projection (see figures in descriptions of species). This is less pronounced in *Holidotea* where the endopodite also is reduced in size. In all three the penis is single but bilobed.

Genus Pseudidothea Ohlin, 1901

The description of the coxal joint is unsatisfactory in the diagnosis of this genus. Of the species *P. bonnieri*, Ohlin (1901, p. 276) said: 'epimera of all segments visible from above, being small, slightly triangular tubercles'; in his description of the appendages he makes no mention of the first joint. Nordenstam (1933, p. 113) also gave a diagnosis of the genus, and with reference to this point says: 'Coxae developed as incomplete not very distinct rings around the proximal ends of the basipodites of the second to seventh pereiopods.'

The coxal joints of the thoracic limbs of the third, fourth and fifth somites (second to fourth pereiopods) can be seen in a lateral view of the animal, as small rings, which extend as flat coxal plates over the ventral surface of their respective somites up to the mid-ventral line. The coxal joint of the second thoracic limb (first pereiopod) is partially fused with the tergum of its segment, the plate is well developed and extends towards the mid-ventral line where it meets its fellow of the other side.

The coxal joints of the sixth, seventh and eighth pairs of thoracic limbs (5–7 pereiopods) are entirely fused with the lateral parts of the terga of their respective somites. From analogy with other members of the Valvifera it may be assumed that the ventral coxal expansions have fused with one another in the mid-ventral line; this can be correlated with the fact that the posterior part of the body is narrow and more or less cylindrical in shape.

As already noted, the penis in the male is enclosed by the first pleon segment (Text-fig. 1 *d*); it is single, but its double origin may be seen in its bilobed extremity.

Pseudidothea bonnieri Ohlin, 1901 (Text-fig. 14*a–f*)

P. bonneiri, Ohlin, 1901, pp. 276–81, pls. xx and xxi, fig. 6; Barnard, 1920, pp. 380–1; Nordenstam, 1933, p. 114, fig. 27.

Occurrence. St. WS 212: 30. v. 28, 49° 22′ 00″ S., 60° 10′ 00″ W., 242–249 m., 1 ♀ (non-breeding). St. WS 214: 31. v. 28, 48° 25′ S., 60° 40′ W., 208–219 m., 1 ♂. St. WS 756: 10. x. 31, from 50° 53′ S., 60° 00′ W., to 50° 56·3′ S., 59° 56′ W., 117 m., 2 ♀♀ (non-breeding), 2 immature. St. WS 766: 18–19. x. 31., 44° 58′ 00″ S., 60° 05·5′ W., 545 m., 2 ♂♂ and 4 immature. St WS 818: 17. i. 32., 52° 30·5′ S., 63° 27′ W., 272 m., from Cidaroid spines, 3 immature specimens. St. WS 825: 28–29. i. 32, 50° 50′ S., 57° 13′ W., 135 m., from Cidaroid spines, 6 ♀♀ (breeding), 3 ♂♂, 8 immature. St. WS 839: 5. ii. 32, 53° 29·5′ S., 63° 31′ W., 503 m., from Cidaroid spines, 5 ♀♀ (breeding), 6 ♂♂, and a number immature. St. WS 871: 1. iv. 32, 53° 16′ S., 64° 12′ W., 336–341 m., 1 ♂, 1 immature.

REMARKS. The largest specimen in the Discovery collections is a female in the breeding condition, 12 mm. in length and 4 mm. in greatest breadth; the largest male is 9·5 mm. in length and 3 mm. in breadth; the length is the same as that given by Ohlin (1901, p. 281) for the type specimen. My observations on this species differ from those of Ohlin (1901) in the following details:

The antennule (Text-fig. 14*e*) consists of a peduncle of three joints, the second one of which bears on its outer side a rounded tubercle, the apex of which is armed with four short spinules. The flagellum consists of two joints (Text-fig. 12*b*), the first one of which is extremely short. This joint was overlooked by Ohlin. The terminal joint is fairly broad, with a rounded extremity bearing eight sensory setae.

According to Ohlin, the first and second joints of the antennular peduncle are coalescent, so that there is no articulation between them, the suture being visible only from below or *en profile*. Nordenstam (1933, p. 113) said that the peduncle is better described as consisting of five joints, and continues: 'the short proximal joint is indistinctly marked off on the ventral side from the second'. My own observation on this point agrees with Nordenstam as far as the number of joints is concerned, but the proximal one is not 'indistinctly marked off on the ventral side from the second', but is a distinct joint (Text-fig. 14*a*). A tubercle, very similar to that found on the second peduncular joint of the antennule, is present on the second peduncular joint of the antenna. The flagellum consists of two joints with a distal spine which may be regarded as the rudiment of a third, terminal joint.

The details of the cutting edges of the mandible require some amplification. The primary cutting edge of the left mandible (Text-fig. 14*c*) bears four teeth; the secondary one bears three teeth, and between this and the molar tubercle are four spines; the molar tubercle is large, triangular truncated, with a denticulate margin. The primary cutting edge of the right mandible (Text-fig. 14*d*) bears three teeth, the secondary one is more delicate and less chitinized than the corresponding one on the left mandible; it bears six teeth. The molar tubercle is very similar to that of the left side.

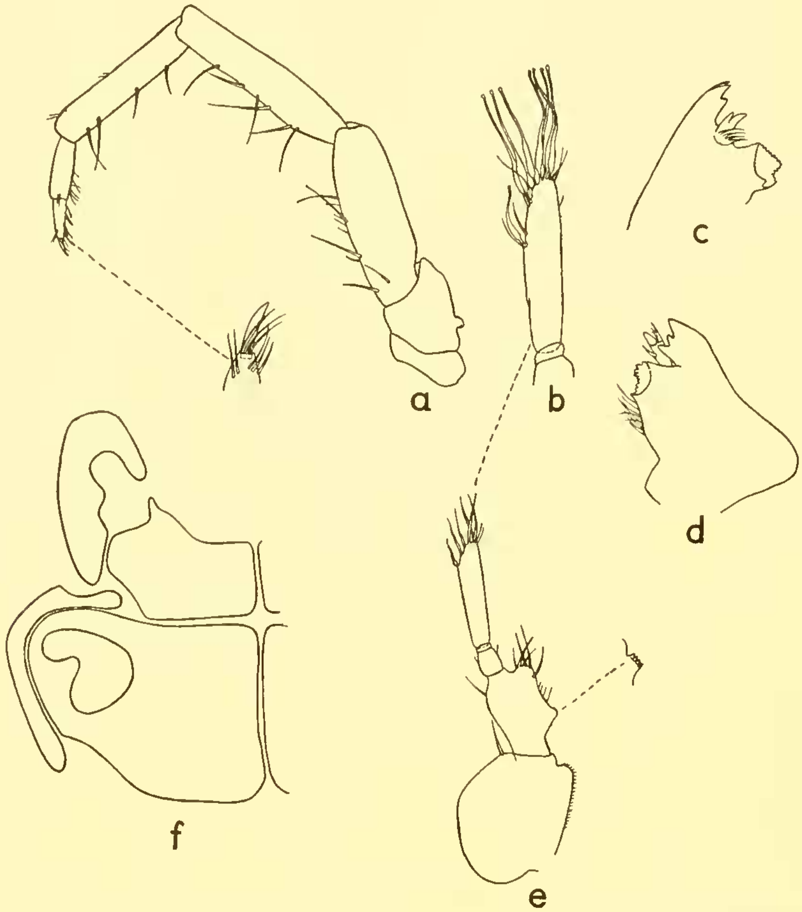
The marsupium of the breeding female consists of four pairs of brood lamellae formed on the coxae of the second, third, fourth and fifth pairs of thoracic appendages; the first pair of these is of the usual isopod type, that is, it is folded and the smaller anterior lobe covers the mouthparts; the larger, posterior lobe forms the anterior boundary to the brood chamber. The maxilliped of the breeding female bears a coxal lobe. The ventral integument in the region of the marsupium is soft and unchitinized (cf. the introduction to the suborder Valvifera, pp. 147–148).

The form of the penial process in the male of this species has already been dealt with in the introduction to this suborder (see p. 149 and Text-fig. 1*d*).

DISTRIBUTION. The species is restricted to an area around the Falkland Islands. Ohlin's specimens were taken in 43° 6′ S., long. 60° W.; Nordenstam's specimens were collected south of West Falkland Islands, and those of the Discovery collections were caught between 45° 13′ S., 59° 56′ 30″ W. and

53° 30′ 15″ S., 63° 29′ W. Thus, the species may be said to belong to the shallower waters of the Sub-Antarctic zone.

It seems probable that, as Ohlin suggested, this species is identical with *Idothea miersi* Studer (1884), which was collected in the same locality (47° 1′ 6″ S., 63° 29′ 6″ W.).



Text-fig. 14. *Pseudidothea bonnieri*. (*a*) Antenna, × 16. (*b*) Flagellum of antennule, × 60. (*c*) Cutting edge of left mandible, × 30. (*d*) Right mandible, × 30. (*e*) Right antennule, × 30. (*f*) Coxae of first and second pereiopods, × 32.

Pseudidothea scutatus sp.n. (Text-figs. 15, 16)

Microarcturus scutatus Stephensen, 1947, pp. 15–17, text-figs. 5 and 6.

Occurrence. St. 170: 23. ii. 27, 61° 25′ 30″ S., 53° 46′ 00″ W., 342 m., 4 ♀♀ (breeding), 2 ♂♂, 3 immature.

A male and a female specimen from St. 170 are chosen as holotypes.

Description. The largest male of the Discovery collections was damaged so that measurements cannot be given, the smaller one is 19 mm. in length and 6 mm. in greatest breadth; the breeding female is considerably broader and measures 23·5 mm. in length and 8·75 mm. in greatest breadth.

The *body* is subcylindrical, scarcely depressed (Text-fig. 15*a*) and characteristically sculptured; all the specimens were thickly coated with fine mud, etc. The anterior margin of the head is deeply excavate, and a median narrow groove extends backwards to unite with the transverse groove which separates the head from the first pereion somite with which it is fused. The eyes, which are small and dorso-lateral in position, are slightly raised. Between the eyes are two raised areas separated from each other by the median groove; immediately behind these, in the mid-line, is a small rounded tubercle. On the first pereion somite, behind the groove separating it from the head, is the first pair of a series of large dorsal protuberances, the flattened surfaces of which are raised 1 mm. above the general body surface. Each pair is separated by a median space (Text-fig. 15*a*). These protuberances decrease in size and height from the fourth pair backwards; the series is continued on to the pleotelson where it is represented by three pairs of rounded tubercles. A further series of these raised areas occurs in a lateral position above the coxae of the limbs of each pereion somite except the first; a smaller pair is present on the pleotelson in front of the articulation of the uropods. The body surface between the median and lateral protuberances is itself slightly raised and this is more marked on the last three somites. The third pereion somite is the broadest, but this width is much greater in the female than in the male; in the latter there is only a very gradual decrease in width from this somite to the last one.

The *abdominal segments* are fused together to form a pleotelson which forms about one-third of the length of the body. The three pairs of tubercles may possibly indicate the position of three fused segments. The convex surface of the pleotelson slopes away sharply a short distance behind the last pair of tubercles; it ends in a blunt, up-tilted point.

The *antennules* (Text-fig. 15*d*) do not extend to the end of the third peduncular joint of the antennae; each consists of a peduncle of three joints and a flagellum consisting of one large and a terminal minute joint from the extremity of which arises a single sensory seta and a group of three simple ones. The sensory setae on the flagellar joint extend its whole length in the male (Text-fig. 15*d*), but are restricted to the distal half in the female (Text-fig. 15*c*).

The *antenna* (Text-fig. 15*f*) is stout and slightly over half of the length of the body. The peduncle consists of five joints, the first two of which are short, the third joint is broad and longer than the first two together; the fourth and fifth are subequal and about equal to the length of the second and third together. The upper and lateral surfaces of these joints are tuberculate, the ventral margin is fringed with long setae which are directed towards the mouth region. The flagellum consists of two joints which together measure about half the length of the fifth joint of the peduncle; the terminal joint is about half the length of the basal one and is tipped with a stout curved spine.

The *mouthparts* are normal; their form can be seen from Text-fig. 15*b*, *e* and *g* and Text-fig. 16*k* and *l*.

The coxae of the *first pair of pereiopods* are fused with their somite, but the suture between the ventrally extended coxal plates may be seen in the mid-ventral line. The coxae of the second, third and fourth pairs of pereiopods are just visible in lateral view; they too are expanded into ventral plates, the sutures between which may be seen in the mid-line. The coxae of the last three pairs of pereiopods are completely fused with their respective somites, and the plates of each pair are fused together in the mid-ventral line. This condition of the coxae and their plates agrees with that found in *Pseudidothea bonnieri*.

The first pair of pereiopods (Text-fig. 16*a*) is short, stout and subchelate and is closely applied to the mouthparts. The propodus is broad and armed with modified setae, each of which has a double row of minute rounded serrations; the dactylus ends in one large and two smaller curved spines. The remaining pairs of pereiopods are of approximately the same length except for the last pair which is slightly shorter and more slender. The second, third (Text-fig. 16*j*) and fourth pairs are directed forwards and differ from the remaining three pairs in having the inner margin of the ischium, merus, carpus and propodus sparsely fringed with long setae. The basipodite of each of the last three pairs (Text-fig. 16*f*) bears a well-marked conical projection in about the middle of the length of its posterior surface.

The *brood pouch*, unlike that of *Pseudidothea bonnieri*, consists of five instead of four pairs of lamellae, of these the last pair (Text-fig. 16*g*) is small and forms the posterior limit of the marsupium. The fused ventral coxal plate of the fifth somite in the breeding female is narrow and limited to the posterior half of the somite and the brood lamellae articulate, one on either side with the anterior region of this plate near the base of each limb. Small coxal lobes are also developed on the coxae of the maxillipeds in the breeding female.

In the male the *penis* (Text-fig. 16*e*) is single but distally cleft.

The protopodite of the *uropod* is long and tapering and bears at its extremity the small pointed endopodite which is tipped with a single seta; the exopodite, like that of *P. bonnieri*, is about three-quarters the length and less than half the breadth of the endopodite, and also bears a single seta at its distal extremity (Text-fig. 16*b*).

The form of the *first pair of pleopods* of the male is shown in Text-fig. 16*d*, that of the female in Text-fig. 16*h*. The basipodite in both sexes is large. Its inner margin bears coupling setae, the structure of which may be seen in Text-fig. 16*d*; there are fourteen of these setae in the male, but only eight in the female. Its outer margin bears a number of minute rounded tubercles which extend along the distal half of its length.

In the female the exopodite and endopodite of the pleopods are of similar structure, rather small, with their distal extremities fringed with a few plumose setae; the endopodite is shorter and narrower than the exopodite. In the male the exopodite is modified, it is traversed by a diagonal groove which extends to the distal extremity which curves outwards and is tipped with a stout spine. The outer margin of the distal third of the exopodite is markedly concave and densely fringed with distally directed setae; the endopodite is considerably narrower and about two-thirds the length of the exopodite, its rounded end is fringed with rather short plumose setae.

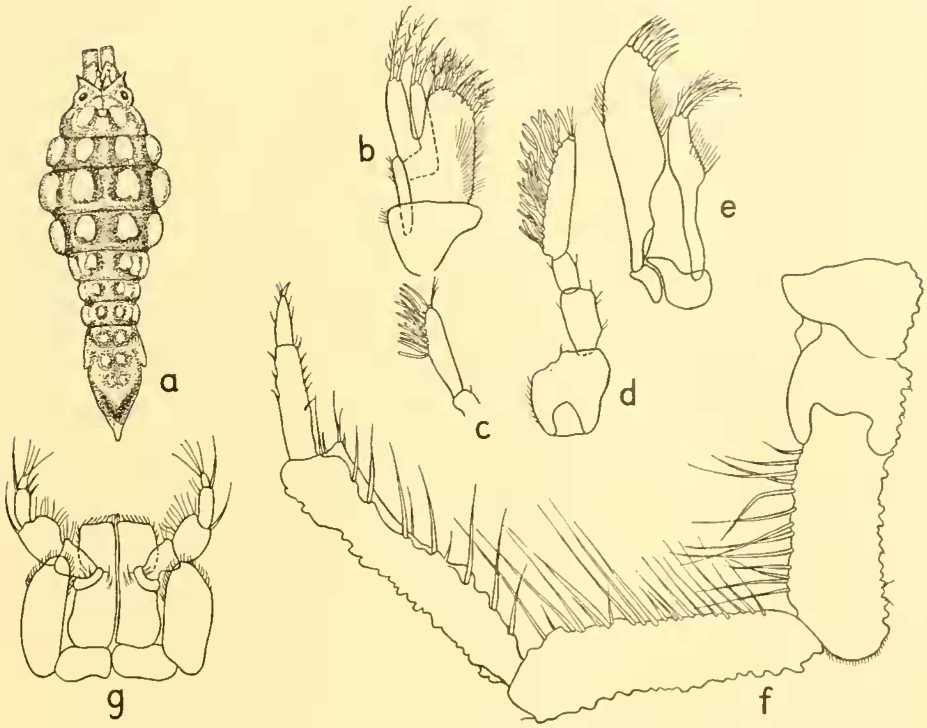
The *appendix masculina* of the second pleopod of the male (Text-fig. 16*c*) is extremely long, it gradually tapers until it has reached three-quarters the length of the endopodite, then suddenly narrows to a whip-like filament; this filament extends back about as far as the tips of the plumose setae which fringe the distal end of the endopodite.

The above description and figures were made before I received Stephensen's paper (1947) in which he described a new species *Microarcturus scutatus*. This species appears to be identical with my specimens, but I cannot agree that it belongs to the genus *Microarcturus*, since the four anterior pairs of pereiopods do not markedly differ from the hinder three pairs, that is to say they are *not* of the astacillid type.

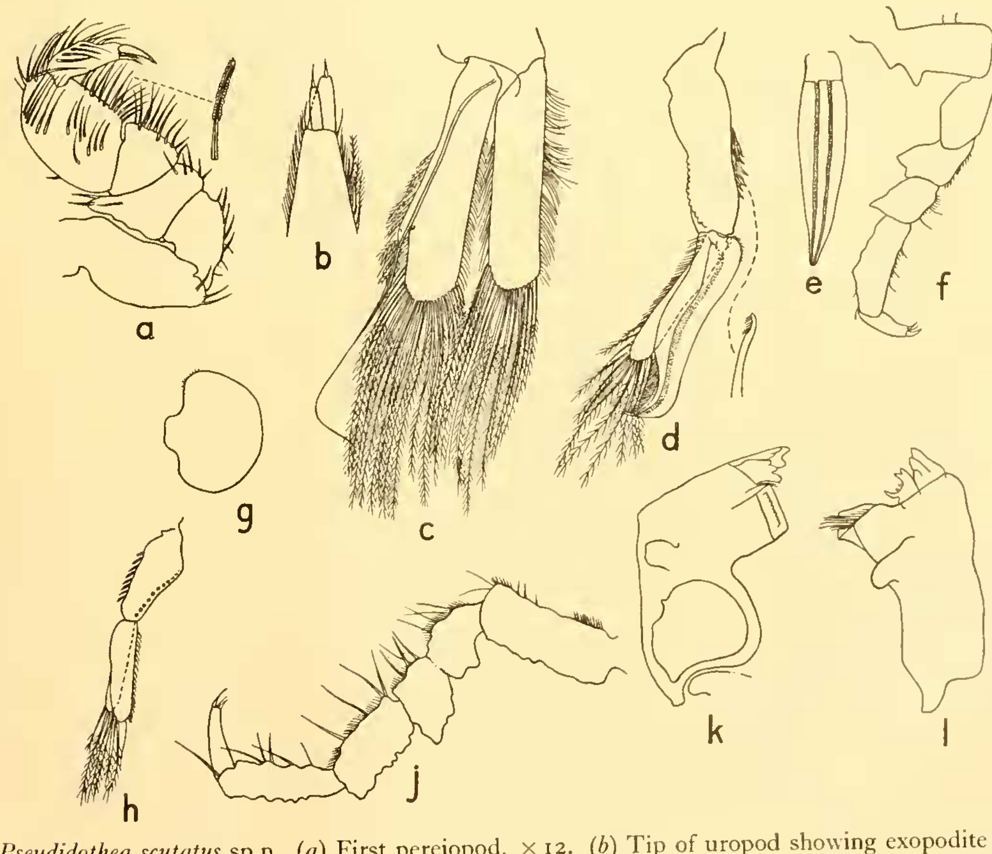
Stephensen's description is based on a single male specimen, 20 mm. in length, and differs only in minor points from that given above. Stephensen (p. 17) states that there are only six or seven coupling setae on the first pair of pleopods (whereas I counted fourteen) in the male and eight in the female.

Large flat tubercles, which form the 'armour' of this species, have also been described for *Antarcturus drygalskii* by Vanhoffen (1914, pp. 521–3 and fig. 53); their arrangement is different, however, and they are absent from the post-thoracic region. Monod (1926, pp. 27–9, figs. 23–25) described a rather similar type of tubercle for *A. belgica*, but again these do not appear on the post-thoracic segments, nor are they present on the last three thoracic segments. The tubercles are not as large or distally so expanded as those of *Pseudidothea scutatus*, and their upper surfaces appear to be toothed at the margin.

Distribution. The specimens in the Discovery collections came from a single station, off Cape Bowles, Clarence Island (61° 25′ 30″ S., 53° 46′ 00″ W.). Stephensen's specimen was also collected from the South Shetland area off Elephant Island, both of these stations lying within the Antarctic Convergence. The only other species of the genus, *P. bonnieri*, is found farther north, outside the Convergence, in localities around the Falkland Islands; thus, the two species, both shallow-water forms, are separated from each other by the deep waters of the Drake Strait, as well as by the changed hydrographical conditions on either side of the Antarctic Convergence.



Text-fig. 15. *Pseudidothea scutatus* sp.n. (*a*) Dorsal view of the body, × 2. (*b*) Right maxilla, × 30. (*c*) Flagellum of antennule, × 12. (*d*) Antennule ♂, × 12. (*e*) Right maxillula, × 30. (*f*) Antenna, × 12. (*g*) Maxillipeds, × 12.



Text-fig. 16. *Pseudidothea scutatus* sp.n. (*a*) First pereiopod, × 12. (*b*) Tip of uropod showing exopodite and endopodite, × 12. (*c*) Second pleopod ♂, × 12. (*d*) First pleopod (right) ♂, × 12. (*e*) Penis, × 12. (*f*) Seventh pereiopod, × 12. (*g*) Last brood lamella (breeding female), × 12. (*g*) First pleopod (right) ♀, × 12. (*j*) Third pereiopod ♀, × 12. (*k*) Left mandible, × 25. (*l*) Right mandible, × 25.

It has already been pointed out in an earlier report (1933, p. 266) that the shallow-water fauna of these two areas is distinct. Each area has its own representative species; it is interesting therefore, that, of the two known species of *Pseudidothea*, one should belong to the group found outside, and the other to the group lying inside the Antarctic Convergence.

Genus Arcturides Studer, 1882

The diagnostic characters have been given in the introductory remarks on the family (pp. 173–174).

Arcturides acuminatus sp.n. (Text-figs. 17, 18)

Arcturides cornutus Studer, 1882, p. 57; 1884, pp. 15–17, pl. 1, fig. 4; Beddard, 1886, p. 108.

Occurrence. St. 1562: 17. iv. 35, 46° 51·7′ S., 37° 56·5′ E. to 46° 54·8′ S., 37° 53·8′ E., 97–104 m., 1 ♂. St. 1564: 7. iv. 35, 46° 36·5′ S., 38° 02·3′ E. (off Prince Edward Island), 110–113 m., 1 ♀.

The male holotype is from St. 1562, the female holotype from St. 1564.

DESCRIPTION. The male specimen measures 12·5 mm. in length and 2 mm. in greatest breadth, the female 10 mm. in length and 1·5 mm. in greatest breadth; the *body* is subcylindrical and scarcely depressed (Text-fig. 17*g*). The *head* bears a pair of bluntly pointed, forwardly directed dorsal spines; the antero-lateral angle is rounded; the eyes are large and lateral in position. The first pereion somite which is fused with the head is separated from it by a well-marked groove; it is somewhat deeper than the head and bears a pair of short knob-like dorsal spines and a similar but smaller pair of lateral ones.

The *perion somites* increase in length from the second to the fourth, the fifth and sixth are subequal and about half the length of the fourth, the seventh is considerably shorter. The second, third and fourth somites each bear two pairs of short dorsal spines similar to those on the first segment; a lateral pair, one on either side, placed in a position midway between the dorsal pairs, is also present; the area just above each coxal joint is raised and bears a very small spine. On each of the last three somites a single pair of small dorsal and a pair of lateral spines are present as well as a small one on each coxal area.

The *abdominal segments* are coalesced to form a pleotelson, the shape of which, in dorsal view, may be seen from Text-fig. 17*c*; on the dorsal surface within the anterior third of the pleon are two rows of four very small spines; a number of smaller ones are scattered on the surface behind these rows. Posteriorly the pleotelson is drawn out into a somewhat acute point which extends beyond the extremities of the uropods.

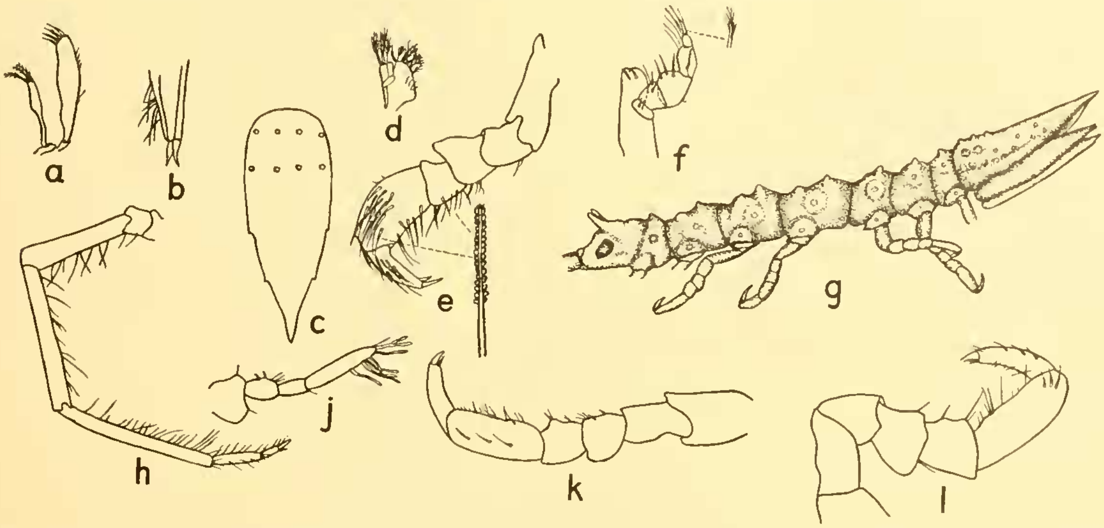
Each *antennule* (Text-fig. 17*f*) extends to about the middle of the third peduncular joint of the antenna; each consists of a peduncle of three joints, the first one of which is very broad, the second is about half the width of the first and the third slightly narrower; the three joints are of approximately equal length; the second joint bears two strong spines on its inner margin. The flagellum consists of a single joint equal in length to the combined length of the two distal joints of the peduncle; it bears three sensory setae and a few simple ones at its distal extremity, and four more sensory setae on the distal half of its margin.

The *antennae* (Text-fig. 17*h*) measure 6·5 mm. in length, each consists of a peduncle of five and a flagellum of three joints. The first segment is very short, the second about twice the length of the first, the third is five times as long as the second, and the fourth and fifth increase in length, the fifth being half as long again as the third. The flagellum is about half the length of the fifth peduncular joint, and its first joint is greater in length than the distal two together. Setae are present on the outer margins of the peduncular joints and scattered on the surface of the joints of the flagellum.

The *mouthparts* are of the usual type, the form of the maxillule and of the maxilla may be seen from Text-fig. 17*a* and *d*. The maxilliped, the distal portion of which is seen in Text-fig. 17*f*, has a five-jointed palp, the fourth joint of which bears a slightly raised longitudinal region surmounted by a row of very minute rounded projections; the endite is indented and bears two simple setae.

The first, second and last *pereiopods* are shown in Text-fig. 17*e*, *k* and *l*, as well as the setae on the distal three joints of the first pereiopod. Each pereiopod bears, on the margins of the distal half, a series of small rounded tooth-like projections.

The modifications of the first and second *pleopods* of the male and the form of the penis are very similar to those described and figured by Hale (1946, p. 169 and fig. 4, p. 170) for *A. tribulis*. The *penis* (Text-fig. 18*b*) is single but distally cleft. The basipodite of the first pleopod (Text-fig. 18*a*) is about twice as long as broad and has a pronounced curve inwards towards the middle of its outer margin; it bears seven coupling setae on its inner margin (five in *A. tribulis*) and ten very small teeth on its outer margin (these are also present in *A. tribulis*). The form of the exopodite is also very similar in the two species, the oblique furrow terminates in a narrow projection, which is bent



Text-fig. 17. *Arcturides acuminatus* sp.n. (*a*) Maxillula (left), ×25. (*b*) Tip of uropod. (*c*) Dorsal view of pleotelson. (*d*) Maxilla (right), ×15. (*e*) First pereiopod, ×20. (*f*) Maxilliped (left), ×25. (*g*) Lateral view of female, ×7. (*h*) Antenna, ×12. (*j*) Antennule, ×18. (*k*) Second pereiopod, ×20. (*l*) Seventh pereiopod, ×20.

outwards and is about a third of the length of the broader part of the exopodite. In *A. acuminatus*, the distal end of the projection is obliquely truncated to form a pointed extremity (Text-fig. 18*a*); the *appendix masculina* of the second pleopod (Text-fig. 18*c*) is about the same length as the endopodite, its distal end is flattened and terminates in a curved pointed projection. The exopodite and endopodite of the *uropod* (Text-fig. 17*b*) are of approximately equal size and each is tipped with a single seta.

A. acuminatus bears a close resemblance to the genotype *A. cornutus* Studer and also to a species, *A. tribulis*, described and figured by Hale in 1946, but differs from them in the following points:

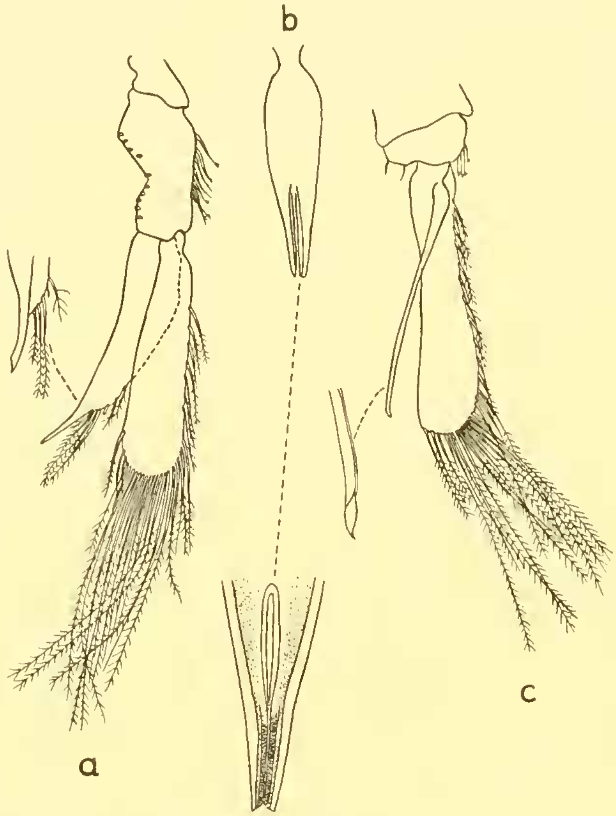
(1) The narrow distal extremity of the pleotelson tapers to a point in *acuminatus* whereas in the other two species it is truncate and notched.

(2) In *acuminatus* the body armature has body spines less well-developed than those of *tribulus*, and the blunt, downwardly directed tooth is not present on the antero-lateral angle of the head.

(3) In *acuminatus* the areas above the insertions of the coxal joints are raised.

(4) The endite of the maxilliped is also different.

Both Studer's and Hale's specimens were obtained from Kerguelen Island, and Hale suggested that in view of their great similarity *tribulis* might be a variety of *cornutus*. Beddard's material of *cornutus*, on the other hand, came from Marion Island. I have examined one of his identified specimens in the British Museum (Natural History). The specimen is a male and possesses a pointed pleotelson as in *acuminatus* and therefore differs from Studer's genotype, *cornutus*. Beddard's specimen is slightly larger than the male in the Discovery collections and lacks body spines, except for a pair on the head; the spines on the male specimen in the Discovery collections are less well developed than those of the female. Both Discovery specimens were taken in the neighbourhood of Prince Edward Island, that is, in the same area as Beddard's specimen.



Text-fig. 18. *Arcturides acuminatus* sp.n. (*a*) First pleopod (right) ♂, ×34. (*b*) Penis, ×34. (*c*) Second pleopod ♂ with exopodite removed, ×34.

Prince Edward and Marion Islands are separated by about 1800 miles of deep water from Kerguelen Island; this must almost certainly act as a barrier to the spread of a shallow-water species from one locality to the other. I consider that the specimens collected from these two areas, although very similar, represent two distinct species, and that Beddard's material, recorded as *A. cornutus*, more properly belongs to the new species just described, *A. acuminatus*.

Xenarcturidae, fam.n.

Diagnosis. The *body* is dorso-ventrally flattened, without any elongation of the fifth thoracic somite; the second thoracic somite has its middle portion completely fused with the head, but its lateral pleural extensions are free. The tergum of each of the second to the fifth thoracic somites inclusive (first to fourth pereion somites) has on either side a pleural extension which extends laterally over the base of the limb. On the ventral surface of these somites each coxal joint is clearly defined; its outer margin is ring-like and, except for those of the second somite, is separated from the ventral surface of its pleuron by a suture. The inner margins of the coxal joints of these limbs are expanded into coxal plates; each extends over the ventral surface of its somite almost to the mid-line, where it meets, but does not fuse with, the corresponding plate of the opposite limb. The coxae of the last three pairs of thoracic appendages have plates developed on both their inner and outer margins, the latter extending on to the dorsal surface of the body where they are separated from their respective terga by sutures.

The pleon segments are all coalesced to form a single plate. The *antennule* consists of a peduncle of three joints and a single flagellar joint. The *antenna*, which is setose, is considerably longer than the antennule; it is built up of five peduncular joints and a single one to the flagellum; the distal portion of each antenna is directed towards the mouth. The *maxilliped* has a five-jointed palp; the second pair of *thoracic appendages* is short, setose and carried close to the mouthparts; the third and fourth pairs are long and setose, the remaining four pairs are all alike, and are ambulatory; of these the fifth pair is directed forwards, and the remaining three pairs (6–8) backwards.

The first as well as the second pair of *pleopods* in the male is modified as a copulatory organ; the penis is single. The uropod has a large protopodite, with both endopod and exopod present but of small size.

The *marsupium* of the breeding female is large and formed from four pairs of lamellae carried on the coxae of the second to the fifth pairs of thoracic appendages, its development is similar to that of *Idotea emarginata* (Fabr.) (p. 154).

This family is intermediate in position between the families Pseudidotheidae Ohlin and Astacillidae Stebbing. The broad, dorso-ventrally flattened body of *Xenarcturus* g.n., recalls the body form of the first family, although the breadth of the head and anterior thoracic somites is relatively greater. The fusion of the head with the second thoracic somite is common to all three families; the condition in *Xenarcturus* comes nearest to that of the astacillid genus *Idarcturus* Barnard; in this genus the head is fused with the second thoracic somite, but sutures are distinct laterally, whereas in *Xenarcturus* the pleura of the somite form free lobes.

The fusion of the abdominal segments to form a pleotelson, and the presence of both exopod and endopod on the uropod, are characters shared by members of all three families.

The antennule of *Xenarcturus* has a single joint to the flagellum and this bears sensory setae, which are more numerous in the male than in the female; this character is also found amongst the Astacillidae in the following genera: *Antarcturus* Zur Strassen, *Microarcturus* Nordenstam, *Astacilla* Cordiner and *Neastacilla* Tattersall; it is also a character of *Pseudidothea* Ohlin.

The antenna of *Xenarcturus* differs from that in the other two families in being very setose and directed towards the mouth, and in having a single joint to the flagellum; *Pseudidothea* has two, and the *Astacilla* group three flagellar joints. The palp of the maxilliped is five-jointed like that of *Pseudidothea* and some astacillids; it agrees with *Pseudarcturella chiltoni* Tattersall, in the absence of coupling hooks from the endite of the basipodite.

The form of the thoracic appendages (2–8) is astacillid-like, but with one very important difference, the fifth pair, though directed forwards, resembles the posterior three pairs; that is to say, it is strong and ambulatory, not delicate and setose as in the astacillids. The second pair of thoracic appendages is short and closely applied to the mouth parts, and, like that of the *Arcturus* group, has the dactylus expanded and without a claw. The third and fourth pairs are long and setose.

The modification of the exopod of the first pleopod as a copulatory organ in the male is also present in the astacillid genera *Antarcturus* Zur Strassen, *Dolichiscus* Richardson, and *Neoarcturus* Barnard, as well as in the family Pseudidotheidae.

The diagnosis of the family Astacillidae, as given by Richardson (1905, p. 323), included as a character 'the four anterior pairs of legs *unlike* the three posterior ones, not ambulatory, nor strictly prehensile, directed forward, slender, ciliated', and it is therefore obvious that *Xenarcturus*, with its four posterior pairs of limbs *alike*, cannot be included in this family. The combination of this limb arrangement with a dorso-ventrally flattened body removes it still further from the Astacillidae.

The fact that the second, third and fourth pairs of thoracic limbs (first, second and third pereiopods) are astacillid-like in form excludes the genus from the family Pseudidotheidae; for these reasons the new family Xenarcturidae has been formed to contain it.

Genus Xenarcturis g.n.

Xenarcturus spinulosus, g.n., sp.n. (Plate VIII, fig. 3; Text-figs. 19–22)

Occurrence. St. WS 237: 7. vii. 28, 46° 00′ 00″ S., 60° 05′ 00″ W., 150–256 m., 1 ♂, 1 ♀ (breeding). St. WS 756: 10. x. 31, from 50° 53′ S., 60° 00′ W. to 50° 56·3′ S., 59° 56′ W., 119 m., 2 ♂♂. St. WS 782: 4. xii. 31, from 50° 30′ S., 58° 19′ W. to 50° 27′ S., 58° 31′ W., 141–146 m., 1 ♂, 1 ♀.

The male holotype is from St. WS. 756, the female holotype from St. WS. 237. The genus has the characters of the family.

DESCRIPTION. The Discovery collections contain a single breeding and a single non-breeding female, measuring 7·5 mm. in length by 3·5 mm. in greatest breadth, and four mature males of approximately equal size, one of which measures 6·75 mm. in length and 3 mm. in greatest breadth.

The form of the *body* may be seen from Plate VIII, fig. 3; the anterior margin of the head is broad, and the breadth is gradually increased to the fifth thoracic somite, after which it decreases to the extremity of the pleotelson, which ends in an acute point. The dorsal surface of the body is slightly arched in the male, more so in the female; its surface is covered with scattered spinules.

The shape of the head and second thoracic somite, and the position of the eyes are shown in Text-fig. 19*a*; the line of fusion of the head with the second thoracic somite is marked by a shallow groove; the pleural portions of the somite are free and lie partly beneath the lateral margins of the head.

The arrangement of the coxal joints and their plates has already been given in the diagnosis of the family; the pleura of the second to the fifth thoracic somites are separated by grooves from their respective terga; each tergum is raised in the middle, so that the animal when viewed from the side has a slightly corrugated dorsal surface. The form of the pleotelson can be seen from Text-fig. 19*b*.

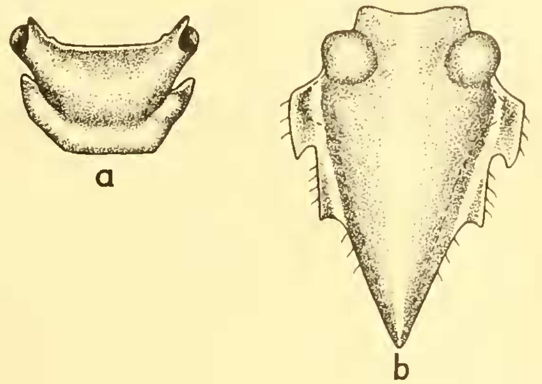
The *antennule* (Text-fig. 20*a*) is short and broad, the peduncle consists of three joints, the middle one of which is the longest; the flagellum is a single, broad, rounded joint with sensory setae fringing its tip and inner margin; these setae are more numerous in the male than in the female.

The *antenna* (Text-fig. 20*b*) is very much longer than the antennule; it is bent sharply between the third and fourth peduncular joints so that the flagellum is directed towards the mouth; long setae fringe the inner margins of the second, third and fourth joints. The flagellum consists of a single short joint, tipped with three long setae.

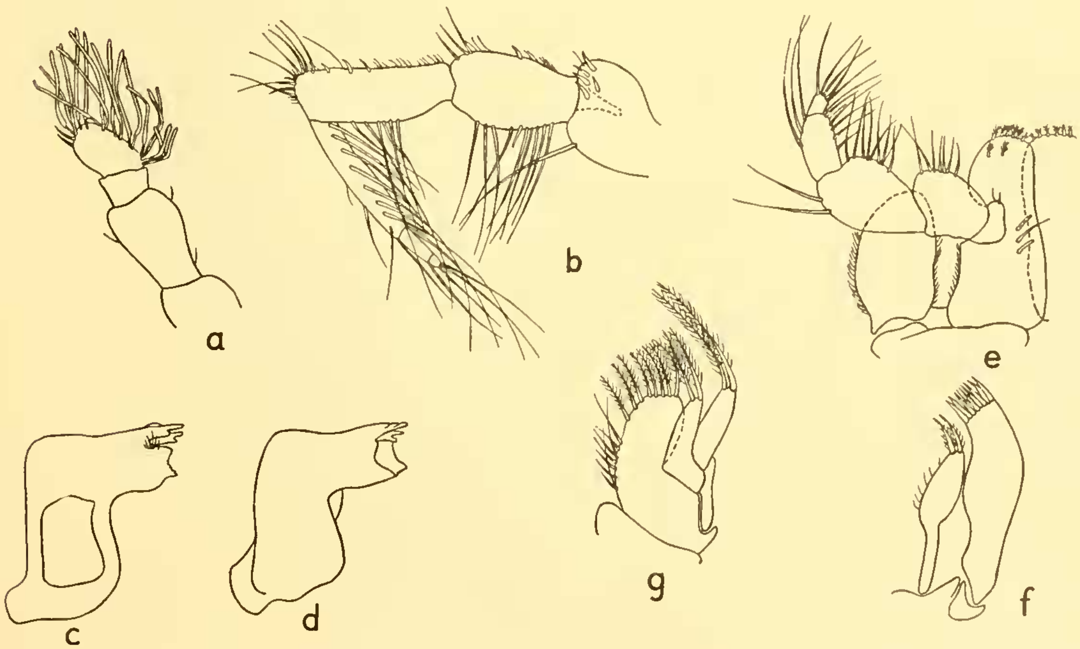
The form of the cutting edge of each *mandible* is shown in Text-fig. 20*c*, *d*.

The *maxillula* and *maxilla* (Text-fig. 20*f*, *g*) show the typical astacillid structure; in the latter, the broad fixed lobe has its rounded extremity fringed with plumose setae; each of the two outer lobes bears two plumose setae on its truncate distal extremity; those of the outer lobe are the longer. The palp of the *maxilliped* (Text-fig. 20*e*) is five-jointed, the inner margin of each joint, except the first, is fringed with long setae; no coupling hooks are present on either the basipodite or its endite, but the edges of these appear to interlock with those of the opposite maxilliped; as in other isopods, a coxal lobe is developed on the coxal joint of the breeding female.

The second thoracic appendage (*first pereiopod*) (Text-fig. 21 *a*) is shorter and broader in proportion than the succeeding appendages, and the dactylus is broad, with its rounded distal end fringed with long setae; similar setae are also present on the inner margins of the ischium, merus, carpus and propodus. The third and fourth *thoracic appendages* (Text-fig. 21*b*) are both alike, and are directed forwards and curved towards the mouth; each is about one and a half times the length of the second thoracic appendage and is considerably stouter. The inner margins of the merus, carpus and propodus bear long setae; the dactylus ends in a curved claw. The remaining four pairs of thoracic appendages are all very similar; they are stout and ambulatory in function (Text-fig. 21*c*) and the dactylus of



Text-fig. 19. *Xenarcturus spinulosus* g.n., sp.n. (*a*) Head and first pereion (second thoracic) somite, × 12. (*b*) Dorsal view of pleotelson. × 7.

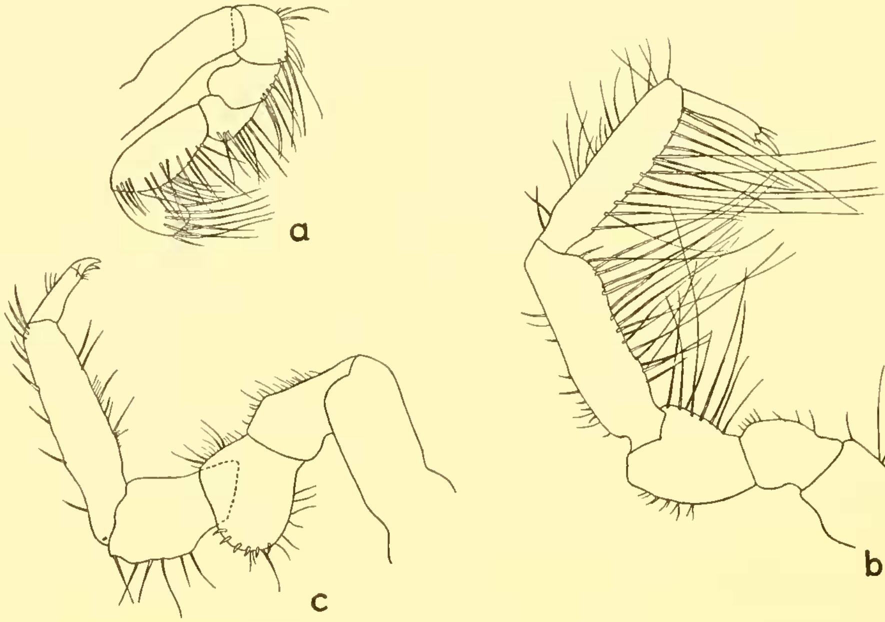


Text-fig. 20. *Xenarcturus spinulosus* g.n., sp.n. (*a*) Antennule, × 32. (*b*) Antenna, × 32. (*c*) Left mandible (dorsal view), × 50. (*d*) Right mandible (ventral view), × 50. (*e*) Right maxilliped (ventral view), × 50. (*f*) Left maxillula, × 60. (*g*) Left maxilla, × 60.

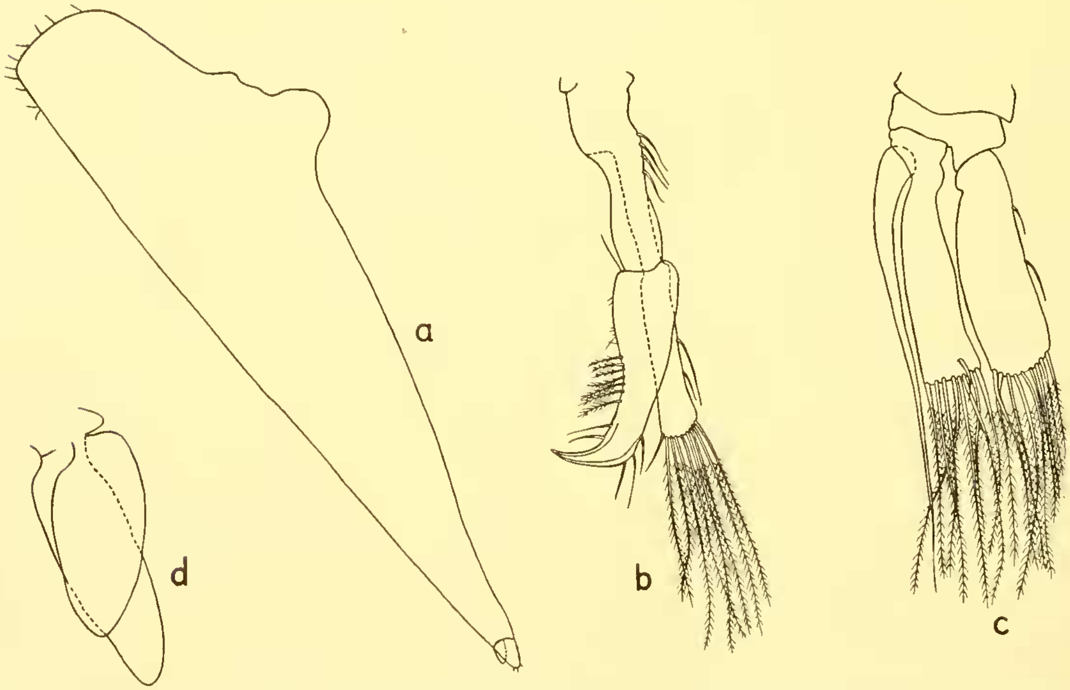
each ends in a curved claw. The distal end of the merus of the last thoracic appendage has its inner angle produced to form a subacute projection. The surface of the joints is covered with scattered spinules similar to those covering the body surface.

In the breeding female, *brood lamellae* are developed on each of the second to the fifth pairs of thoracic appendages inclusive.

The first *pleopod of the male* (Text-fig. 22*b*) has the exopod modified as a copulatory organ; it is longer than the endopod and has its distal portion bent almost at right angles and drawn out into an acute point. Its outer concave margin bears a number of plumose setae; a similar modification is seen in the first pleopod of the male of *Pseudidothea bonnieri* Ohlin. The form of the *appendix musculina* on the second pleopod of the male is also very similar to that of *P. bonnieri*; it is considerably longer than endopod (Text-fig. 22*a*), nearly straight, but decreasing in thickness so that its distal portion



Text-fig. 21. *Xenarcturus spinulosus* g.n., sp.n. (*a*) First pereiopod, × 32. (*b*) Second pereiopod, × 32. (*c*) Fourth pereiopod, × 32.



Text-fig. 22. *Xenarcturus spinulosus* g.n., sp.n. (*a*) Uropod (dorsal view), × 32. (*b*) First pleopod (right) ♂, × 32. (*c*) Second pleopod (left) ♂, × 32. (*d*) Third pleopod, ♂, × 32.

forms an acute point. The *penis* is single, it is rather long and tapers to a rounded extremity. The remaining pleopods (Text-fig. 22*d*) are all similar. The protopodite of the uropod (Text-fig. 22*a*) is large and carries at its tip a small exopod and an endopod which is slightly larger.

DISTRIBUTION. The three stations at which this species was collected are all on the Patagonian Shelf. St. WS. 237 (46° 00′ S., 60° 05′ W.) lies some distance farther north than the other two, towards the edge of the shelf. Sts. WS. 756 and WS. 783 are both a little north of the Falkland Islands.

SUMMARY

1. The paper deals with fifteen species in the Discovery collections, 1925–36, belonging to the families Idoteidae, Pseudidotheidae and Xenarcturidae fam.n.

2. One new genus and five new species are described: *Xenarcturus spinulosus*, *Edotia oculopetiolata*, *E. corrugata*, *Pseudidothea scutatus* (= *Microarcturus scutatus* Stephensen, 1947) and *Arcturides acuminatus*.

3. Points of morphological interest, including modifications in the form of the brood pouch of *Edotia*, are discussed.

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SUPPLEMENT TO ISOPOD CRUSTACEA, PART I: THE FAMILY SEROLIDAE (Text-figs. 23–29)

Since the publication of the Discovery Report, *The Family Serolidae*, vol. VII, 1933, pp. 253–362, three new species have been erected. One, *Serolis johnstoni* Hale, was collected by the B.A.N.Z. Antarctic Research Expedition, 1929–31, and is described in volume VI of the reports (Hale, 1952, pp. 32–5); the other two, *S. acuminata* sp.n. and *S. ovata* sp.n., occurred amongst the specimens collected by R.R.S. 'Discovery II' between 1928 and 1937 and are described below. The type specimens of *S. acuminata* and *S. ovata* are deposited in the British Museum (Nat. Hist.).

According to Hale (1952, p. 35), *S. johnstoni* comes nearest to *S. gerlachei* Monod (1925, p. 299 and 1926, p. 36, figs. 35–7), but the latter differs in having '(1) no transverse lateral ridges on the dorsum of second peraeon somite; (2) no median dorsal spine at the hinder margin of the first two free peraeon somites; (3) the coxal plates of the seventh peraeon somite shorter; (4) an additional longitudinal carina on each side of the median carina of the telsonic somite; (5) a small jointlet at the distal end of the third joint of the palp of the maxilliped; (6) the posterior spines on inner edge of the propodus of the first peraeopod broader' (cf. Hale, 1952, p. 33, fig. 4 sp. and Monod, 1926, fig. 36*c*).

In *S. johnstoni* the coxal plates of the seventh thoracic somite are figured by Hale (fig. 4, pin. ♂) as being incomplete (i.e. broken) in the adult male, but are shown complete on one side of a young male (fig. 4, juv. ♂) and extending back beyond the tips of the pleural plates of the second and third abdominal segments. If Hale's figure of the adult male is correct, the broken part of the coxal plate must have been very delicate. Presumably, when complete it extends backwards over the pleural plates as far as in the young specimen, for I know of no example in which the young differ from the adult in this respect.

Hale states on p. 32 that the pleural plates of the second abdominal segment are produced beyond those of the third; this is shown in his figure of the adult male, whereas in his figure of the young male the plates of the third segment are shown as extending beyond those of the second. Normally, the comparative lengths of these plates do not change with age, so that the arrangement shown in the figure of the young male is either abnormal or represented incorrectly.

S. johnstoni can be placed in the key to the species of the genus (Sheppard, 1933, pp. 278–82) in Section BI, CII, b1 α (p. 280) together with *S. gerlachei* Monod, for both species have the median dorsal portion of the cephalosome produced backwards into a spine.

There is one point which needs correction in the published Discovery report on this family (Sheppard, 1933). On p. 273, fig. 2, showing the form of the maxilliped in various species of *Serolis*, *S. discoverii* sp.n. should read *S. exigua* Nordenstam. The error arose because a form already named and described as a new species proved to be identical with Nordenstam's new species *S. exigua* which appeared before the publication of my report; owing to an oversight the name in this figure was not altered to read *S. exigua* Nordenstam.

STATION LIST

Further records of species of *Serolis* collected between 1928 and 1937.

St. WS 213: 30. v. 28, 49° 22′ 00″ S., 60° 10′ 00″ W., net of 7 mm. mesh attached to trawl, green sand, mud and pebbles, 49–239 m.

Serolis neaera Beddard, 1 ♀ (breeding), 1 ♂.

St. WS 772: 30. x. 31, from 45° 13′ S., 60° 00′ W. to 45° 13·8′ S., 60° 00·5′ W., tow-net of coarse silk attached to back of trawl, grey sand, 309–163 m.

Serolis schythei Lütken, 2 ♀♀ (breeding), 1 (non-breeding), 5 ♂♂, and a number of immature.

St. WS 783: haul A, 5. xii. 31, 50° 03·5′ S., 60° 08′ W., net of 7 mm. mesh attached to trawl, rock, stones and shells, 157–159 m.

Serolis schythei Lütken, 3 ♀♀ (breeding).

St. WS 836: 2. ii. 32, 53° 05·5′ S., 67° 38′ W., small beam trawl, 14–16 m.

Serolis convexa Cunningham, 1 ♂.

St. WS 821: 18. i. 32, from 52° 55′ S., 60° 57′ W. to 52° 56·5′ S., 60° 53′ W., net of 4 mm. mesh attached to trawl, fine green grey sand and mud, 461–468 m.

Serolis neaera Beddard, 1 ♀ (breeding), 2 damaged and 1 immature specimen.

St. 1230: 23. xii. 33, 6·7 miles N. 62° W. from Dungeness Light, Magellan Strait, Russell's bottom tow-net, 29 m.

Serolis orbiculata sp.n., 1 ♀ (non-breeding).

St. 1562: 7. iv. 35, 46° 51·7′ S., 37° 56·5′ E. to 46° 54·8′ S., 37° 53·8′ E., Russells' bottom tow-net, 97–104 m.

Serolis septemcarinata Miers, 4 ♀♀ (breeding), 9 ♂♂, and a number of immature specimens.

St. 1562: 7. iv. 35, 46° 51·7′ S., 37° 56·5′ E. to 46° 54·8′ S., 37° 53·8′ E., large rectangular net, 90–97 m.

Serolis septemcarinata Miers, 1 ♀ (breeding), 2 ♂♂, 1 immature.

St. 1564: 46° 36·5′ S., 38° 02·3′ E., 7. iv. 35, large dredge, 108–118 m.

Serolis septemcarinata Miers, 1 ♀ (breeding), 4 ♂♂, 2 immature.

St. 1660: 27. i. 36, 74° 46·4′ S., 178° 23·4′ E., large otter trawl, 351 m. (taken from jar of unsorted bottom fauna).

Serolis acuminata sp.n., 8 ♀♀ (breeding), 2 ♀♀ (non-breeding), 10 ♂♂, and a number of immature specimens.

St. 1873: 13. xi. 36, 61° 20·8′ S., 54 04·2′ W., rectangular dredge bag bent on to a Russell frame, etc., 210–180 m.

Serolis trilobitoides, 1 ♀ (non-breeding), *Serolis ovata* sp.n., 1 ♀ (non-breeding).

St. 1902: 49° 48′ S., 67° 39·5′ W., 4 miles S. 32° E. of Cape San Francisco de Paula Light, large otter trawl, 50–80–50 m.

Serolis schthyei Lütken, 1 ♀.

St. 1941: 29. xii. 36, Leith Harbour, South Georgia, small rectangular dredge. 38 m.

Serolis pagenstecheri Pfeffer, 1 ♂, 1 ♀ (non-breeding); 55–22 m. *Serolis pagenstecheri* Pfeffer, 3 ♂♂, 2 ♀♀ (non-breeding).

St. 1948: 60° 49·4′ S., 52° 40′ W., 4. i. 37, rectangular dredge bag bent on to a Russell frame, etc., 490–610 m.

Serolis trilobitoides Eights, 1 ♂, 1 ♀ (non-breeding). *Note on colour:* centre brown with dark brown lines and shadings, pleurae pale brown shades and spotted with dark brown; limbs pale brown.

Serolis bouveri Richardson, 2 ♂♂. *Note on colour:* dark brown with cream margins to pleura, limbs pale brown.

St. 1955: 29. i. 37, 61° 35·1′ S., 57° 23·2′ W., rectangular dredge bag bent on to a Russell frame, etc., 440–410 m.

Serolis trilobitoides Eights, 1 ♀ (breeding), 2 ♀♀ (non-breeding), 2 ♂♂.

St. 1957: 3. ii. 37, off south side of Clarence island, 7 miles east of Cape Bowles, South Shetlands, large dredge, heavy pattern, 4 ft. long (1·2 m.), 785–810 m.

Serolis meridionalis Hodgson, 1 ♀ (breeding), 1 ♀ (non-breeding) incomplete.

Serolis acuminata sp.n. (Text-figs. 23–26)

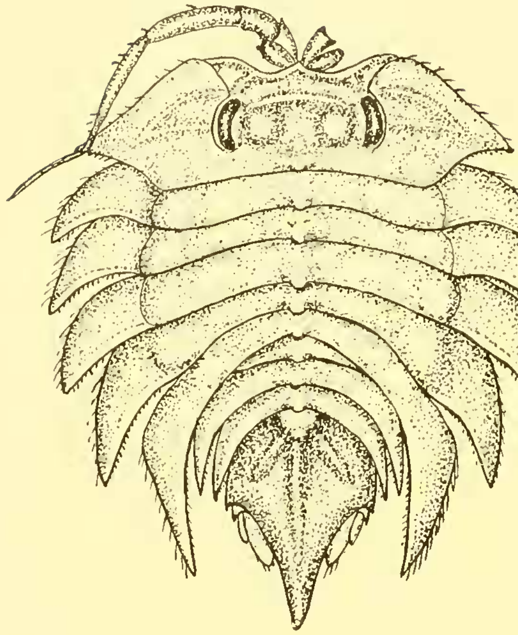
Occurrence. St. 1660: 27. i. 36, 74° 46·4′ S., 178° 23·4′ E., 351 m., 8 ♀♀ (breeding), 10 ♂♂, 2 ♀♀ (non-breeding) and a number of immature specimens.

One male and one female specimen from St. 1660 are chosen as holotypes.

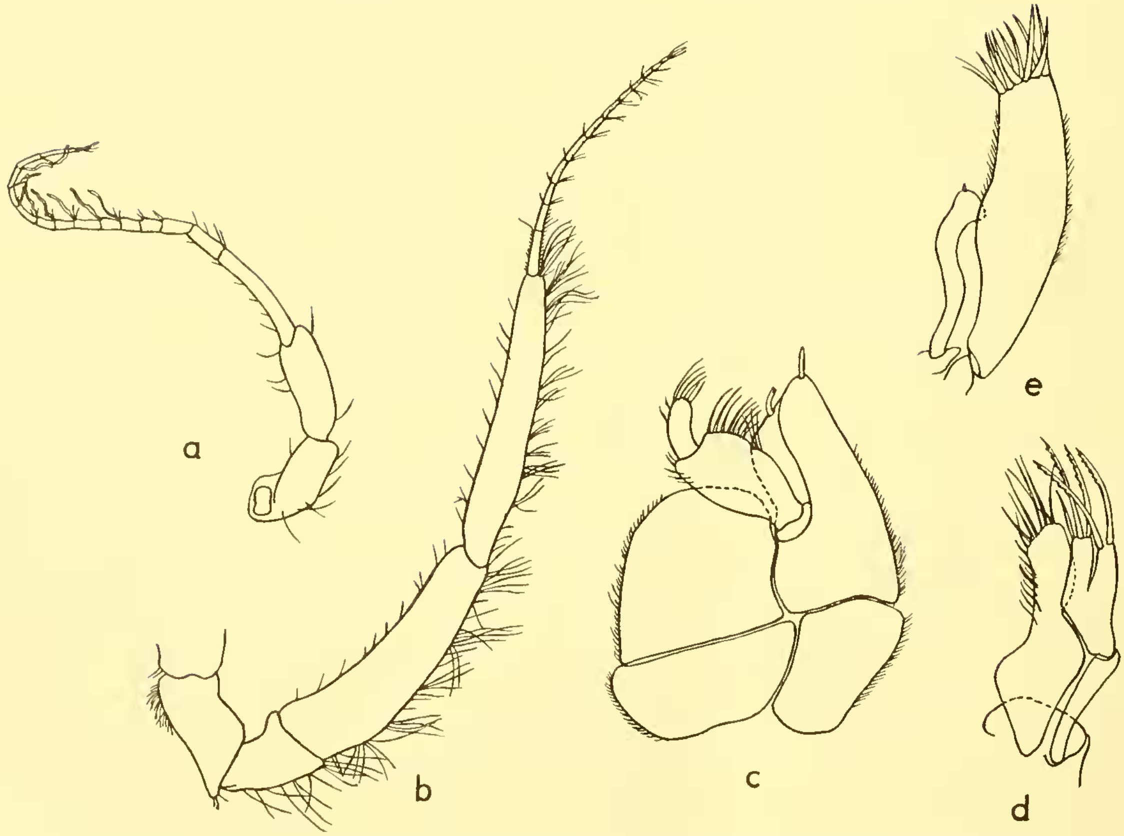
Description. The size of the largest male (Text-fig. 23) is 11 mm. in length and 10 mm. in greatest breadth; the female, which is in the breeding condition, is 10 mm. in length and 8 mm. in greatest breadth. The male is proportionately slightly broader than the female with a length:breadth ratio of 1·1:1 as compared with the female ratio of 1·25:1. The head is twice as broad as long and broadest anteriorly. The anterior margin shows two shallow excavations one on either side of a small pointed rostrum; behind the latter, running parallel with it, is a slight transverse ridge. A second ridge extends between the anterior extremity of the eyes and the area of the head between the eyes is raised into two rounded prominences; between these two, posteriorly, is a small median one.

The suture line separating the head from the second thoracic (first pereion) somite extends to just behind the eyes, which are about half the length of the head, reniform in shape and contain black pigment. The lateral or coxal portion of the second thoracic somite on either side of the head is marked by two low transverse ridges, one, extending outwards from just in front of the eye, curves backwards to meet the second ridge which extends outwards from the middle region of the eye (Text-fig. 23); the resulting single ridge curves slightly backwards and disappears. The median portion of the somite, which is completely fused with the head, is narrow and bears a small backwardly projecting median spine. On either side of the junction of the tergal with the coxal region is a low rounded eminence. The second, third and fourth pereion somites are subequal; each is produced backwards in the mid-dorsal line into a small spiniform process, which increases in size from before backwards. A low prominence occurs just within the lateral margins of all the pereion somites. The sixth and seventh thoracic somites (fifth and sixth pereion) are slightly narrower than preceding somites. Well-developed coxal plates are present on each of the second to the sixth pereion somites; those of the first three are separated by distinct sutures from their respective somites. The coxal plates are not closely applied together and each is fringed with delicate hairs, which are longer on their lateral than their posterior margins; the plates of the last two segments are longer than the preceding ones, and those of the last extend backwards to beyond the tip of the uropods. The posterior margin of each of the three free abdominal segments is produced into a median spiniform process similar to, but slightly smaller than, those of the thoracic somites. The pleural plates of the third abdominal segment extend backwards slightly farther than those of the second, but not quite as far as the level of the base of the uropods. A short lateral carina is present on either side of the median one. The terminal segment narrows considerably between the uropods and extends for some distance beyond the tip of these, as a pointed process; the dorsal surface has a small low eminence in the median line from which a median carina extends backwards disappearing at the level of the tip of the uropods.

The *antennule* (Text-fig. 24*a*) has a peduncle of four joints, the first one of which is broad and geniculate, with a few scattered hairs; the second joint is about equal in length and breadth to the first; the third is the same length as the second, but narrower and three times as long as the fourth. The flagellum consists of twelve joints and a minute terminal one; a single sensory seta is found at the distal end of all except the first three joints.



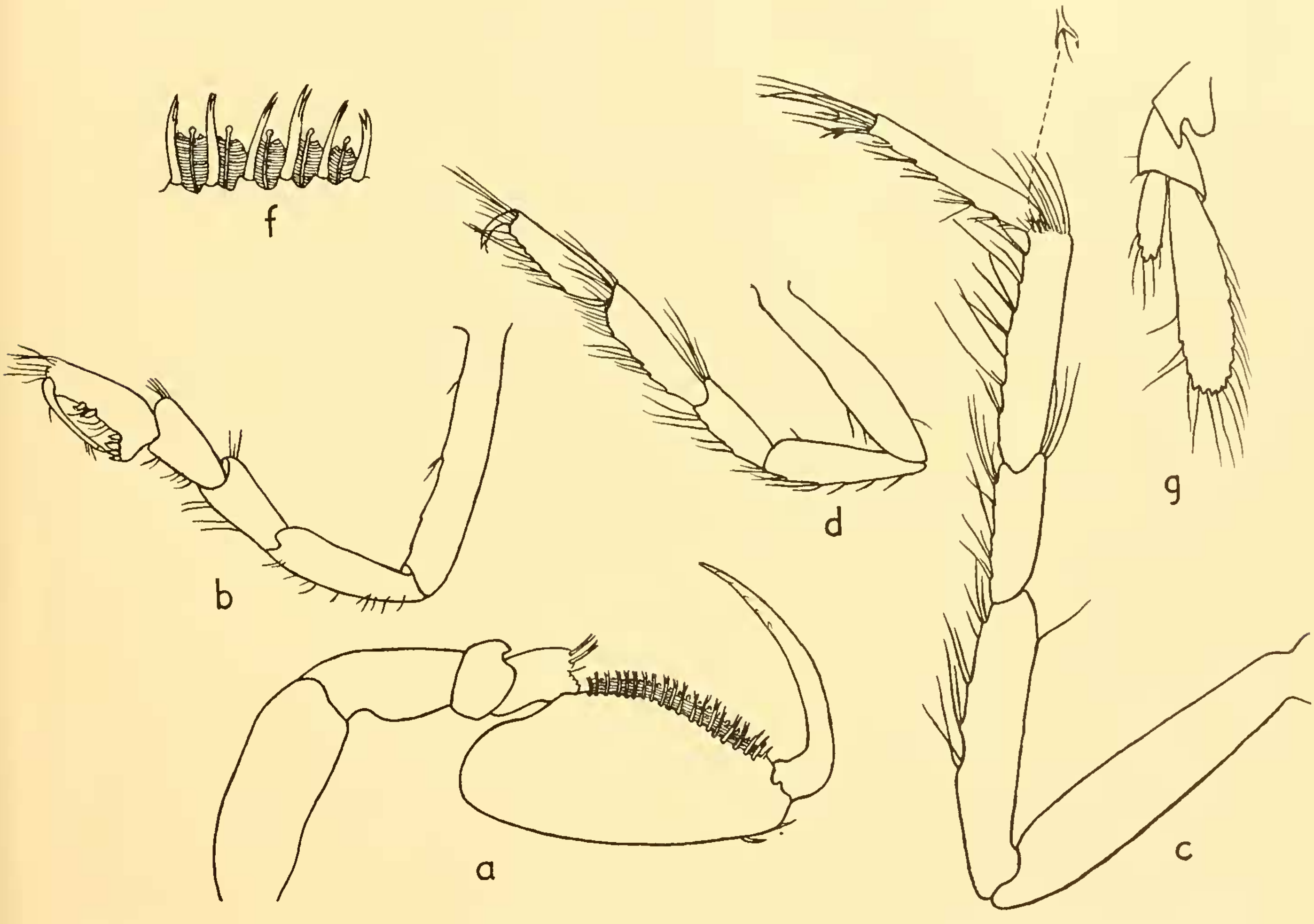
Text-fig. 23. *Serolis acuminata* sp.n., ×7.



Text-fig. 24. *Serolis acuminata* sp.n. (*a*) Antennule, ×16. (*b*) Antenna, ×16. (*c*) Maxilliped, ×50. (*d*) Maxilla, ×50. (*e*) Maxillula, ×50.

The form of the *antenna* may be seen from Text-fig. 24*b*, the peduncle consists of five joints, and the flagellum of twelve, of which the terminal three are small. The first three joints are fringed with very short hairs, the next six joints each bear a longitudinal row of minute spiniform processes.

The *mouthparts* are of the usual type, the maxilliped (Text-fig. 24*c*) is broad, with the basipodite separated from its lamella by a suture; the maxilla (Text-fig. 24*d*) has its two outer lobes each bearing two long setae with delicate pectinations along their inner edges; the truncate distal end of the fixed lobe is fringed with delicate setae; the outer lobe of the maxillula (Text-fig. 24*e*) is stout and bears ten

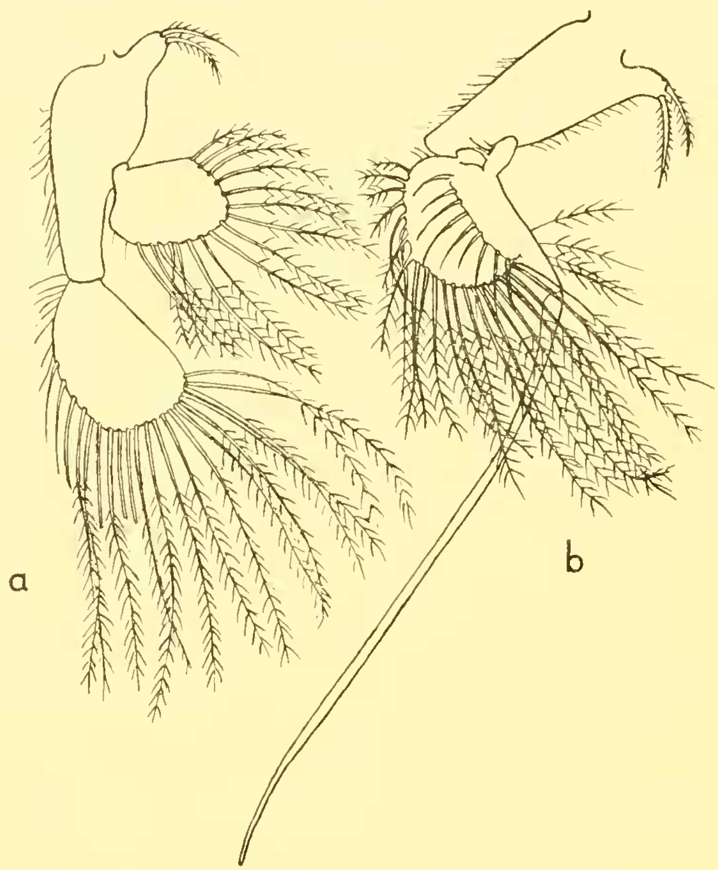


Text-fig. 25. *Serolis acuminata* sp.n. (*a*) First pereiopod, ×30. (*b*) Second pereiopod, ×30. (*c*) Sixth pereiopod, ×30. (*d*) Seventh pereiopod, ×30. (*e*) Spines on propodus of first pereiopod, enlarged. (*f*) Uropod, ×30.

spines and two delicate setae on the inner angle of its distal truncate extremity; the inner lobe is considerably shorter than the outer and is broadest at its distal extremity which is rounded and bears a single minute spine.

The first, second, sixth and last *pereiopods* are shown in Text-figs. 25*a*, *b*, *c* and *d*. The propodus of the first is greatly expanded, with its inner edge armed with a row of about twenty-two broad processes alternating with modified spines (Text-fig. 25*f*); the dactylus bears five flattened spines in its distal region and the distal end of the carpus is crenulate and bears two modified spines similar to those on the propodus. The second pereiopod (Text-fig. 25*b*) is much smaller than the first, with the propodus expanded and its inner margin armed with stout spines, a pair of which occurs at about the middle of its length and a group of four at its broadened proximal end. The remaining pereiopods, except for the last, are more or less alike (Text-fig. 25*c*); the last pair (Text-fig. 25*d*) are considerably smaller, with the propodus proportionately broader and the dactylus shorter and curved.

The first and second *pleopods* of the male are shown in Text-fig. 26*a* and *b*; the *appendix masculina* of the second pleopod reaches to the level of the tips of the uropods. The uropods (Text-fig. 25*g*), as already noted, do not extend beyond about two-thirds of the length of the terminal segment; the exopod is about half the length of the endopod, both have notched margins from which spring delicate setae, these are restricted to the distal region of the exopod.



Text-fig. 26. *Serolis acuminata* sp.n. (*a*) First pleopod ♂, ×36. (*b*) Second pleopod ♂, ×36.

This species fits into the key of the species of *Serolis* (Sheppard, 1933, pp. 278–82) in the section containing *S. cornuta* Studer and *S. trilobitoides* (Eights) (p. 280, BI, CII*b*2). The species can be readily distinguished from these by its smaller size and by the shape of the terminal segment.

DISTRIBUTION. Ross Sea.

Serolis ovata sp.n. (Text-figs. 27–29)

Occurrence. St. 1873: 13. xi. 36, 61° 20·8′ S., 54·04 2′ W., 210–180 m., 1 ♀ (non-breeding), the holotype.

DESCRIPTION. The single specimen (Text-fig. 27) on which this species is based is a female in the non-breeding phase, measuring 13 mm. in length and slightly over 10 mm. in greatest breadth; it is broadly ovate in outline and compact in form. The head is broadest anteriorly where the width is twice that of the length; a very small median rostral process is present, on either side of which the anterior margin is slightly excavated in the region of the base of the antennule. A curved transverse ridge extends from just behind the rostral process and dies out on the coxal area of the second thoracic somite; behind this, and in front of the eyes, the head is raised into a somewhat pitted area which is separated from the hinder part of the head by a second transverse ridge which extends between the anterior limit of the eyes. The hinder part of the head, between the eyes, is raised into two low, rounded prominences and between these, in the posterior median position, is a very small rounded projection. The region between the sutures separating the head from the second thoracic somite is marked by a shallow groove. The eyes are reniform in shape and contain black pigment.

As in all the members of the Serolidae, the second thoracic (first pereion) somite is fused with the head, the limits of which may be seen laterally by the presence of sutures. The median portion of the tergum of this and the succeeding somites, both thoracic and abdominal, is raised in a slight keel. The coxal plates of all the segments are somewhat thickened at their lateral margins; in this character the species resembles *S. bouvieri* Richardson (1906, pp. 7–10), where a similar but much greater thickening occurs. The third, fourth and fifth thoracic (second–fourth pereion) somites are subequal and their terga are separated from their respective coxal plates by sutures; the terga of the sixth and seventh thoracic somites together have a length less than one of the preceding ones; that of the seventh is about half the length of the sixth; the tergum and coxal plates of the last thoracic somite, as in most species of *Serolis*, are absent.

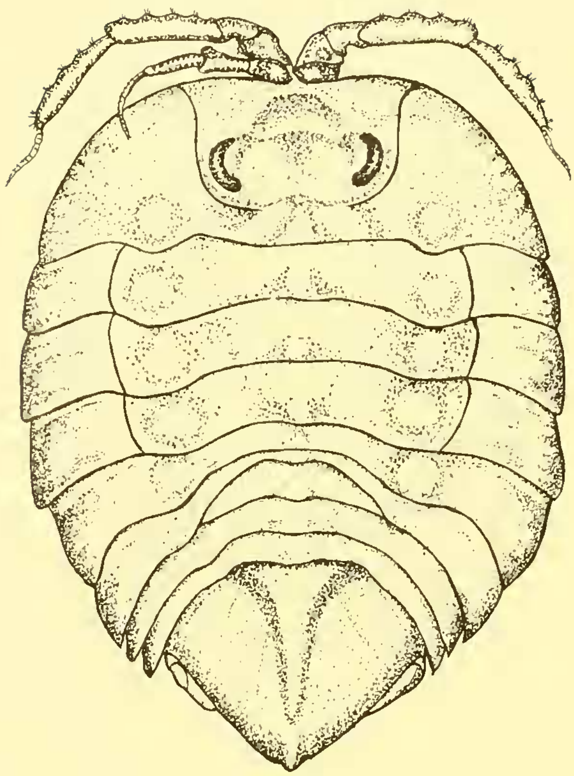
The terga of the three free abdominal segments are subequal and each is equal to the combined length of the sixth and seventh thoracic somites; the pleural plates of the second and third segments extend back beyond the coxal plates of the seventh thoracic somite, those of the third are slightly longer than the second, and reach to the level of the distal extremity of the protopodite of the uropods. The terminal segment is broader than long, somewhat pentagonal in outline, with thickened margins and a raised central area, the latter forming a broad keel, which narrows towards the posterior extremity of the segment and disappears a little distance from the tip of the segment, which is rounded and slightly keeled; arising from the broader portion of the keel, on either side, is a series of three delicate ridges (Text-fig. 27) which curve outwards and backwards and disappear some distance from the margins of the segment.

The peduncle of the *antennule* (Text-fig. 28*a*) consists of four joints, the first one of which is broad and geniculate, with a raised, rounded longitudinal ridge extending from the middle of its distal upper margin to a point a little short of the geniculation; a similar ridge is present on the second joint which is broadest at its distal end and is about two-thirds the length of the first; the third joint is a little longer but about half the width of the second, and the fourth is a third of the length of the third: the flagellum consists of seventeen joints, the distal one of which is very small; a single sensory seta is present at the distal end of each joint except the first four.

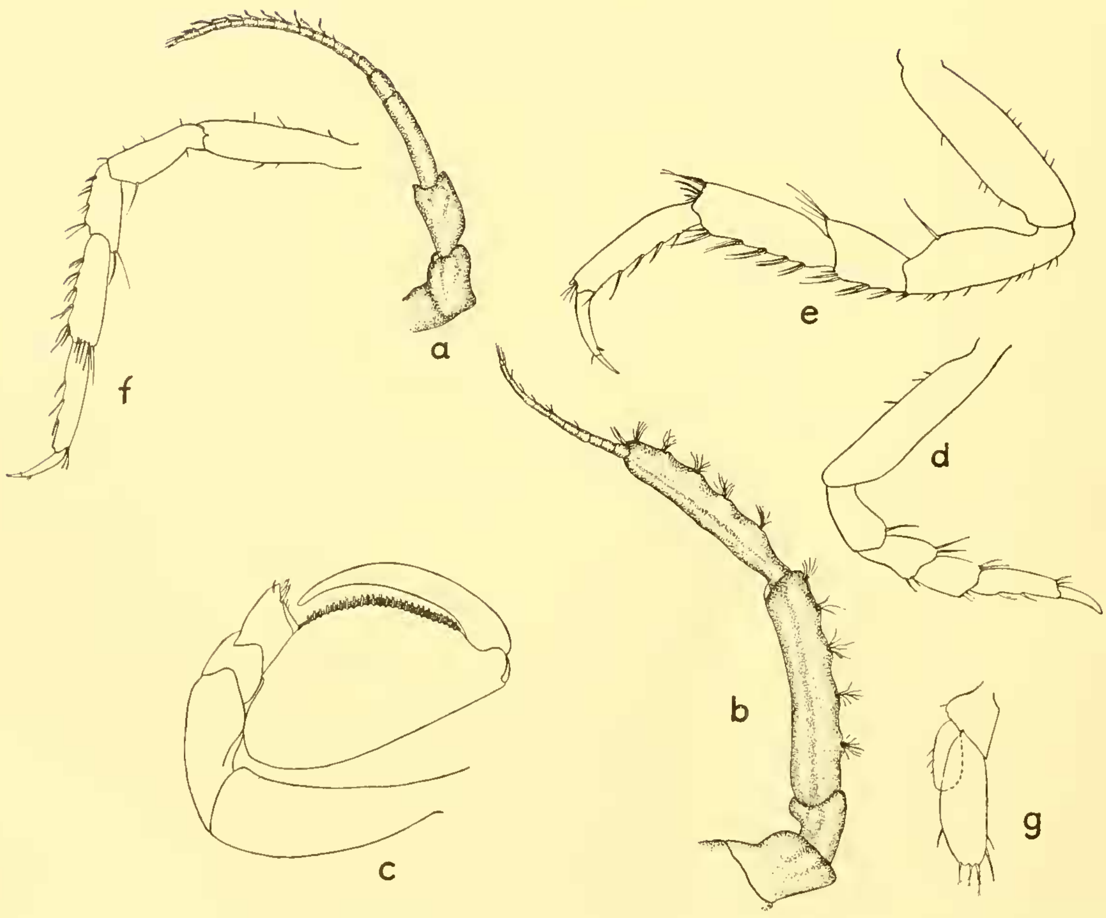
The *antenna* is shown in Text-fig. 28*b*; the first joint of the peduncle is short; the second and third are subequal, but the second is broader than the third which is narrower at its proximal end; the fourth and fifth are subequal and three times as long as the third; the fifth is narrower than the fourth; these two last-mentioned joints each possess five groups of delicate hairs which are found on raised areas along their anterior margins; a longitudinal ridge is present on all except the first joint of the peduncle; the flagellum is shorter and narrower than the fifth joint of the peduncle and consists of eleven joints, the distal one of which is small.

The *mouthparts* are of the usual type, the form of the maxillula, maxilla and maxilliped may be seen in the Text-fig. 27*a*, *b* and *c*.

The first, second, sixth and seventh *pereiopods* are shown in Text-fig. 28*c*, *d*, *e* and *f*. The first pereiopod, as usual, is of a stout build, with the propodus greatly expanded and with its inner margin armed with a row of about thirty-three broadly oval processes alternating with modified spines similar to those illustrated for *S. acuminata* (Text-fig. 25*f*). The distal edge of the carpus is crenulate and bears two spines similar to those on the propodus.

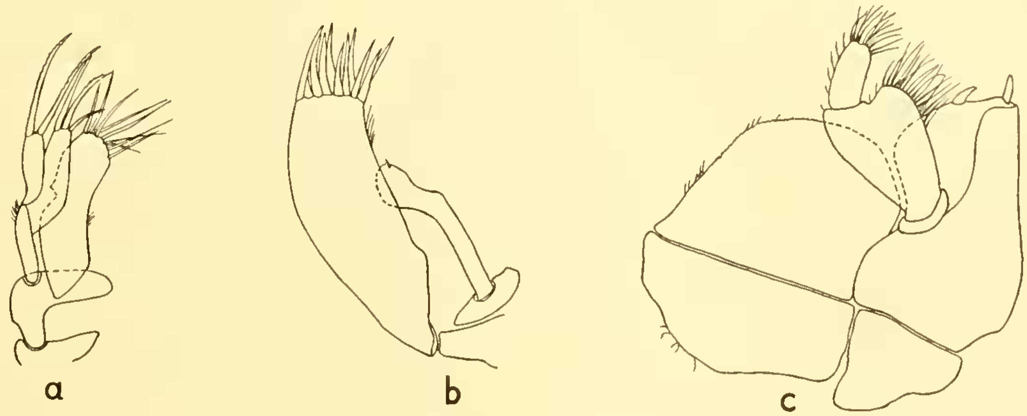


Text-fig. 27. *Serolis ovata* sp.n., ×7.



Text-fig. 28. *Serolis ovata* sp.n. (*a*) Antennule, ×12. (*b*) Antenna, ×12. (*c*) First pereiopod, ×12. (*d*) Second pereiopod, ×12. (*e*) Sixth pereiopod, ×12. (*f*) Seventh pereiopod, ×12. (*g*) Uropod, ×12.

The protopodite of each of the first three pairs of *pleopods* is triangular in shape, and like those of *S. acuminata* bear plumose setae (Text-fig. 26*a*); the exopodite of the fourth pleopod is divided, near its distal end, by a transverse suture at right angles to its long axis: the uropods (Text-fig. 28*g*) extend half way along the lateral margins of the terminal segment; the protopodite of each is triangular in shape; the exopodite is half the length of the endopodite, and both have rounded distal extremities, that of the former bears two or three short plumose setae, and a few simple ones.



Text-fig. 29. *Serolis ovata* sp.n. (*a*) Maxilla, ×32. (*b*) Maxillula, ×32. (*c*) Maxilliped, ×32.

This species can be placed in the key to the species of *Serolis* (Sheppard, 1933, pp. 279–82), in section B I C I *b* (pleural plates on third abdominal segment extend beyond those of second) and in this group in 2β (ii) (Uropods *not* broad and extending beyond the posterior extremity of the terminal segment). Thus, in general characters *S. ovata* sp.n. comes nearest to *S. exigua* Nordenstam (1933, pp. 70–5), but can be readily distinguished from that species by the compact form of its body with its somewhat thickened coxal plates, and by the absence of a median backwardly projecting spine to the cephalosome.

DISTRIBUTION. Scotia Sea, 61° 20·8′ S., 54·04° 2′ W.

SUMMARY

1. The supplement records additional species of the family Serolidae from the Discovery collections made between 1928–37.

2. Two new species *Serolis acuminata* and *Serolis ovata* are described.

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