

DEEP-SEA TANAIDACEA

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CONTENTS

I. Introduction	23	Neotanaidae Lang	133
II. Terminology, mode of descriptions, and methods of measuring	24	Key to the genera	133
III. Notes on the postmarsupial development and on the sexual dimorphism	25	<i>Neotanaïs</i> Beddard	133
IV. Taxonomic part.	26	Key to the females	134
A. Species collected by the <i>Galathea</i> Expedition	26	<i>Neotanaïs deflexirostris</i> n.sp.	135
Apseudidae G. O. Sars	26	<i>Neotanaïs bacescui</i> n.sp.	141
Preliminary revision of the genus <i>Apseudes</i>	27	<i>Neotanaïs peculiaris</i> n.sp.	147
<i>Apseudes</i> Leach	27	<i>Neotanaïs pfaffioides</i> n.sp.	152
<i>Apseudes grossimanus</i> Norman & Stebbing	28	Paratanaidae Lang	157
<i>Apseudes lagenirostris</i> n.sp.	33	<i>Typhlotanaïs</i> G. O. Sars	161
<i>Apseudes setosus</i> n.sp.	39	<i>Typhlotanaïs peculiaris</i> n.sp.	161
<i>Apseudes tuberculatus</i> n.sp.	47	<i>Leptognathia</i> G. O. Sars	166
<i>Apseudes diversus</i> n.sp.	54	<i>Leptognathia parabrevimanu</i> n.sp.	166
<i>Carpoapseudes</i> n.gen.	60	<i>Leptognathia forcifera</i> n.sp.	170
Key to the species	62	<i>Leptognathia paraforcifera</i> n.sp.	174
<i>Carpoapseudes serratispinosus</i> n.sp.	63	<i>Paranarthrura</i> Hansen	179
<i>Carpoapseudes longissimus</i> n.sp.	72	Key to the species	179
<i>Carpoapseudes oculicornutus</i> n.sp.	79	<i>Paranarthrura undulata</i> n.sp.	179
<i>Leiopus</i> Beddard	87	<i>Anarthruopsis</i> n.gen.	183
Key to the females	89	<i>Anarthruopsis galathea</i> n.sp.	184
Key to the males	89	<i>Exspina</i> n.gen.	188
<i>Leiopus shiinoi</i> n.sp.	91	<i>Exspina typica</i> n.sp.	188
<i>Leiopus aberrans</i> n.sp.	97	B. Supplementary description of some deep-sea species collected by other expeditions	193
<i>Leiopus conspicuus</i> n.sp.	103	<i>Leiopus leptodactylus</i> Beddard	193
<i>Leiopus wolffi</i> n.sp.	110	<i>Leiopus gracilis</i> (Norman & Stebbing)	195
<i>Apseudella</i> n.gen.	120	<i>Leiopus sibogae</i> (Nierstrasz)	197
<i>Apseudella typica</i> n.sp.	120	<i>Leiopus weberi</i> (Nierstrasz)	200
<i>Sphyrapus</i> Norman & Stebbing	126	<i>Leiopus gracillimus</i> (Hansen)	203
Key to the species	127	<i>Leiopus hanseni</i> n.nom.	204
<i>Sphyrapus dispar</i> n.sp.	127	<i>Leiopus galathea</i> (Wolff)	205
		V. Summary	207
		VI. Literature cited	208

I. INTRODUCTION

WOLFF (1956a) has preliminarily described six species of *Neotanaïs* collected by the *Galathea* Expedition 1950-52 at depths between 400 and 6000 m. The present paper deals with the rest of the tanaids from this area. It contains four new genera and twenty-five species, twenty-four of which are new. Further-

more, the genus *Leiopus* Beddard (1886a, p. 116; 1886b, p. 114) has been reinstated.

Most of the species are represented by a single specimen or very few specimens and some of them are more or less incomplete.

The deep-sea Tanaidacea collected by the *Vema*

Expedition have also been placed at my disposal. The collections of the expeditions mentioned are quite different. The larger specimens from the *Vema* Expedition are as a rule much more mutilated than those from the *Galathea* Expedition, and the former material is much richer in small species, some of which are in their tubes, than the latter one. This must be due to the different modes of collecting used by the two expeditions.

Thanks to the courtesy of the following scientists, to whom I express my sincere gratitude, I have also had the opportunity of examining some other deep-

sea Tanaidacea, described earlier: Dr. J. FOREST, Natural History Museum, Paris; Dr. I. GORDON, British Museum of Natural History, London; Dr. A. GRUNER, Zoological Museum of the Humbolt University, Berlin; Dr. R. K. KUDINOVA-PASTERNAK, Moscow State University, U.S.S.R.; Dr. J. H. STOCK, Zoological Museum, Amsterdam; and Dr. T. WOLFF, Zoological Museum of the University, Copenhagen.

The types and the other collection are in the Zoological Museum, Copenhagen. Some duplicate specimens are in the Riksmuseum, Stockholm.

II. TERMINOLOGY, MODE OF DESCRIPTIONS, AND METHODS OF MEASURING

For the body segments and the legs the terminology of WOLFF (1956b, pp. 188-189) has been used, except that the anterior prolongation of the propus of the cheliped has not been called "the fixed finger" but simply "the finger", and that "the movable finger" has been replaced by the, in my opinion, correct term "the dactylus".

The antennulae, antennae, peraeopods, and uropods are often provided with some characteristic setae which G. O. SARS (1886, p. 363) named "auditory bristles". These setae are movable, feathered and as a rule more or less dagger-shaped, and they are attached to a small one- or sometimes two-jointed protuberance. As it is certain that they have no auditory function and as their real function is unknown, I have referred to them by the neutral term "particular setae". They have often been lost and especially on the basis of the peraeopods it is very difficult to count them because they are situated all around the joint. In the descriptions, therefore, only the presence or absence of them has been mentioned.

As the number of ordinary setae on the joints of the above-mentioned appendages of the Apseudidae is very variable even in the same specimen, their number has not been mentioned.

The Apseudidae represented in the present paper have in common that the first joint of the inner antennular flagellum forms a rectangular excavation on the outside, from which the outer flagellum issues; that the distal part of the first joint of the palp of the maxillipeds is expanded outward; that the couplers are set with small flukes, and that the exopodites of the chelipeds and peraeopods II are

three-jointed with setae on the last joint only. These common characters have thus not been mentioned in the descriptions.

The inner part of the distal margin of the maxillae is in all Apseudidae and in the females of the Neotanaidae set with a caudal subterminal sparse row of more or less spiniform setae, and opposite to this row there is a close-set row of more or less slender setae, dilated at the base, which as a rule continues in a gentle curve below the fixed endite. To avoid repetition and for the sake of brevity these rows are simply designated as the caudal and rostral row, respectively. As the number of the setae in the caudal row and the armament of the setae of both rows seem to be of specific value, these characters have been pointed out in the descriptions.

The oral parts and the legs have been oriented in the same way as proposed by RACOVITZA (1923, pp. 77-79). The surface of the oral parts which faces the body is the rostral and the opposite surface the caudal one. The lower surface of the cheliped is the sternal, the opposite surface the tergal one, and the inner surface is the rostral, the outer surface the caudal one. If we presume that by walking the terminal claw of the peraeopods is directed straight downwards we get one ventral, one dorsal, one anterior, and one posterior surface. These surfaces have been designated as the sternal, the tergal, the rostral, and the caudal surfaces, respectively. As the last three pairs of peraeopods are directed opposite to the preceding ones their rostral surface corresponds to the caudal surface of the latter.

If nothing is said to the contrary, the length of the specimens is measured from the tip of the rostrum

to the posterior end of the pleotelson; the width is measured across the second peraeonite, i.e., the first free peraeonite.

The length of the carapace of the Apseudidae, *Sphyrapus* excepted, is measured from the base of the rostrum, of the other species from the tip of the rostrum, to the posterior margin; and the width of it is in all species measured across the broadest part.

The width of each joint of the chelipeds is measured perpendicular to the tergal and the sternal surfaces, the length of the carpus is measured along the caudal surface, and the length of the propus is measured from the middle of the posterior margin to the tip of the terminal claw.

The length of the joints of the peraeopods is measured along the middle of the caudal or sternal surface.

III. NOTES ON THE POSTMARSUPIAL DEVELOPMENT AND ON THE SEXUAL DIMORPHISM

The present material contains but few manca stages, i.e., stages where the last pair of peraeopods is not fully developed. Of *Anarthruopsis galathea* n. gen., n. sp. (see p. 188) one specimen, of *Exspina typica* n. gen., n. sp. (see p. 192) two, and of *Leiopus wolffi* n. sp. (see p. 117) seven such specimens have been found. In the two first-mentioned species peraeopods VII are completely lacking while in the last-mentioned species, which is about 5.5 mm long, this pair is rudimentary but distinctly six-jointed and the pleopods are rudimentary and without setae (see p. 119, Fig. 68e-f).

Of *L. wolffi* there are also four specimens with a length of about 7.0 mm which have fully developed peraeopods VII but imperfectly developed pleopods, provided with only two setae on each ramus (see p. 119, Fig. 68h). This stage, which I designate as "youth stage", is followed by at least two stages without any trace of oostegites. The first one is about 7.8 mm long, the second one about 8.3 mm and they have the first pair of pleopods armed as shown in Fig. 69a-b (p. 119), respectively.

The manca stages and the youth stages of *L. wolffi* are rather more slender than the adult specimens and all of them have hyposphenians on peraeonites 1-7.

Before going any further it may be pointed out that in the present paper (see p. 88), *Apseudes galathea* Wolff (1956b, p. 191), *Apseudes gracilis* Norman & Stebbing (1886, p. 95), *Apseudes gracillimus* Hansen (1913, p. 15), *Apseudes sibogae* Nierstrasz (1913, p. 3), *Apseudes weberi* Nierstrasz (1913, p. 7) and *Apseudes zenkevitchi* Kudinova-Pasternak (1966, p. 518) have been transferred to *Leiopus* Beddard (1886a, p. 116), the generotype of which is *L. leptodactylus*.

WOLFF (op. cit., pp. 195-196, 201, and 203-204) has made the interesting observation that the pleotelson and the mandibles in *L. galathea* and *L.*

gracillimus show sexual dimorphism. In the first-mentioned species the female pleotelson is "cylindrical throughout" while in the male the distal half of the ventral side "becomes more and more flattened towards the end", and "on this flattened area" there are "two longitudinal, rounded keels ... which increase in height towards the distal end of pleotelson where they are abruptly cut off", and "viewed from below they are seen to diverge and to bear two short setae on the hind margin ... only one", however, "could be seen on the left keel". The dorsal side has "two longitudinal, lateral furrows" which "divide the distal end of pleotelson into a median part and two lateral sections which serve as a base for the two attached peduncles of the uropods", and "the median part has a low furrow in the middle which posteriorly ends at a transverse seam ... furnished with a backwards pointing, median bend, anterior to which there is a low convexity with a pair of setae" (WOLFF, op. cit., p. 195). In *L. gracillimus*, the pleotelson shows a similar sexual dimorphism (WOLFF, op. cit., p. 203).

In both species the spines on the spiniferous lobe of the right mandible are stiletto-shaped in the male while in the females all or most of the spines are forked. The spines on the left male mandible are stiletto-shaped in *L. galathea*, almost missing in *L. gracillimus*, and in both species the pars incisiva is almost conical (WOLFF, op. cit., pp. 192-193, 196, 203-204).

I myself had long before made the same observations on *L. weberi* Nierstrasz but I thought the male was abnormal because in *L. sibogae* Nierstrasz the pleotelson and the mandibles were almost alike in the two sexes. After having examined the *Galathea* material it is clear to me that the male of the first-mentioned species is adult, while the male of the last-mentioned species is not.

It is quite obvious that the transformation of the mandibles and the pleotelson in the males takes place gradually during the last moultings. In the subadult males of *L. wolffi* the mandibles and the pleotelson are the same as in the females, in the subadult male of *L. conspicuus* the mandibles are the same as in the female while the pleotelson is more like that of the adult male (see p. 110, Fig. 60a-c), and in the three males of *L. shiinoi* the antennulae

and the pleotelson are alike but in one of them two of the spines on the spiniferous lobe of the right mandible are bifurcate while in the other two males all the spines on the mandibles are stiletto-shaped (see p. 92, Fig. 47).

In none of the males examined by me is the pars incisiva transformed as in *L. galathea* and *L. gracillimus*.

IV. TAXONOMIC PART

A. Species collected by the Galathea Expedition

APSEUDIDAE G. O. Sars, 1882

Apseudidae G. O. Sars, 1882a, p. 8.

The question of whether the family Apseudidae is a natural one is outside the compass of the present study. An answer to this question cannot be given before we have brought order into the species and genera hitherto described, and it will be a long time before we get to that. How the matter stands for the present may be illustrated by some examples.

The family has *inter alia* been characterized by having fossorial peraeopods II (G. O. Sars, 1882a, pp. 8-9; 1886, p. 265; 1896, p. 5; RICHARDSON, 1905, p. 37). In many genera, however, such as *Pagurapseudes* Whitelegge (1901, p. 209), *Metapseudes* Stephensen (1927, p. 374), *Synapseudes* Miller (1940, p. 311), *Apseudomorpha* Miller (*op. cit.*, p. 315), *Pagurapseudopsis* Shiino (1963, p. 491), and in *Apseudes simplicirostris* Norman & Stebbing (1886, p. 91), this pair is constructed in almost the same way as the two succeeding pairs, and in *Apseudes chilensis* Chilton (1923, p. 879) it seems to be adapted not for digging but for swimming.

According to the diagnosis of *Apseudes* Leach (see G. O. Sars and RICHARDSON, *opera cit.*), the chelipeds and the peraeopods II should be provided with an exopodite, and the pleonites with pleopods. But in many species nothing is known about the exopodites. In *A. multicarinatus* Whitelegge (*op. cit.*, p. 204), pleopods are present but there are no exopodites, in *A. galathea* Wolff (1956b, p. 191) and *A. zenkevitchi* Kudinova-Pasternak (1966, p. 518) exopodites are present but the females have no pleopods (in this paper the two latter species have been transferred to *Leiopus*). *Hodometrica* Miller (*op. cit.*, p. 313) has mainly been based upon the idea that the female lacks pleopods; a re-examina-

tion of the single species of the genus, however, has proved that it has five pairs of small pleopods. According to MENZIES (1953, p. 483), "at least one good characteristic separates" his genus *Imitapseudes* and *Apseudomorpha* Miller, viz., that the former genus has five pairs of pleopods whereas the latter has only one pair. A re-examination of the species of the two genera has proved that all of them have five pairs of pleopods which, however, are very difficult to detect because they are very small and closely pressed to the body; moreover, they easily fall off. Of other species re-examined, *Apseudes avicularia* Barnard (1914, p. 329a) has proved to belong to *Apseudomorpha*, and MENZIES (*op. cit.*, p. 493) refers *Metapseudes albidus* Shiino (1951, p. 18) to *Imitapseudes*, which, however, is synonymous with *Apseudomorpha*. In this connection we should bear in mind the fact that in *Pagurapseudes* (WHITELEGGE, 1901, p. 213) the number of pleopods varies between none and three pairs.

Besides the two genera mentioned above, MILLER (*op. cit.*, p. 311) has also established a genus *Synapseudes* for a single species which according to him has only two pleonites, and MENZIES (*op. cit.*, p. 461), too, who describes three new species of the genus, says that they have but two pleonites. A re-examination of all these species, however, has proved that in reality there are three pleonites, the last one being very small and difficult to detect.

As distinguishing characters between *Apseudes* and *Sphyrapus* Norman & Stebbing (1886, p. 97), G. O. Sars (1896, pp. 8-9) *inter alia* points out that in the former the antennulae are alike in the two sexes while in *Sphyrapus* the outer male antennular flagellum is densely set with aesthetascs, and that the peraeopods II of the males of this genus are of extraordinary length. The last-mentioned statement

holds good for the species described by Sars, but judging from the figures of NORMAN & STEBBING (*op. cit.*, pl. XXII, Figs. I L and II D.L.) it seems not to be true for the species described by them, and in many species of *Apseudes* the outer male antennular flagellum is as richly set with aesthetascs as in *Sphyrapus*. In this connection it may be noted that a re-examination of *Sphyrapus stebbingi* Richardson (1911, p. 518), which is described in a very incomplete manner and without any figures, has shown that it does not belong to *Sphyrapus*.

In all Apseudidae, the antennulae have two flagella, the mandibles a three-jointed palp, the left mandible a well-developed lacinia mobilis, the maxillulae two endites, the maxillae one fixed and one movable endite which consists of two lobes, the maxillipeds a four-jointed palp, and the dactylus of the pereopods is devoid of any sensory organs; these characters have therefore not been mentioned in the generic diagnoses.

It may also be pointed out that the number of flagellar joints on the antennulae and antennae, the number of couplers and setae on the vertical surface of the endite and on the palp of the maxillipeds, the number of setae and spines on the joints of the pereopods, the number of setae on the exopodite of the chelipeds and pereopods II, and the number of uropodal joints varies in specimens of the same species.

Preliminary revision of the genus *Apseudes* Leach, 1814

The most primitive species of Tanaidacea are to be found in extant *Apseudes*. It is, however, clear that the genus contains different evolution series and that it must be split up. At the present I am not able to make a complete revision of the genus because for that an examination of all species hitherto described would be necessary. For this reason I must restrict myself to making a partial revision. It must, however, be said at once that a further division of the genus is necessary because it is quite obvious that such a species as, for example, *A. multicarinatus* Whitelegge (1901, p. 204), which I have re-examined, does not fit into any of the genera given below. To this species I will return in another paper.

In most species pereopods II are adapted for digging or swimming while in other species they either do not differ or differ only very slightly from the other pereopods. The latter must, in my opinion, be regarded as a primitive character.

As mentioned above (p. 25), some species show sexual dimorphism in the pleotelson and the mandibles. Obviously this is a secondary character but there can be no doubt that these species are of monophyletic origin.

Earlier (LANG, 1949, p. 4) I have cancelled the monotypic genus *Leiopus* Beddard (1886a, p. 116; 1886b, p. 114), which according to the diagnosis differs from *Apseudes* only by having more slender chelipeds. Having now re-examined BEDDARD's species I find it necessary to reinstate the genus.

The *Galathea* material also contains a species which has taken quite another course than the other Apseudidae: it has lost the maxillular palp, and the epignath of the maxillipeds is almost falciform. In the loss of the maxillular palp the species agrees with Neotanaididae.

In this connection it may be mentioned that SHINO (1963, p. 491) with good reason has transferred *A. gymnophobia* Barnard (1935, p. 317) to his new genus *Pagurapseudopsis*.

With regard to the characters mentioned above, the species which I have examined hitherto have been referred to four different genera.

In the diagnoses the proper generic characters are marked in spaced type.

Apseudes Leach, 1814

Apseudes Leach, 1814, p. 372.

? *Eupheus* Risso, 1816, p. 124.

Rhoea Edwards, 1828, p. 292.

Apseudes Leach, Norman & Stebbing 1886, p. 80 (partim).

Apseudopsis Norman, 1899, pp. 329-330.

Apseudopsis Norman, NIERSTRASZ 1913, p. 14.

Apseudes Leach, NIERSTRASZ 1913, pp. 3-14 (partim).

Remarks on the synonymy:

Eupheus was established by Risso for the new species *E. ligioides*. He referred this genus to the order Gymnobranches which he divides into the sections Squillines, Tétracères and Entomostracés. Squillines comprises the families Squillares and Crevettines, and *Eupheus* is placed in the last-mentioned family. LAMARCK (1818, p. 169; 1838, p. 291) mentions the species as *Apseudes ligioides* but in the latter opus he writes that "il nous paraît devoir se rapporter à notre genre *Tanais*". However, the species is described in such a manner and the illustration of it (RISSE *op. cit.*, pl. 3, fig. 7) is so incorrect that it cannot possibly be identified. As I have in

vain asked different museums about the species, I must place the genus among *genera incertae*. It cannot be decided to what extent the concept of *Apseudes*, as held by authors not mentioned above, coincides with the diagnosis given below.

Generotype: *Apseudes talpa* (Montagu).

Syn. *Cancer Gammarus Talpa* Montagu, 1808, p. 98, pl. IV, fig. 6.

Apseudes talpa Leach, 1814, p. 372.

Apseudes hibernicus Walker, 1897, p. 228, pl. 17, figs. 2-2d; pl. 18, figs. 2e-f.

Nec. *Apseudes talpa* (Mont.), G. O. Sars 1882a, p. 10; 1886, p. 267, pls. 1-2.

Diagnosis:

Pleon with five pleonites. Separated ocular lobes present or absent, with or without visual elements. Antenna with squama. Maxillula with palp. Epignath of maxillipeds a large vaulted plate with a long terminal spine. Chelipeds and peraeopods II with or without exopodite. Peraeopods II adapted for digging (or swimming?); coxa formed into a spiniform projection directed obliquely forwards and downwards; carpus shorter than merus. Five pairs of pleopods. Pleotelson and mandibles without sexual dimorphism.

Remarks on the comprehension of the genus and on the synonymy:

To this genus have been preliminarily referred all those species which have not been transferred to any of the succeeding three genera.

That *A. sculptus* Pfeffer (1889, p. 41) and *A. hermaphroditicus* Lang (1952, p. 341) are synonymous with *A. spectabilis* Studer (1883, p. 23) has already been pointed out by me (LANG, 1958b, p. 536). In another paper I (LANG, 1955, pp. 57-66) have expressed the opinion that *Apseudopsis* Norman (1899, pp. 329-330) must be incorporated with *Apseudes*, and that *Apseudes latreilli* Edwards and *A. latreilli* var. *coecus* in some authors, *Apseudes clausi* Boas (1886, p. 109), *Apseudopsis hastifrons* Norman & Stebbing (1886, p. 133), and *Apseudopsis ostroumovi* Băcescu & Cărausu (1947, p. 366) are identical with *Apseudes acutifrons*. BĂCESCU (1961, pp. 151-152) declares *inter alia* that LANG simply considers *Apseudes latreilli* as synonymous with *A. acutifrons*. However, I have only said (LANG, 1955, p. 65) that *A. latreilli* in CLAUS (1884, p. 319; 1885, p. 316), and in BOAS (1885, p. 113) is synony-

mous with *A. acutifrons*. And that is quite another thing.

HOLTHUIS (1949, pp. 185-187) has, quite rightly, pointed out that *Apseudes hibernicus* Walker is a synonym of *A. talpa*, while *A. talpa* in G. O. Sars (1882a, p. 10; 1886, p. 267, pls. 1-2) is not the species described by MONTAGU. For that reason he proposes the new name *A. sarsi* for Sars's species. But as this name is preoccupied by CLAUS (1887, p. 141), BĂCESCU (1961, p. 146) renames the species *A. holthuisi*. It may also be noted that *A. talpa* in LILLJEBORG (1864, p. 9, and 1865, p. 9), MEINERT (1877, p. 85), METZGER (1875, p. 284), G. O. Sars (1886, pp. 86 and 120; 1868, p. 261), and STEPHENSEN (1937, p. 22) refers to *A. spinosus* (M. Sars) (1858, p. 30), and that *A. koehleri* Bonnier (1896, pp. 562 and 678, pl. XXXI, fig. 1) according to the opinions of NORMAN (1899, p. 330) and ZIRWAS (1911, p. 77) is synonymous with *A. spinosus*. With some hesitation, RICHARDSON (1912, p. 584) shares this opinion and the reference seems to HANSEN (1913, p. 11) to be "somewhat doubtful". In my opinion there can be no doubt that NORMAN and ZIRWAS are right.

Apseudes grossimanus Norman & Stebbing, 1886

- 1870. *Apseudes grossimanus* Norman, p. 157 (n. nud.).
- 1880. *Apseudes grossimana* Norman, NORMAN, p. 387 (n. nud.).
- 1886. *Apseudes grossimanus* Norman, NORMAN & STEBBING, p. 93, pl. XIX.
- 1899. *Apseudes grossimanus* Norman, NORMAN, p. 331.
- 1904. *Apseudes grossimanus* Norman, STEBBING, p. 48.
- 1904. *Apseudes grossimanus* Norman, TATTERSALL, p. 601.
- 1906. *Apseudes grossimanus* Norman, TATTERSALL, pp. 109, 110, 136.
- 1910. *Apseudes grossimanus* Norman, STEBBING, p. 419.
- 1912. *Apseudes grossimanus* Norman, RICHARDSON, p. 584.
- 1913. *Apseudes grossimanus* Norman & Stebbing, NIERSTRASZ, pp. 10, 11, 13.
- 1915. *Apseudes grossimanus* Norman & Stebbing, STEPHENSEN, p. 28.
- 1925. *Apseudes grossimanus* Norman & Stebbing, MONOD, p. 62.
- 1955. *Apseudes grossimanus* Norman & Stebbing, LANG, p. 74, figs. 12-15.

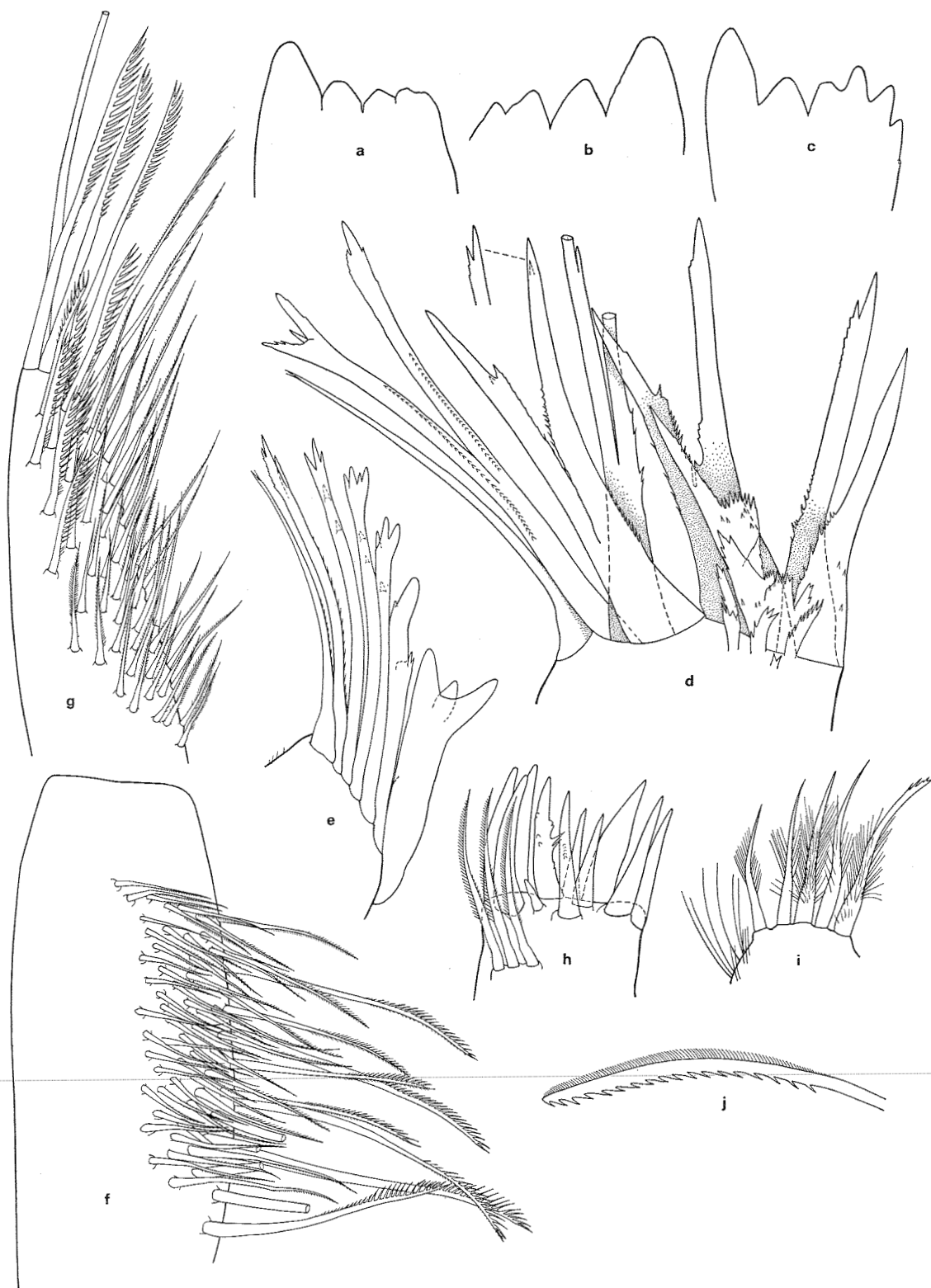


Fig. 1. *Aapseudes grossimanus* Norman & Stebbing, ♀; a-b, pars incisiva of right and left mandibles ($\times 205$); c, lacinia mobilis of left mandible ($\times 205$); d-e, armament of spiniferous lobe of left and right mandibles ($\times 320$ and $\times 205$, resp.); f-g, distal part of last two joints of palp of left mandible ($\times 205$); h-i, distal part of endites of maxillula, caudal view ($\times 205$); j, distal end of seta of maxillular palp ($\times 320$).

Material:

St. 110, Loanda-Lobito (12°05'S, 13°08'E), 975 m, 19 Dec. 1950. Gear: 3 m sledge trawl. Bottom: clay. Bottom temp.: c 4.1°C. – 1 female (with rudimentary oostegites).

St. 137, off SW Africa (20°04'S, 11°56'E), 537 m, 23 Dec. 1950. Gear: 3 m sledge trawl. 3 adult females, 2 adult males.

Supplementary description of female:

Length 16 mm.

Mandibles (Fig. 1a-g). Pars incisiva four-dentate (in the specimen described by me in 1955, the pars incisiva of the right mandible is only three-dentate). Lacinia mobilis of left mandible irregularly six-dentate with a small accessory tooth on the caudal margin. Spines of left mandible much more complicated than those of the right mandible (cp. Fig. 1d and e). Setae on last two joints of the palp shaped as shown in Fig. 1f and g.

Maxillula (Fig. 1h-j). Outer endite with three plumose caudal setae near the distal end and with the end surmounted by one dwarfed and ten strong, blunt spines, two of which have some spiniform projections. Inner endite with five terminal spines shaped as shown in Fig. 1i. Setae of the palp serrate along the most distal part of the concave margin and set with tiny hairs on the opposite margin.

Maxilla (Fig. 2a-c). Caudal as well as rostral surface partly adorned with groups of tiny spinules and hairs. Setae of rostral row bare, those of caudal row twelve in number and finely ciliate. Rostral surface of fixed endite with a subterminal row of spines shaped as shown in Fig. 2b; caudal surface with one strong subterminal seta which is serrated along the distal half; the outer part of the distal margin is set with a row of setae, some of which are ciliate on one side, along the distal half, and the inner part of the margin bears four strong, forked spines, the innermost of which is much longer than the others. Outer lobe of movable endite set with nine setae, inner lobe with a great number of setae.

Maxilliped (Fig. 2d-e). Basis with a strong caudal spine just behind the palp (a re-examination of my preparations of the specimen I described earlier – LANG 1955, p. 78, and Fig. 14E – has proved that in this specimen the spine has been lost). Some of the setae on the last two joints of the palp are shaped in the same manner as the terminal setae of the last joint of the mandibular palp. Dorsal surface of endite with two long setae near the distal margin; median vertical surface set with twelve plumose

setae on the free margin; there are four (left endite) or three (right endite) couplers.

Cheliped (Fig. 3a-b). The cheliped differs from my earlier description (LANG, *op. cit.*, p. 78, fig. 13C) in the following respects. The last joint of the exopodite has not five, but four setae. The sternal surface of the carpus has no dentiform process. The sternal surface of the propus has not six, but nine setae, and the tergal surface of the finger has no dentiform process near the base.

Peraeopods armed almost exactly as in the female earlier figured by me (LANG, 1955, fig. 13D-I).

Supplementary description of the male:

Length 17 mm (the male described by me in 1955 is only 8.2 mm long).

Cheliped (Fig. 3c). The propus differs considerably from my earlier illustration (*op. cit.*, fig. 14I) and it is much more like that figured by NORMAN & STEBBING (1886, pl. XIX, fig. 1L). The other joints agree almost exactly with those of the specimen described by me in the just-mentioned paper.

Remarks:

A re-examination of the female described by me from the *Atlantide* Expedition (*op. cit.*) has proved that it has a genital cone which is as well developed as that of the male.

In the female described above, as well as in the other females taken by the *Atlantide* and the *Gala-thea* Expeditions, there is neither a genital cone nor a hyposphenie.

The presence of marsupium and genital cone, as well as the shape of the cheliped in the female from the *Atlantide* Expedition, strongly indicates that this specimen is protogynous. That protogyny occurs within the tanaids has been demonstrated earlier by the present author (LANG, 1958b).

The quite different shapes of the male cheliped in the specimens figured by NORMAN & STEBBING (1886), by LANG (1955) and in the present paper show that this is due to the developmental stage of the specimens, the male figured by me in 1955 being 8.2 mm long, that figured by NORMAN & STEBBING 12.7 mm and that figured in the present paper 17.0 mm.

The species differs from all other species of the genus hitherto described in the shape of rostrum, in the presence of three caudal setae on the outer endite of the maxillula, and in the presence of the strong spine on the caudal surface of the basis of the maxilliped.

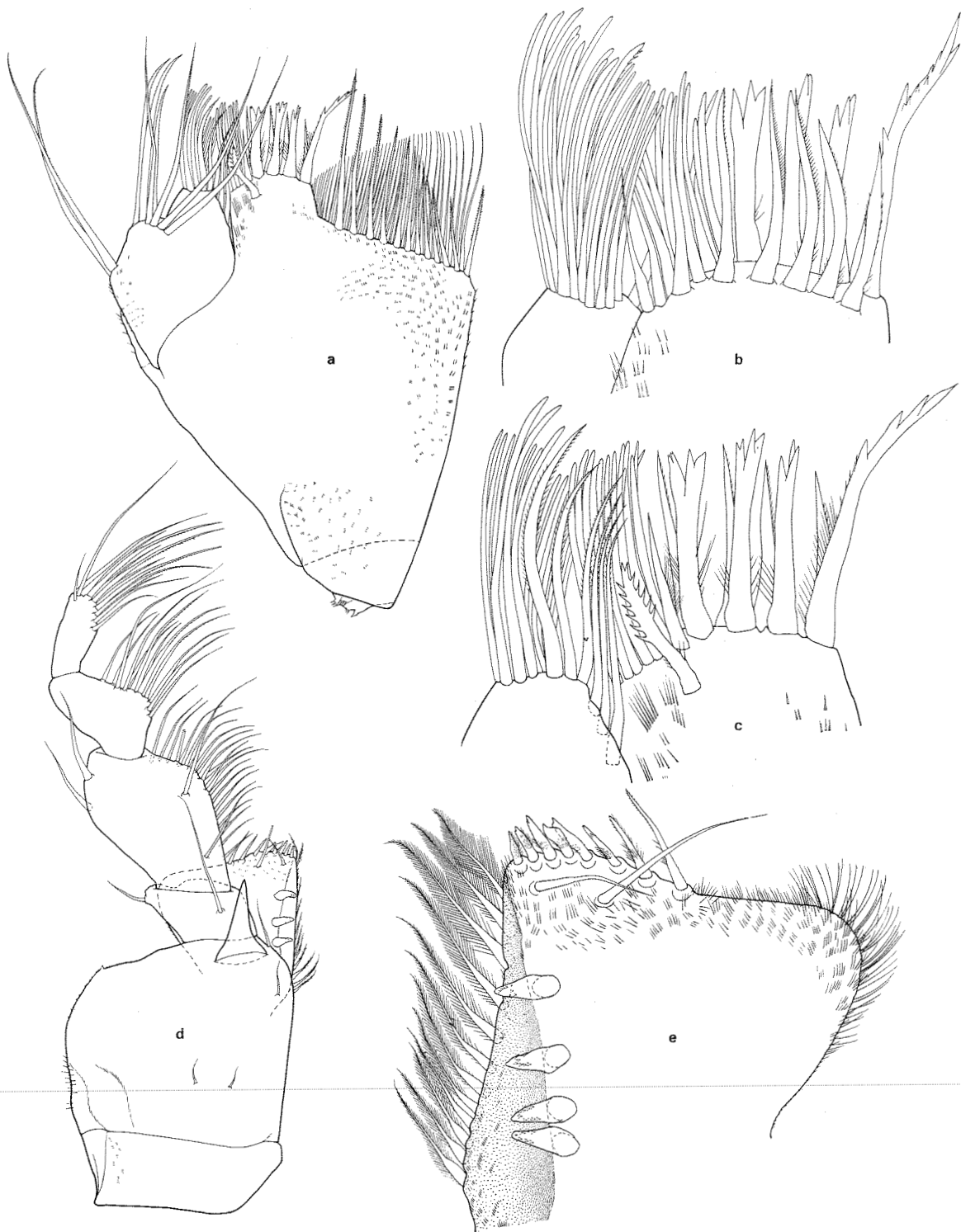


Fig. 2. *Aapseudes grossimanus* Norman & Stebbing, ♀; a, maxilla, caudal view ($\times 64$); b-c, terminal part of inner lobe of movable endite and of fixed endite of the same, rostral and caudal views ($\times 260$); d, maxilliped, caudal view ($\times 58$); e, endite of maxilliped, caudal view ($\times 145$).

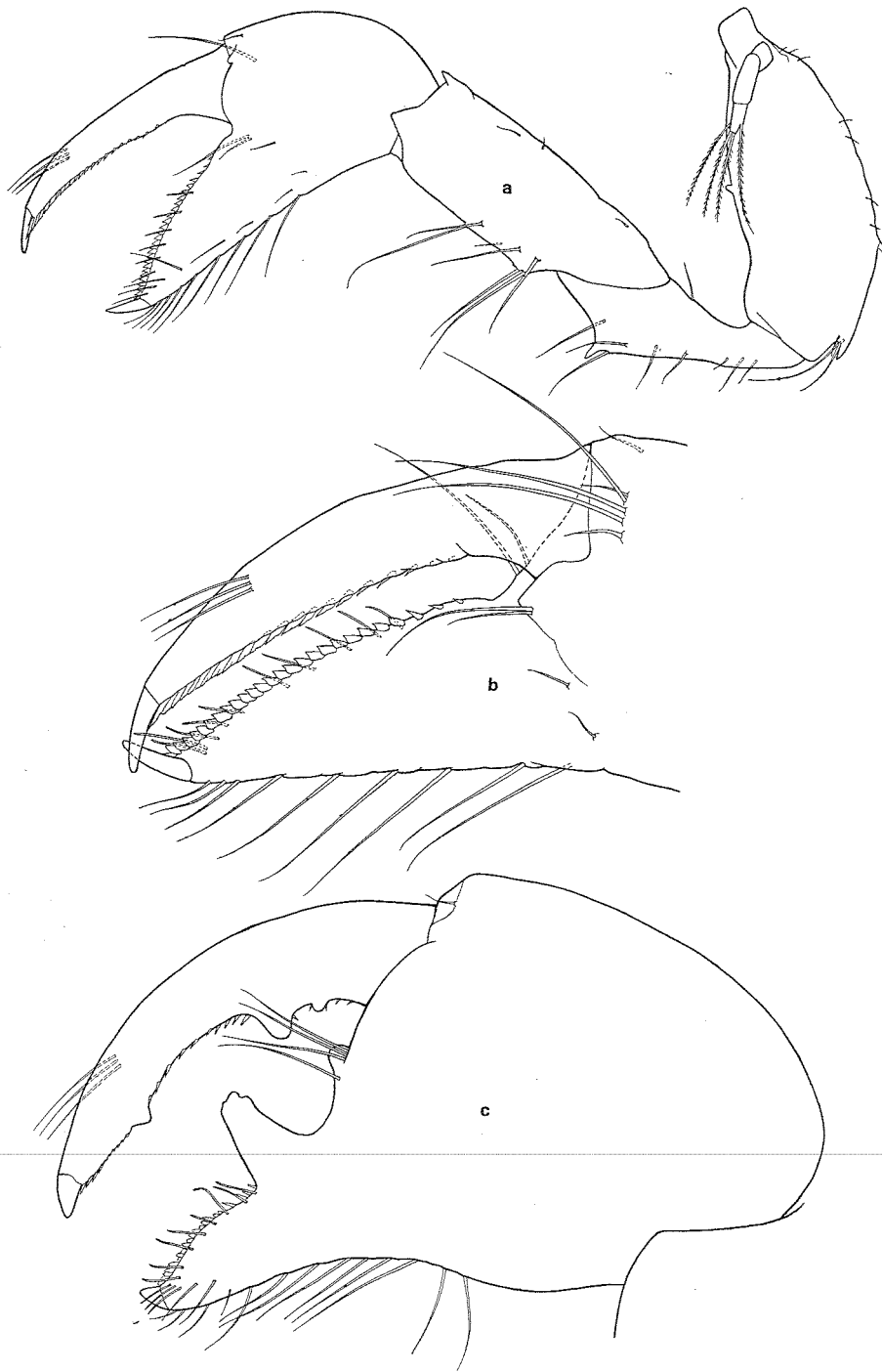


Fig. 3. *Aapseudes grossimanus* Norman & Stebbing; a, cheliped, ♀, caudal view ($\times 27$); b, distal part of propus and dactylus of the same, rostral view ($\times 53$); c, propus and dactylus of cheliped, ♂, caudal view ($\times 25$).

Geographical and bathymetrical range:

Off coast of Portugal (39°3'N, 9°39'W), 1354 m (NORMAN, 1870, 1899; NORMAN & STEBBING, 1886). Bay of Biscay (NORMAN, 1880, 1899). Southwest coast of Ireland (52°25'N, 11°40'W), 165 m (NORMAN & STEBBING, 1886). Morocco, off Sidi Terri (NORMAN, 1899). South Africa, Lion's Head S. 8. 2°E. 27 miles, 229 m; Table Mountain, distant 41 miles east, 448 m (STEBBING, 1904, 1910). Ireland, 50 miles WNW of Tearaght, Co. Kerry, 586 m (TATTERSALL, 1904, 1906). 42°43'N, 9°50'E, 600-620 m; 37°57'N, 11°54'E, 680 m (STEPHENSEN, 1915). 33°54'N, 7°59'W, 158 m, mud; 33°51'30"N, 7°47'26"W, 133 m, mud (MONOD, 1925). 38°7'N, 9°18'W, 1007 m; 6°01'N, 10°26'W, mud, 50 m, bottom temp. 29.7°C and 5°56'N, 4°26'E, 100 m, fine mud (*Atlantide* Exped. St. 98) (LANG, 1955). Loanda-Lobito (12°05'S, 13°08'E), 975 m, clay, and of SW Africa (20°04'S, 11°56'E), 537 m (the present paper).

Apseudes lagenirostris n.sp.

Material:

St. 471, Sunda Trench (10°26'S, 114°15'E), 2780 m, 9 Sept. 1951. Gear: Petersen-Grab 0.2 sq. m. Bottom: clay. Bottom temp.: 1.7°C. — 1 adult female with emptied marsupium.

Description of female type:

Body (Fig. 4a-c, and Pl. Ia) about 7 times longer than broad. Length about 12 mm. Integument rather strongly calcified.

Carapace (Pl. Ib) about 1.25 times broader than long, contracted in the anterior part. The dorsal surface has a shallow transverse furrow between the somewhat swollen respiratory chambers in front of which there is a short spiniform projection, similar to the ocular lobes but smaller. The ocular lobes are distinctly defined, strongly produced obliquely forwards and outwards and excavated in front; there are no visual elements. The rostrum (fig. 4d) is considerably expanded at the base and narrowly exerted at the tip, thus assuming a lageniform shape (the name of this species alludes to this character). The epistome lacks any spiniform projection.

Peraeonites not tuberculated or areolated. They decrease in width from 2-7, and they increase in length from 2 to 5 and 6, which are equally long, while 7 is as long as 3. Coxa of peraeopod II produced into a short spiniform projection, directed obliquely forwards and downwards, below which there is a row of six short plumose setae. Coxa of

the succeeding peraeopods small and rounded. Peraeonites 3-7 with an outwards-directed spiniform projection on either side, which on peraeonite 3 is situated at the anterior corner, and on the succeeding peraeonites somewhat behind this corner; behind the spiniform projection the peraeonites are strongly incurved. Peraeonites 6-7 with hyposphenians as shown in Fig. 4b.

Pleon (Fig. 4a-c) as long as the last three peraeonites together. Pleonites subequal in length, much broader than long, with the epimera strongly produced and acute at the tip; dorsally the epimera bear a row of short plumose setae. First and last pleonites ventrally with an obliquely backwards- and downwards-directed spiniform process. Pleotelson nearly as long as the last four pleonites together, broadest in front and behind, and adorned with some tiny plumose setae.

Antennula (Fig. 4e) much longer than carapace. First peduncular joint 1.7-1.8 times longer than the second and third joints together. Second joint about 2.6 times longer than the third. First two joints with particular setae. Inner flagellum four-jointed; last two joints with one particular seta. The outer flagellum is thirteen-jointed, the joints 7, 9, and 11 bear an aesthetasc.

Antenna (Fig. 4f) much shorter than antennula, reaching to about the end of the third joint of the inner flagellum of the latter. The first joint is produced inward into a rounded bulge, which is irregularly undulated along the end. The second joint is nearly twice as long as the first and much more slender. The squama is slender, reaching to about the middle of the second joint of the ten-jointed flagellum, and it bears four bare setae. The first joint of the flagellum is about half as long as the second, which is a little longer than the third. The second and third joints bear particular setae. The succeeding joints are more slender than the preceding ones.

Labrum (Fig. 4g) hairy along the distal part of the lateral margins. Front margin finely crenate, set with very tiny hairs and with a small median protuberance.

Mandibles (Figs. 4h-j and 5a-f) moderately strongly calcified, partly hairy on the surface. Processus molaris strong, subcylindrical, directed straight inwards, with the grinding surface closely set with hairs. Pars incisiva of right mandible irregularly seven-dentate, that of the left mandible eight-dentate. Lacinia mobilis of left mandible strongly six-dentate. The spiniferous lobe of either



Fig. 4. *Aapseudes lagenirostris* n.sp., ♀; a, right side of peraeon and pleon, dorsal view ($\times 21$); b, posterior part of body, lateral view ($\times 21$); c, right side of last pleonite and pleotelson, dorsal view ($\times 64$); d, rostrum and ocular lobe, dorsal view ($\times 47$); e, antennula, ventral view ($\times 69$); f, antenna, ventral view ($\times 69$); g, labrum, rostral view ($\times 103$); h, right mandible, rostral view ($\times 103$); i-j, pars incisiva and spiniferous lobe of the same ($\times 450$).



Fig. 5. *Aapseudes lagenirostris* n.sp., ♀; a, grinding surface of processus molaris of left mandible ($\times 205$); b-d, pars incisiva, distal part of lacinia mobilis, and spines of spiniferous lobe of left mandible ($\times 450$); e-f, setae of last two joints of mandibular palp ($\times 450$); g, right side of labium, caudal view ($\times 103$); h, distal end of terminal lobe of the same ($\times 320$); i, right maxillula, rostral view ($\times 103$); j-k, distal end of endites of the same ($\times 320$); l, distal part of seta of maxillular palp ($\times 750$); m, maxilla, rostral view ($\times 190$); n, endites of the same, caudal view ($\times 320$).

mandible bears two very thin and broad semipelucidal forked chitinous formations, and there seem to be four slender acute spines on the right mandible but only two acute spines on the left. The mandibular palps are equal. The second joint is about 3.5 times longer than the first joint, and about 2.6 times longer than the third; in the distal part it is furnished with sixteen setae, shaped as shown in Fig. 5e. The first joint bears two short bare setae near the middle of the inner margin. The distal part of the last joint bears fourteen setae, shaped as in Fig. 5f.

Labium (Fig. 5g-h) with tiny hairs on and just inside the lateral margins, as shown in the figure. The lobes are comparatively slender, for the greater part marginated with long hairs, and they have three spinous spiniform setae at the end.

Maxillula (Fig. 5i-l). The endites are set with hairs as shown in Fig. 5i. The outer endite is at the end surmounted with ten strong blunt spines and one short spine, and it bears two caudal setae near the end. The two-jointed palp is distally furnished with a number of setae, the terminal part of which is serrate or pectinate along the lateral margins. The inner endite bears a row of hairs along the distal part of the caudal surface and four terminal spiniform setae or spines, shaped as in Fig. 5k.

Maxilla (Fig. 5m-n) broadly lamellar with numerous groups of tiny hairs on the caudal and rostral surfaces. Setae of rostral row bare, those of the caudal row six in number and finely plumose. The fixed endite has two subterminal caudal spines shaped as in Fig. 5n, and a subterminal rostral row of seven setae; the distal margin bears three strong forked spines and two slender spines which are pectinate along the greater part of the one margin and bifid at the tip. The outer lobe of the movable endite bears eight long setae, and the inner lobe nine slender and two spiniform setae, the armature of the setae differing somewhat.

Maxilliped (Fig. 6a-f). Coxa short, bare. Basis hairy laterally. First joint of the palp hairy on the inner side, provided with a short bare outer seta, and with a long bare seta near the inner distal end; second joint with four bare setae near the outer distal end, and with numerous inner setae, the longest of which are slender and bare, the others spiniform and irregularly serrate or pectinate in their distal half (Fig. 6b); third joint with six inner bare setae, last joint with seven. Either endite with three couplers, and with two long caudal setae near the distal end; median vertical surface with six plumose setae on the free margin. The distal end of

the endite armed as shown in Fig. 6c and d. Epignath with two oval lobes in front, one of which is for the greater part marginated with long hairs; the distal half of the outer surface is set with a row of shorter hairs, and the terminal spine with some tiny hairs.

Cheliped (Fig. 6g-h) moderately slender. Coxa small. Basis broadest at about the distal fourth, somewhat more than twice as long as broad, and furnished with a spine at about the distal fourth of the sternal surface. Exopodite with four plumose setae. Merus comparatively short, with six setae. Carpus somewhat shorter than basis and than propus, which are subequal in length, and richly set with setae. Propus about twice as long as its greatest width, with concave sternal surface, provided with four bare setae; the tergal surface bears one short seta near the middle and one longer seta near the distal end; the caudal surface has two short setae at some distance from the finger, and the rostral surface has a row of four long setae near the distal tergal end and one seta in the gap between the finger and the dactylus; finger about as long as the rest of the joint and armed as shown in Fig. 6h. Dactylus with three juxtaposed setae near the middle of the rostral surface and with a sternal row of fine spines; terminal claw about twice as long as that of the finger.

Peraeopod II (Fig. 7a) fossorial. Basis almost as long as the three succeeding joints together, furnished with particular setae. Exopodite with four plumose setae. Ischium short. Merus about 1.25 times longer than carpus, without spines. Carpus with one tergal spine and two sternal spines. The propus and dactylus have been lost.

Peraeopods III-IV (Fig. 7b-c) almost identical, differing only in the number of particular setae on the basis. Basis about as long as merus, carpus and propus together. Ischium short. Merus about 0.6 times as long as carpus. Propus as long as carpus with a small particular seta near the middle of the tergal surface. Dactylus with claw longer than propus, with one tiny tergal seta in the middle, and with one tiny seta at the distal sternal end; claw not fully half as long as dactylus.

Peraeopod V (Fig. 7d and f). Basis about 0.8 times as long as the four succeeding joints together, furnished with particular setae. Ischium short. Merus about 0.7 times as long as carpus, and about as long as propus. Carpus with comparatively long spines around the distal end. Propus with a long particular seta somewhat above the middle of the



Fig. 6. *Apsedes lagenirostris* n.sp., ♀; a, maxilliped, caudal view ($\times 103$); b, inner setae of second and third joints of palp of the same ($\times 245$); c, left endite of the same, rostral view ($\times 245$); d, distal part of right endite (flattened), rostral view ($\times 245$); e, couplers ($\times 245$); f, epignath ($\times 103$); g, cheliped, caudal view ($\times 47$); h, tergal armament of finger, rostral view ($\times 320$).

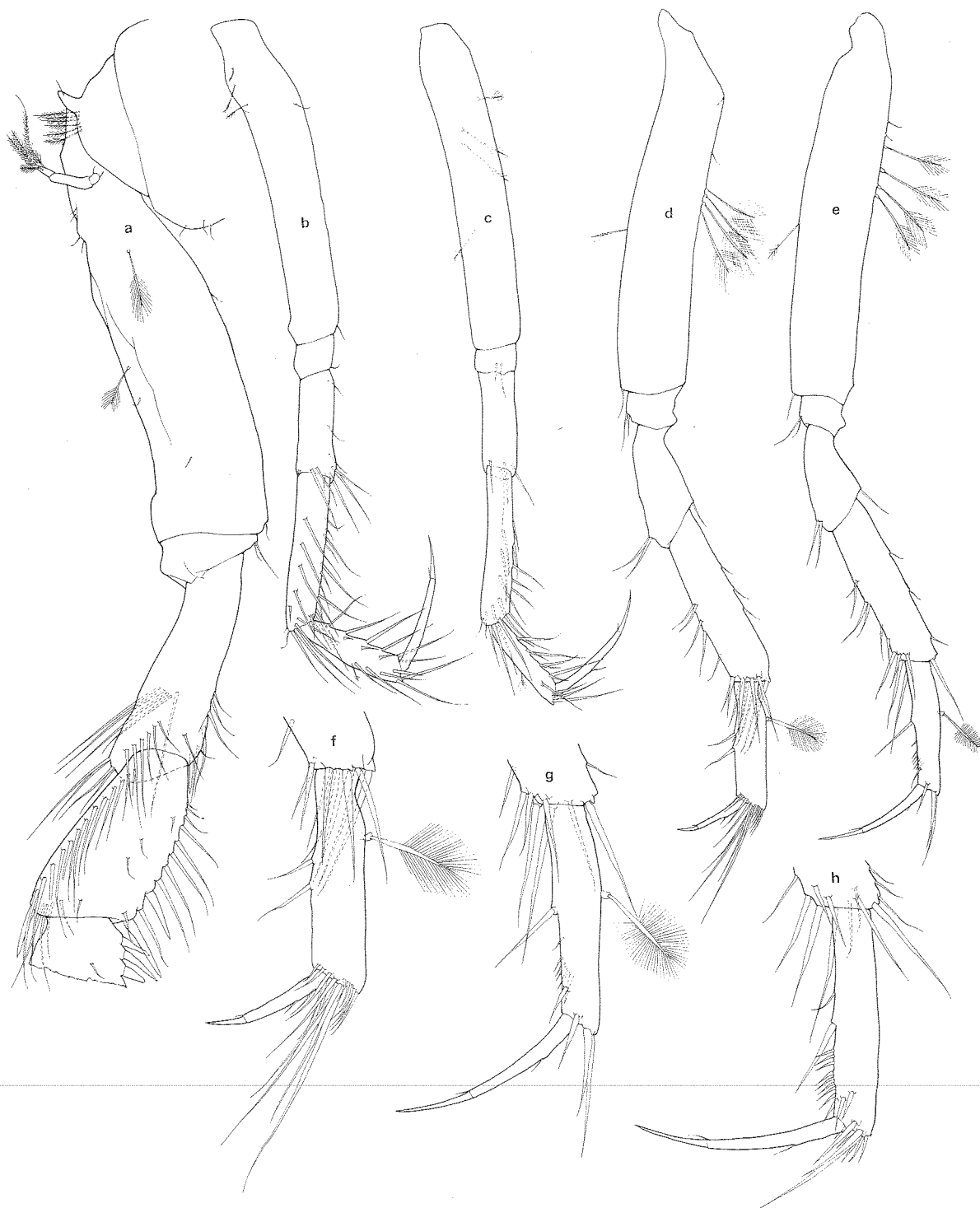


Fig. 7. *Apseudes lagenirostris* n.sp., ♀; a-c, peraeopods II-IV, caudal view ($\times 47$); d-e, peraeopods V-VI, rostral view ($\times 47$); f-h, distal part of peraeopods V-VII, rostral view ($\times 80$).

tergal surface, and with the distal end surrounded with setae of different lengths. Dactylus and claw much shorter than in peraeopods III-IV, and VI-VII.

Peraeopods VI-VII (Figs. 7e and h, 8a) very similar to each other. Basis about as long as the one of peraeopod V, with particular setae. Ischium short. Merus and carpus of peraeopod VI somewhat longer than the corresponding joints of peraeopod VII. Propus of peraeopod VI with a tergal particular seta near the middle. Dactylus with claw somewhat shorter than propus.

Pleopods (Fig. 8b). Coxa short, bare. Basis about twice as long as coxa and 1.2-1.3 times longer than broad, with two outer and three inner plumose setae. Exo- and endopodite slender, one-jointed, with numerous plumose marginal setae. Endopodite longer than exopodite.

Uropod (Fig. 4c) with longish, somewhat curved peduncle, which is broadest at the end and furnished with some bare setae. Exopodite six-jointed, the first two joints being very short. Endopodite broken off.

Remarks:

From all species having a spiniform process in front of the respiratory chambers and produced ocular lobes, *A. lagenirostris* differs markedly in the rostrum.

Apseudes setosus n.sp.

Material:

St. 626, Tasman Sea (42°10'S, 170°10'E), 610 m, 20 Jan. 1952. Gear: herring otter trawl. Bottom: globigerina ooze. Bottom temp.: c. 7.6°C. - 3 adult females (two with rudimentary oostegites).

Description of female type:

Body (Fig. 9a-d, and Pl. 1c) about 6 times longer than broad. Length 10.5 mm. The body decreases in width from peraeonite 2 to pleotelson. Integument very strongly calcified.

Carapace (Pl. 1d) a little shorter than broad. The dorsal surface is somewhat vaulted with strongly swollen respiratory chambers. Just in front of these chambers is a spiniform process similar to the ocular lobes but smaller. Between the chambers is a very distinct transverse furrow, and in front of them a slight transverse impression. The ocular lobes are well defined, strongly extended obliquely forwards and outwards, and excavated in front; there are no visual elements. The rostrum is strongly prominent and acute, and triangularly expanded on either side

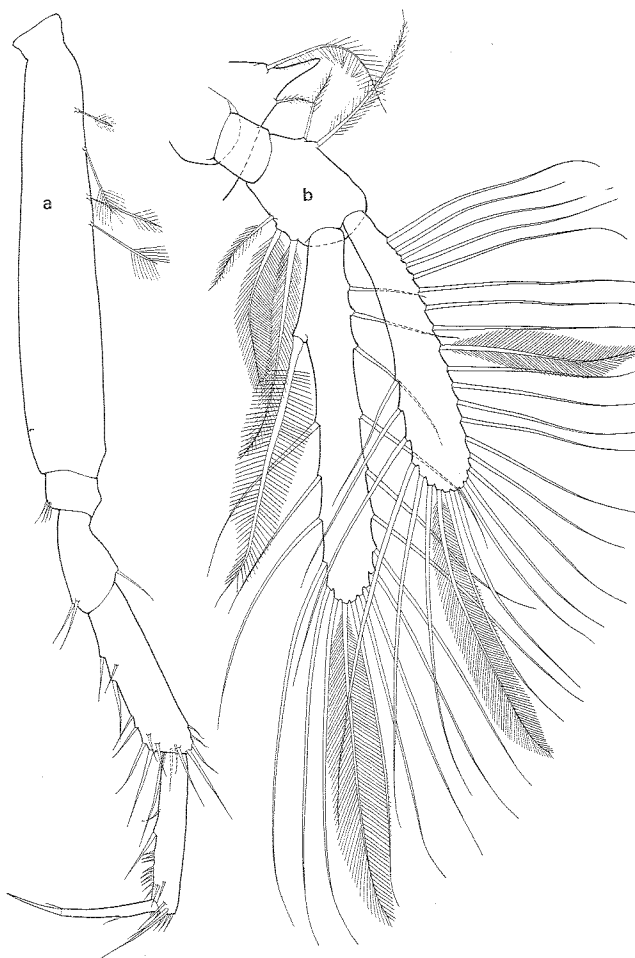


Fig. 8. *Apseudes lagenirostris* n.sp., ♀; a, peraeopod VII, rostral view ($\times 47$); b, pleopod I, rostral view (all setae are plumose) ($\times 75$).

of the base (Fig. 9b). Epistome with a short spine, directed obliquely forwards.

Peraeonites (Fig. 9a) increasing in length from 2 to 5 and 6 which are equally long while 7 is as long as 4. Peraeonites 2 and 3 tuberculated, the succeeding ones more or less areolated. Coxae well defined. Pleuron of peraeonite 2 with two small spiniform projections behind the coxa, which extends as a long spiniform process, directed obliquely outwards and forwards. Peraeonite 3 with a small spiniform projection just in front of the coxa, which is produced into a much shorter spiniform process than that of the preceding peraeonite; pleuron with three small spiniform projections behind the coxa. Peraeonite 4 with a very long spiniform process just in front of the pleuron, which has two small spiniform projections behind the coxa; the latter has a very small spiniform projection, directed straight forwards. The succeeding peraeonites have a long spiniform projection near the anterior third, and one shorter

spiniform projection just in front of the pleuron, the corners of which are spiniform. Peraeonites 3-7 have a dorso-lateral bare seta near the anterior margin and a plumose seta on the anterior spiniform process. Laterally there are also some diminutive hairs arranged as shown in the figure. The coxa of peraeonite 2 has many tiny setae or hairs on the tergal margin (see Fig. 12c). Hyposphenians are present on all peraeonites.

Pleon as long as the last three peraeonites together. Pleonites short, subequal in length, with the epimera formed into long spiniform processes furnished with plumose setae (Fig. 9c); ventrally they have an acute spiniform process directed obliquely backwards. Pleotelson (Fig. 9d) subcylindrical, about as long as last four pleonites together, somewhat widened near the end, and laterally furnished with two widely separated setae.

Antennula (Fig. 9e) much longer than carapace. First peduncular joint very long, being fully 3 times longer than the second and third joints combined. Second joint about 1.6 times longer than third. First two joints with particular setae. Inner flagellum nine-jointed. Outer flagellum twenty-three-jointed; a thin aesthetasc present on joints sixteen and twenty-one.

Antenna (Fig. 9f) much shorter than antennula, reaching to about the end of the inner flagellum of the latter. The first peduncular joint is bare and produced inward into a triangular bulge. The second joint is much longer and more slender. Squama slender, furnished with seven setae. Flagellum fifteen-jointed; first joint shortest, second joint about 5 times longer than the first, and the third joint about 0.4 times as long as the second. The two last-mentioned joints have particular setae. The succeeding joints are shorter and decrease in width distally.

Labrum (Fig. 11a) slightly incurved in the middle of the front margin, and laterally furnished with some hairs at the end of the basal part.

Mandibles (Fig. 10a-d) with strong, subcylindrical processus molaris, the terminal part of which is bent somewhat backwards and outwards; the tip is armed as shown in Fig. 10a. Pars incisiva of either mandible five-dentate. Lacinia mobilis of left mandible also five-dentate, but the proximal tooth is very small. The bunch of spines and setae of the right mandible number one seta and five forked spines, that of the left mandible one seta and six forked spines. Just below the bunch mentioned there is a slight bulge, set with hairs. The mandibular palps are equal. The second joint is longest, being

about 3 times longer than the first joint and 4.5 times longer than the third. The first joint has one short and three long bare inner setae, the second joint one short and one longer bare seta and a great number of short one-sidedly ciliate setae in the distal part, and the third joint bears distally an inner row of short bare setae and three terminal setae, the outer of which is longest and bare, the others finely ciliated on the one side.

Labium (Fig. 10e-f) with fine short hairs along the lateral margins of the basal part and with the caudal surface adorned as in Fig. 10e. The lobes are set with long hairs along the outer margin and along the distal part of the inner margin; distal margin with three spines, the inner one bifurcate at the tip, the middle and outer ones with two and three spiniform projections, respectively.

Maxillula (Fig. 10g-j). The endites are set with hairs as shown in Fig. 10f. The outer endite is at the end surmounted with one dwarfed and eleven moderately long stout and blunt terminal spines, and near the end it bears two caudal setae which are finely serrate along the distal half of the outer margin (Fig. 10h). The most distal part of the palp is furnished with eight setae which are finely serrated distally (Fig. 10i). The inner endite has an outer blunt dentiform projection near the middle, and five more or less hairy terminal setae (Fig. 10j).

Maxilla (Fig. 10k-l) broadly lamellar. The rostral surface of the endites is partly set with tiny hairs, and there is a row of longer hairs along the outer margin of the fixed endite. Setae of sternal row bare, those of the caudal row six in number and finely plumose. The fixed endite has a dwarfed spine on the rostral surface, and the caudal surface bears two strong spiniform setae which are strongly pectinate in the distal part; the distal margin bears three forked spines, nine bare setae, one one-sidedly ciliate seta, and one very long and crooked seta which is serrated along the distal half of the outer margin and around the tip. The outer lobe of the movable endite bears eight setae, some of which are more or less finely ciliate, and the inner lobe a great number of bare setae.

Maxilliped (Fig. 11b-d). Coxa small, unarmed. Basis irregularly serrated along the outer distal part. The first joint of the palp is furnished with a moderately long outer seta, and it bears a very long caudal seta near the inner distal end; second joint with four outer setae, the terminal of which is very long, and with numerous inner setae; third joint with twelve inner setae, and last joint with seven setae; the setae

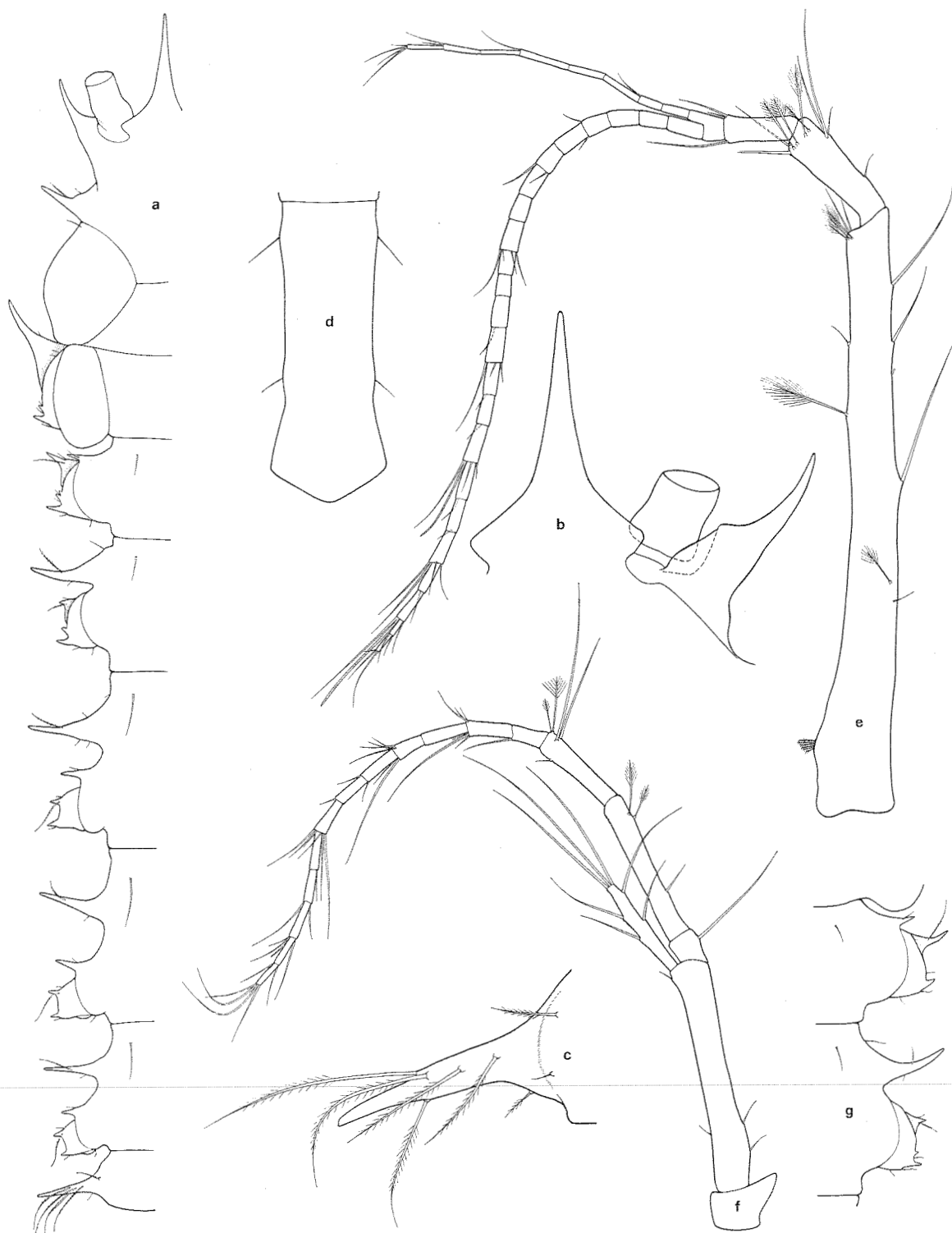


Fig. 9. *Aapseudes setosus* n. sp., ♀; a, left side of carapace, pereopod 1 and pleonite 1 ($\times 24$); b, rostrum, dorsal view ($\times 53$); c, left side of pleonite 3, dorsal view ($\times 80$); d, pleotelson, dorsal view ($\times 33$); e, antennula, ventral view ($\times 53$); f, antenna, ventral view ($\times 53$); g, right side of pereopods III and IV of another female, dorsal view ($\times 29$).



Fig. 10. *Apseudes setosus* n.sp., ♀; a, right mandible, rostral view ($\times 98$); b, distal part of the same ($\times 205$); c, distal part of left mandible ($\times 205$); d, pars incisiva and lacinia mobilis of the same ($\times 205$); e, right side of labium, caudal view ($\times 98$); f, terminal spines of the same ($\times 750$); g, maxillula, caudal view ($\times 98$); h, distal end of outer endite of maxillula ($\times 195$); i, distal end of seta of maxillular palp ($\times 550$); j, distal end of inner endite of maxillula ($\times 195$); k-l, distal part of maxilla, rostral and caudal views ($\times 160$).

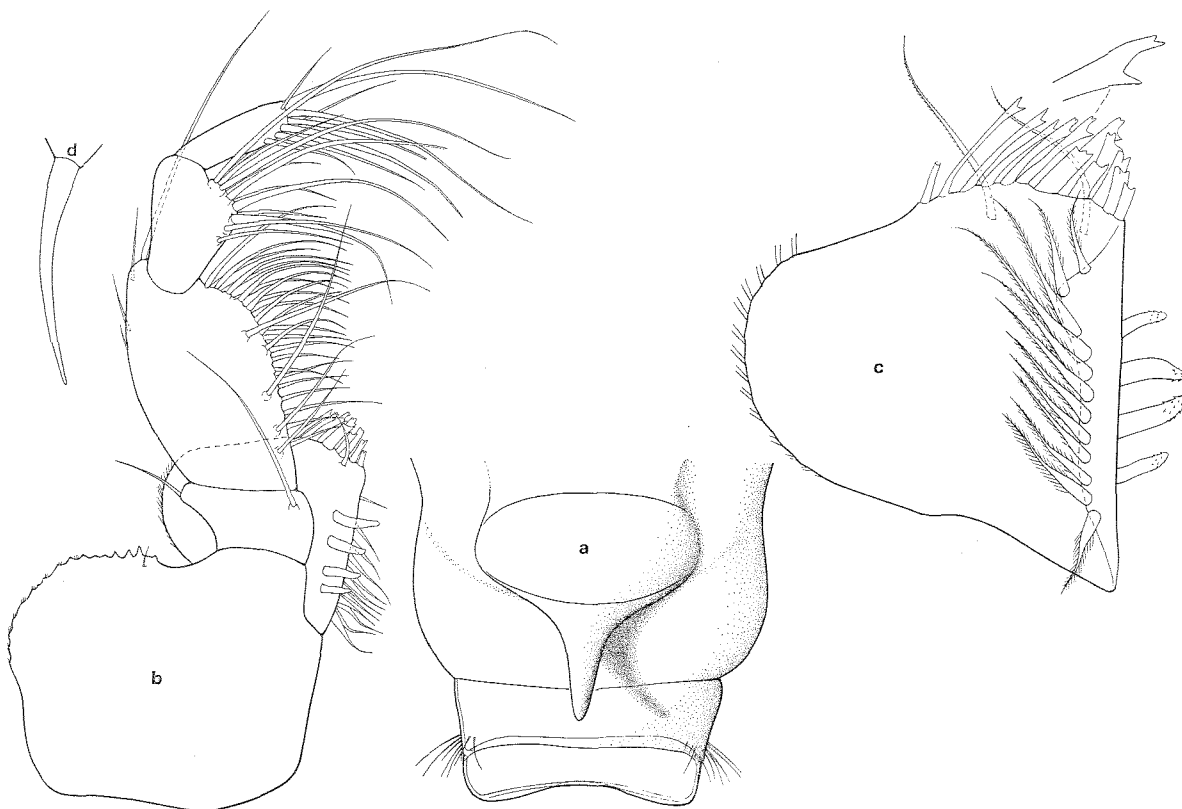


Fig. 11. *Aapseudes setosus* n.sp., ♀; a, labrum, rostral view (×98); b, maxilliped, caudal view (×98); c, endite of the same, rostral view (×205); d, terminal spine of epignath (×98).

are bare. Either endite with four couplers, and with two long caudal setae near the distal end; free margin of median vertical surface (Fig. 11c) with a close row of twelve plumose setae; inner part of distal margin with thirteen chitinous formations, shaped as shown in the figure. Terminal spine of epignath bare (Fig. 11d).

Cheliped (Fig. 12a-b) moderately slender. Coxa very small. Basis about 2.5 times longer than broad with a strong spiniform projection at about the distal fifth of the sternal surface and with a strong spine at about the proximal third of the rostral surface (Fig. 12b). Exopodite with four plumose terminal setae. Merus comparatively long with a spiniform projection near the distal sternal end and with four short and four long setae, arranged as in the figure. Carpus shorter than propus, with a spiniform projection at the distal tergal end and with a number of setae arranged as shown in the figure. Propus longer than basis and set with numerous setae; finger about as long as the rest of the joint, with two strong rounded tergal prominences, and armed as shown in Fig. 12a. Dactylus with short terminal claw and with three juxtaposed rostral setae.

Peraeopod II (Fig. 12c-d) broader than the other

peraeopods, but it does not seem to be adapted for digging but for swimming. Basis about as long as the four succeeding joints combined, with at least one short particular seta. Exopodite with six plumose setae. Ischium short. Merus more slender and somewhat longer than carpus, which is longer than propus. The latter is oval in form and somewhat more than twice as long as broad. Merus, carpus and propus are furnished with a great number of setae, those corresponding to the spines in most other species being filiform and plumose in their distal part (the name of the species alludes to the setiform character of the spines). Dactylus with claw much shorter than propus; dactylus with two spiniform sternal projections (Fig. 12d) and with two juxtaposed tergal setae near the middle, the one of which is tiny; distal sternal end produced into a long setiform process; claw very short.

Peraeopods III-IV (Fig. 12e-f) very similar to each other, but with the following differences: Basis of peraeopod III is distinctly shorter than the four succeeding joints together while basis of peraeopod IV is as long as these joints; merus of peraeopod III longer than that of peraeopod IV and furnished with more setae; there is no particular seta on the



Fig. 12. *Apseudes setosus* n.sp., ♀; a, cheliped, caudal view ($\times 43$); b, basis of the same, rostral view ($\times 43$); c, pereopod II, caudal view ($\times 43$); d, distal end of dactylus of the same ($\times 205$); e-f, pereopods III-IV, caudal view ($\times 43$), detail figure ($\times 77$).

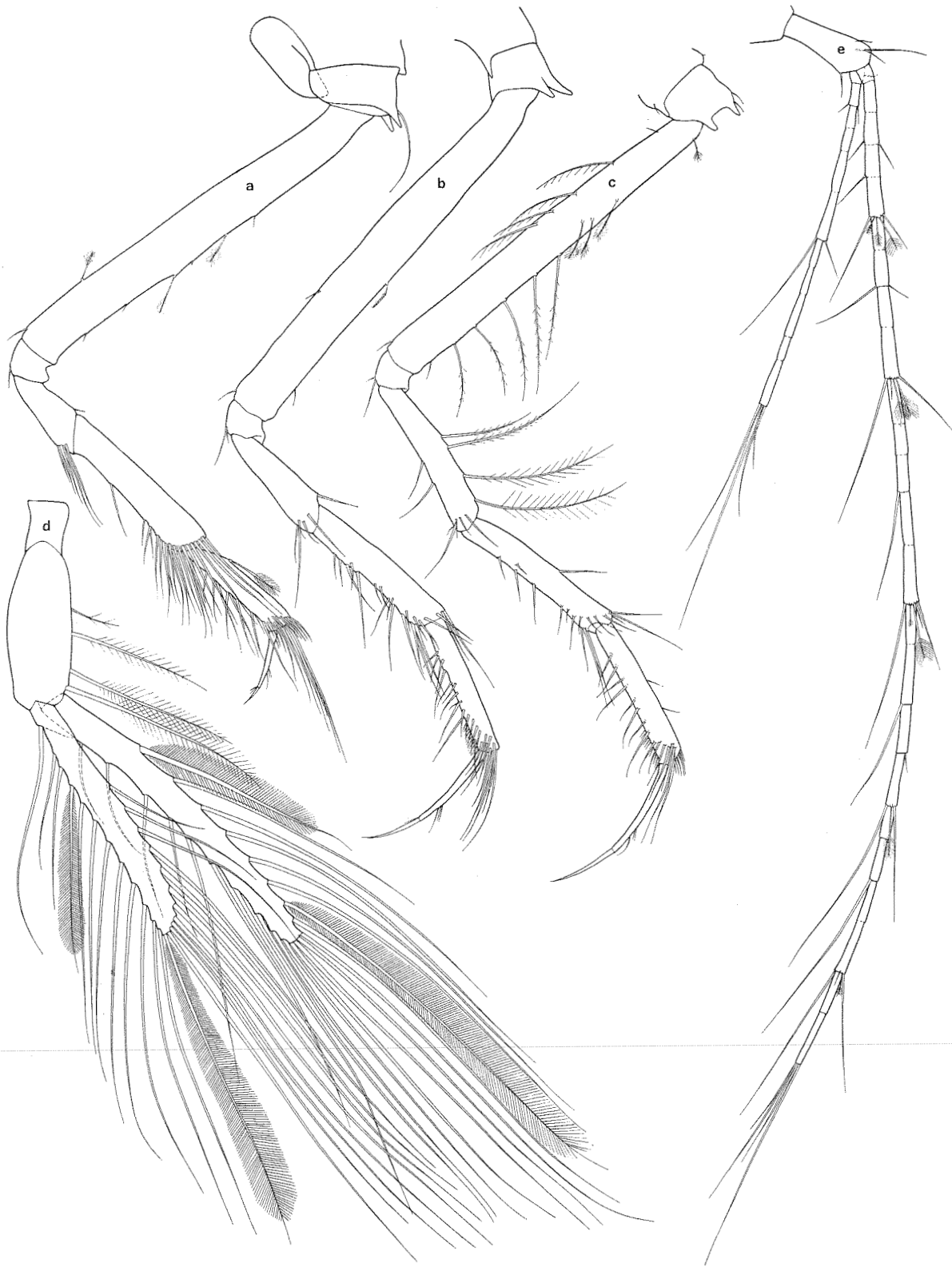


Fig. 13. *Apsaudea setosus* n.sp., ♀; a-c, peraeopods V-VII, rostral view ($\times 43$); d, pleopod I, rostral view ($\times 64$); e, uropod ($\times 53$).

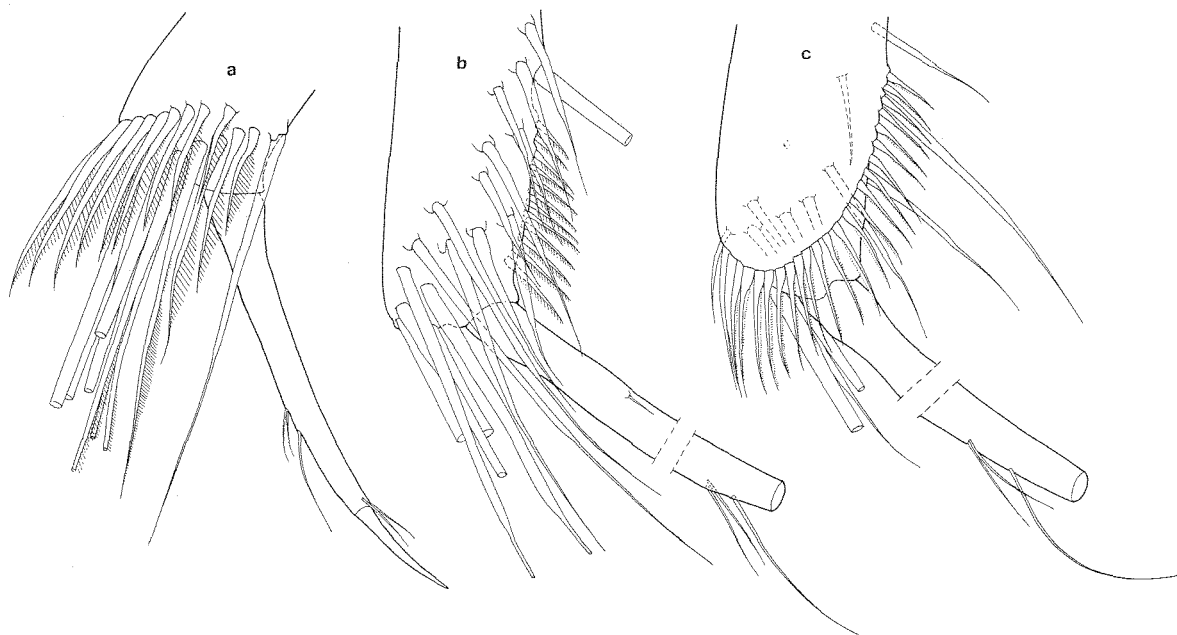


Fig. 14. *Aapseudes setosus* n.sp., ♀; distal part of pereopods V-VII, caudal view ($\times 205$).

propus of pereopod III, but there is a short tergal one on pereopod IV. Carpus and propus richly set with setae. Dactylus with claw somewhat longer than propus; claw about 0.7 times as long as dactylus. Dactylus with two tiny setae at the distal sternal end and two juxtaposed short tergal setae near the distal third.

Pereopod V (Figs. 13a and 14a), dactylus excluded, of the same length as pereopod IV, excluding the dactylus. Basis as long as the four succeeding joints together, with particular setae. Ischium short. Merus shorter, carpus longer than in pereopod IV. Carpus with a close-set row of long setae along the distal part of the sternal surface and around the distal end. Propus as long as that of pereopod IV, with a long tergal particular seta in the proximal part, and with the distal end surrounded by a great number of setae, some of which are long and bare, others moderately long and more or less ciliate on the sternal margin. Dactylus with claw much shorter than propus; claw much shorter than in the other pereopods (excl. pereopod II), being only 0.3 times as long as dactylus. The latter has two small setae at the distal sternal end, two short juxtaposed tergal setae in the distal third and one longer seta below these setae.

Pereopods VI-VII (Figs. 13b-c and 14b-c) as slender as pereopod V. Basis of pereopod VI about as long as the four succeeding joints together, with particular setae. Basis of pereopod VII only 0.75 times as long as the four succeeding joints to-

gether, with particular setae and with many plumose or one-sidedly ciliate setae. Ischium short. Merus of pereopod VI about 0.7 times as long as carpus, without plumose tergal setae. Merus of pereopod VII about as long as carpus, with four long plumose tergal setae. Propus of both pereopods equally long and distinctly longer than in pereopod V, without particular setae; distally they are armed in a quite different manner (see Fig. 14b-c). Dactylus with claw fully as long as propus; the distal sternal end of dactylus of pereopod VI bears one short seta which is not present in VII; the tergal surface is armed in the same manner as in pereopod V; claw about 0.6 times as long as dactylus.

Pleopods (Fig. 13d) with well-developed coxa. Basis almost 4 times longer than coxa and about 2.5 times longer than broad, with four inner plumose setae. Exopodite indistinctly two-jointed, shorter than the endopodite. Both rami are long and slender and furnished with long plumose setae which end in a slender lash.

Uropod (Fig. 13e). Peduncle furnished with some setae. Exopodite indistinctly eleven-jointed. Endopodite indistinctly twenty-four-jointed; some of the joints are bare, others armed with bare setae only, others again with bare and particular setae.

Variation:

The two females without rudimentary oostegites (length about 9 mm) differ from the female described inasmuch as the pleura of pereopods 2-4

are devoid of the small spiniform projections in front of the spiniform posterior corner (Fig. 9g). There are also some differences in the number of joints of the flagella of the antennula and the antenna, and in the number of joints of the uropods. As only the type specimen has been dissected, it is impossible to tell whether or not any other differences exist. In both specimens, however, peraeopod II is devoid of real spines.

Remarks:

From all other species having a spiniform process in front of the respiratory chambers, *A. setosus* differs in the general shape of the peraeonites, in the coxa of peraeopods III-IV and in the absence of real spines on peraeopod II. In the latter character the species approaches *A. grossimanus* Norman &

Stebbing, in which the spines of peraeopod II terminate in a slender plumose lash (see LANG, 1955, p. 79, fig. 13D).

Apseudes tuberculatus n.sp.

Material:

St. 238, off Kenya (3°23'S, 44°04'E), 3960 m, 13 March 1951. Gear: herring otter trawl. Bottom: globigerina ooze. Bottom temp.: 1.8°C. – 1 adult male.

Description of male type:

Body (Fig. 15a-c, and Pl. Ie) about 7 times longer than broad. Length about 9 mm. Integument rather strongly calcified.

Carapace (Fig. 15b, and Pl. If) about as long as broad, contracted in the anterior part. The respira-

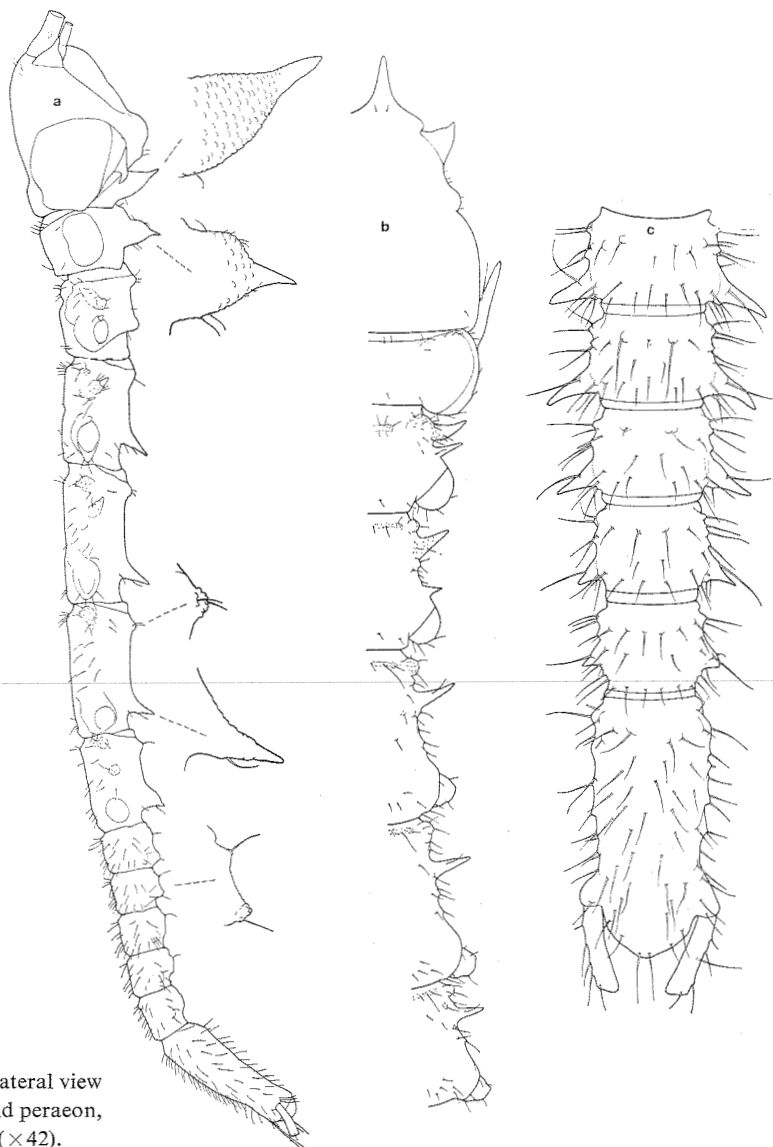


Fig. 15. *Apseudes tuberculatus* n.sp., ♂; a, lateral view ($\times 18$), detail figures ($\times 60$); b, carapace and peraeon, dorsal view ($\times 22$); c, pleon, dorsal view ($\times 42$).

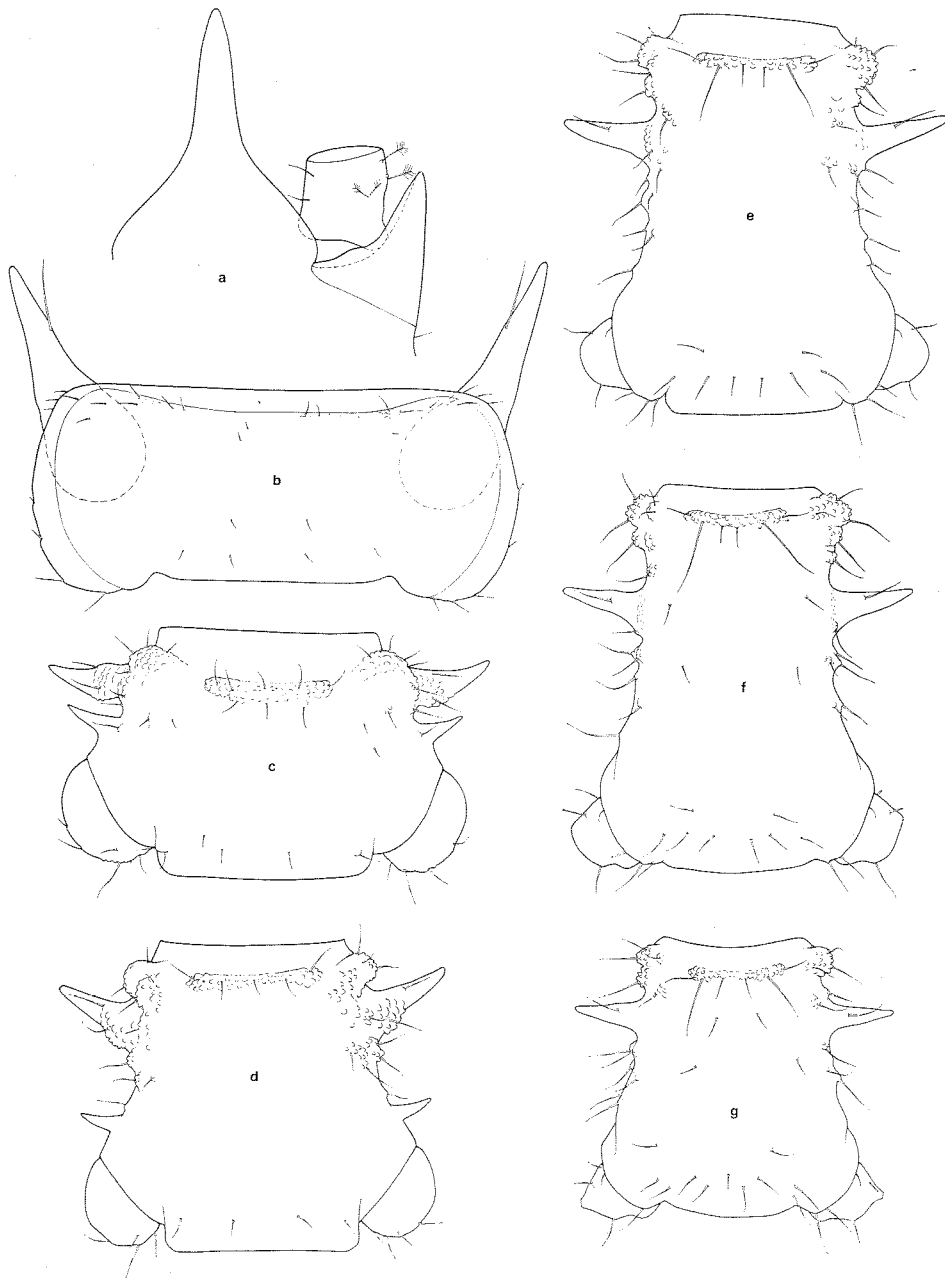


Fig. 16. *Aapseudes tuberculatus* n.sp., ♂; a, rostrum, dorsal view (×64); b-g, peraeonites II-VII, dorsal view (×50).

tory chambers are somewhat swollen, and just in front of them is a small rounded prominence. Posteriorly, the dorsal surface has a semicircular furrow. Ocular lobes well defined, slightly extended forwards and completely without visual elements. Rostrum strongly prominent, running out into an acute, somewhat deflexed, point, and with a small rounded expansion on either side of the base (Fig. 16a). Epistome with a short spiniform process.

Peraeonites (Figs. 15a-b, 16b-g, and Pl. 1e) increase in length from 2 to 5 and 6 which are almost equally long while 7 is somewhat shorter than 4.

Coxa of peraeopod II produced into a long spiniform process, directed obliquely forwards. Peraeonites 3 and 4 with two lateral spiniform processes, the succeeding peraeonites with but one such process. Dorsally and laterally the peraeonites are armed as shown in the figures (the name of the species alludes to the tuberculated and granulated surface). Peraeonites 1-6 with hyposphenians as in Fig. 15a. Peraeonite 7 with a small genital cone similar to the hyposphenians but thicker.

Pleon (Fig. 15a and c) a little shorter than the last three peraeonites together. Pleonites richly set



Fig 17. *Aapseudes tuberculatus* n.sp., ♂; a, antennula, ventral view ($\times 64$); b, antenna, ventral view ($\times 64$); c, labrum, rostral view ($\times 175$); d-e, right and left mandibles, rostral view ($\times 103$); f-g, distal end of the same ($\times 425$); h-i, pars incisiva and lacinia mobilis of left mandible in different positions ($\times 425$); j, right side of labium, caudal view ($\times 175$), spines ($\times 700$).

with setae, somewhat broader than long, with irregular outlines and with the epimera produced into an acute process, diminishing in length, counting caudad. Pleotelson not fully as long as the last three pleonites together.

Antennula (Fig. 17a) longer than carapace. First joint about twice as long as second and third joints together. Second joint about 1.2 times longer than third. First two joints with particular seta. Inner flagellum five-jointed; a particular seta is present on the third and fourth joints. Except for the last joint, all joints of the nine-jointed outer flagellum are set with long aesthetascs.

Antenna (Fig. 17b). The first joint is produced inward into a broad bulge. Second joint about 1.4 times longer than the first and much more slender. Squama reaching somewhat beyond the middle of the second flagellum joint and furnished with four setae, one of which is very short. The first joint of the eleven-jointed flagellum is short. The second joint is 3 times longer than the first and 1.2 times longer than the third. Second and third joints with particular setae. The succeeding joints are slenderer; the first four of them are furnished with long aesthetascs and the antepenultimate joint with one particular seta.

Labrum (Fig. 17c) with broadly trapezoid basal part, laterally set with long hairs. Front margin undulated and laterally set with short hairs.

Mandibles (Fig. 17d-i) strongly calcified, with subcylindrical, straight inwards-directed processus molaris, the tip of which is bent somewhat backwards and outwards and set with blunt spinules. In front of this process the corpus is adorned as shown in the figures. Pars incisiva of right mandible six-dentate, the one of left mandible five-dentate. Lacinia mobilis of left mandible six-dentate. The spiniferous lobe of the right mandible bears one slender simple spine and five forked spines of different lengths, that of the left mandible one slender simple spine and eight strong spines, six of which are bifid at the tip. First joint of the palp short, with two setae. The second joint is longest, being about 5 times longer than the first and twice as long as the third, and in the distal part set with simple setae. Some of the setae of the last joint are very finely ciliated on one side.

Labium (Fig. 17j) set with small spinules and hairs on the lateral margins and with some tiny hairs on the caudal surface just inside these margins. The oval lobes are marginated with long hairs and at the end furnished with three forked spines;

the caudal surface is partly set with shorter and longer hairs.

Maxillula (Fig. 18a-c). Endites adorned with hairs and spinules as shown in Fig. 18a. The outer endite bears two long bare caudal setae near the distal end, and one dwarfed and ten strong blunt terminal spines. The palp is distinctly three-jointed and each joint is adorned with some spinules; the last joint has at least six long setae which are serrated distally. The inner endite bears five terminal setae, shaped as in Fig. 18c.

Maxilla (Fig. 18 d-f). Caudal surface partly adorned with small spinules. Inner margin serrated along the distal half. Outer margin with some serrations proximally and distally, and for the rest, for the greater part set with hairs. Setae of rostral row one-sidedly ciliate and bifid at the tip. The caudal row numbers five more or less two-sidedly ciliate setae. The fixed endite has two caudal subterminal spines, the outer of which is widened and forked in the distal part and set with hairs in the proximal part; the rostral surface bears four subterminal spines, the innermost of which is longest and one-sidedly ciliate along the distal part; the distal end has four setae and three strong forked spines. The outer lobe of the movable endite bears six long setae which are one-sidedly ciliate along the distal part, and the inner lobe has eleven setae, the six inner of which are one-sidedly ciliate along the distal part.

Maxilliped (Fig. 18g-j). Coxa short, set with some groups of extremely tiny hairs on the caudal surface. Caudal surface of basis with four short setae and many rows of extremely tiny hairs situated as shown in Fig. 18g; distal part of outer surface irregularly crenated. The first joint of the palp is set with a short bare outer seta; it bears, furthermore, one long bare seta at the inner distal end and a short bare caudal seta at some distance from the latter; second joint with one bare seta near the outer distal end and numerous inner setae, most of which are one- or two-sidedly ciliate or finely pectinate, and with a row of fine hairs below the setae. Each endite with three couplers and two long caudal setae near the distal end; distal margin armed as shown in Fig. 18h; the median vertical surface bears seven strong hairy setae on the free margin. Epignath (Fig. 18i) set with hairs along the distal margin and in front furnished with two oval lobes, the proximal of which for the greater part is marginated with hairs; the terminal spine is adorned with some rows of tiny spinules and hairs (Fig. 18j).



Fig. 18. *Aapseudes tuberculatus* n.sp., ♂; a, maxillula, rostral view (×130), seta (×320); b-c, distal end of endites of the same, rostral view (×320); d maxillula, caudal view (×215); e-f, distal end of fixed endite of the same, caudal and rostral views (×425); g, maxilliped, caudal view (×130); h, endite of the same, rostral view (×320); i, epignath (×130); j, terminal part of the same (×320).



Fig. 19. *Aapseudes tuberculatus* n.sp., ♂; a, cheliped, caudal view ($\times 53$); b, distal end of the same, rostral view ($\times 205$); c, peraeopod II, caudal view ($\times 64$), spines ($\times 205$); d, peraeopod III, caudal view ($\times 53$); e, distal end of propus and dactylus of the same, caudal view ($\times 205$).

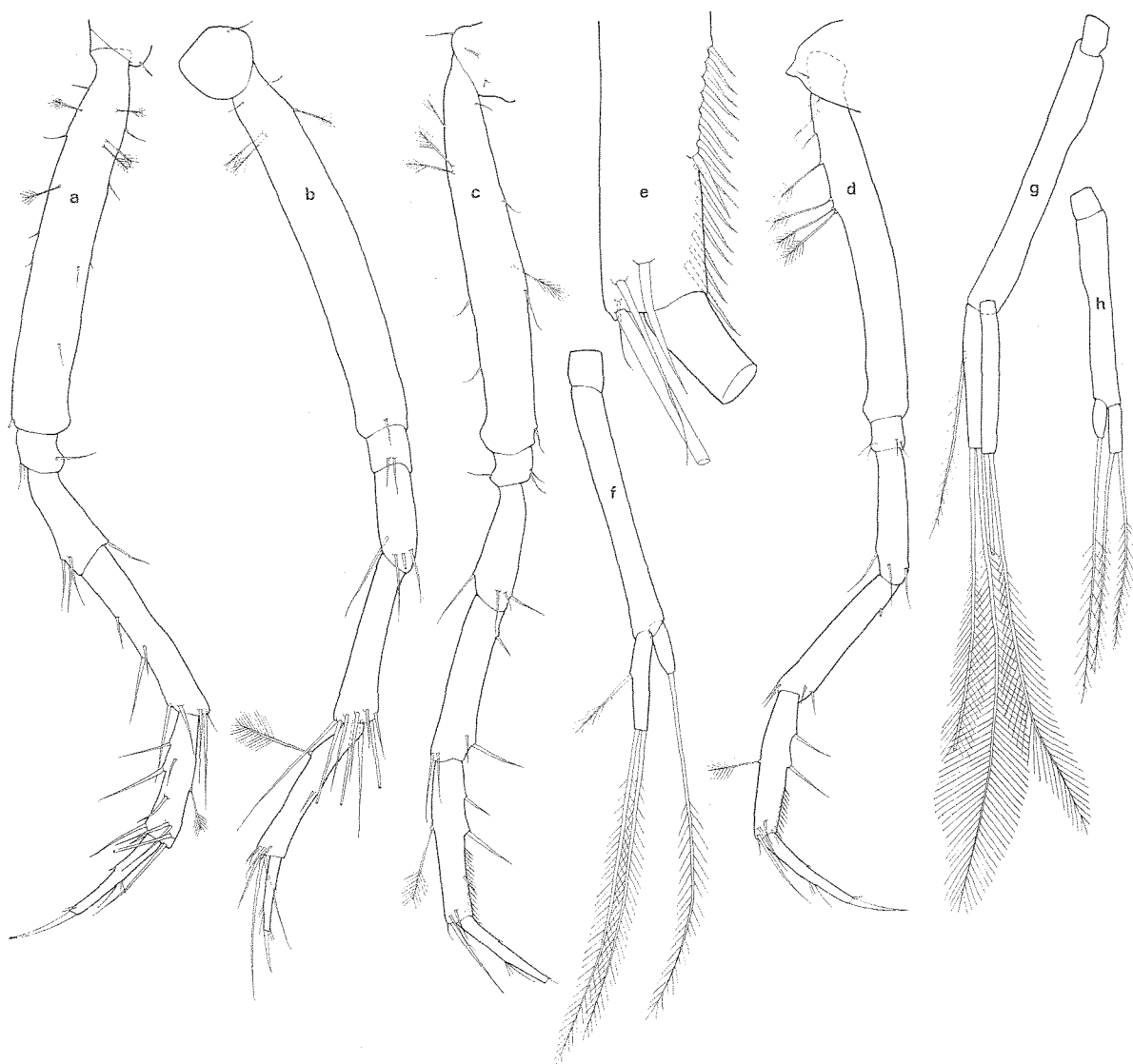


Fig. 20. *Aapseudes tuberculatus* n.sp., ♂; a, peraeopod IV, caudal view ($\times 53$); b-d, peraeopods V-VII, rostral view ($\times 53$); e, distal part of propus of peraeopod VI, rostral view ($\times 205$); f, left pleopod I, caudal view ($\times 118$); g, left pleopod II, caudal view ($\times 118$); h, right pleopod V, caudal view ($\times 118$).

Cheliped (Fig. 19a-b). Coxa very small, bare. Basis about as long as carpus, with a sternal spine at about the distal fourth. Exopodite slender with four plumose setae. Merus with four setae. Carpus about 0.7 times as long as propus, without spines or spiniform projections, but with four setae arranged as shown in the figure. Propus about 2.2 times longer than the greatest width, with somewhat concave sternal surface, set with four setae; tergal surface with three distal setae; rostral surface with one one-sidedly ciliate spiniform seta and with three bare setae of different lengths just behind the dactylus; finger shorter than the rest of the joint, with a moderately strong dentiform projection near the base and armed as shown in Fig. 19b. Dactylus

with three juxtaposed sternal setae in the distal part and with a sternal row of spiniform lamellae; terminal claw longer than the one of the finger.

Peraeopod II (Fig. 19c) fossorial. Basis a little shorter than the three succeeding joints together and furnished with particular setae. Exopodite with five plumose setae. Ischium short. Merus slightly longer than carpus, distally set with one sternal and one tergal spine. Carpus with two sternal spines and one distal tergal spine. Propus about 0.8 times as long as carpus, with six sternal spines, with one short one-sidedly ciliate rostral spine near the distal sternal corner, and with two tergal spines; the tergal spines on carpus and propus have some small spiniform projections (see the figure).

Peraeopods III-IV (Fig. 19d-e, and Fig. 20a) very similar, but merus, propus and dactylus of peraeopod IV are somewhat shorter than the corresponding joints of III, and dactylus of peraeopod III has two sternal spinules, while that of peraeopod IV has but one. Basis longer than the three succeeding joints together, furnished with particular setae. Propus with one one-sidedly ciliate sternal seta at the distal end, and with one tergal particular seta somewhat below the middle. Dactylus with claw longer than propus; claw about 0.6 times as long as dactylus.

Peraeopod V (Fig. 20b). Basis longer than the three succeeding joints together, with particular setae. Ischium and merus as long as the corresponding joints of peraeopod IV. Carpus and dactylus shorter, propus longer than the corresponding joints of the two preceding peraeopods. Propus without one-sidedly ciliate sternal seta; the tergal particular seta is situated near the base. Dactylus with claw shorter than propus; claw about 0.6 times as long as dactylus.

Peraeopods VI-VII (Fig. 20c-e) very similar, but carpus and propus of peraeopod VII are somewhat shorter than those of peraeopod VI. Basis longer than the three succeeding joints together, with particular setae. Propus with a distal sternal row of one-sidedly ciliate spinules, and with one tergal particular seta near the middle (Fig. 20e). Dactylus with claw a little longer than propus; claw about half as long as dactylus.

Pleopods (Fig. 20f-h) variable. Coxa short, unarmed. Basis very long and slender, unarmed. Right pleopod I and pleopods II and III as in Fig. 20g, left pleopod I as in Fig. 20f; pleopods IV and right pleopod V as in Fig. 20h, left pleopod V with two terminal setae on the exopodite.

Uropod (Fig. 15a and c). Peduncle long, set with five short setae. Exo- and endopodite lost.

Remarks:

In the rudimentary condition of the pleopods and in the presence of the one-sidedly ciliate distal sternal spine on propus of peraeopods II-IV, *A. tuberculatus* rather closely approaches *A. diversus*, described below, but differs from this species in many other characters, as for instance in the general shape of the body, in the squama of the antenna and in the cheliped. From the other species, *A. tuberculatus* differs materially in the ornamentation of the body.

Apseudes diversus n.sp.

Material:

St. 626, Tasman Sea (42°10'S, 170°10'E), 610 m, 20 Jan. 1952. Gear: herring otter trawl. Bottom: globigerina ooze. Bottom temp.: c. 7.6°C. – 16 females with rudimentary oostegites. Gear: Petersen Grab, 0.2 sq. m. – 1 adult male.

St. 726, Gulf of Panama (5°49'N, 78°52'W), 3670-3270 m, 13 May 1952. Gear: herring otter trawl. Bottom: clay. Bottom temp.: c. 1.9°C. – 2 females with rudimentary oostegites.

Description of female type (from St. 626):

Body (Pl. IIa) moderately elongate, about 5.3 times longer than broad. Length about 4.3 mm. The paraeonites decrease gradually in width. Pleon much narrower than paraeon. Integument strongly calcified.

Carapace (Fig. 21a, Pl. IIb) broader than long, with some tiny lateral hairs but without spiniform projections. The posterior half of the somewhat vaulted dorsal surface is furnished with shallow furrows, which together form two connected trapezoidal figures. The rostrum is expanded at the base into a pair of large lateral lobes, the anterior margins of which are for the greater part very finely crenated; medially, the rostrum runs out into a long and somewhat deflexed point which is set with a fine hair near each lateral lobe. The ocular lobes are well defined, obliquely extended forwards and outwards and excavated in front; there are no visual elements. Epistome without spine.

Peraeonites (Fig. 21a-a.1 and Pl. IIa) increase in length from 2 to 5 and 6 which are equally long while paraeonite 7 is a little shorter than 3. They are shaped as shown in the figures. The last paraeonite has three small setae near the posterior dorsal margin. Coxa of peraeopod II extends as a long acute spiniform projection, directed obliquely outwards. Coxa of the succeeding peraeonites small but well defined. Hyposphenians are present on all peraeonites; they are short and somewhat forwards directed on paraeonites 1-3, short and straight downwards directed on 4, longer and somewhat backwards directed on 5-7.

Pleon (Fig. 21b-b.1) not fully as long as the last two paraeonites together. Pleonites with the epimera extended as spiniform projections, the projections of pleonite 5 much longer than the others; each of the pleonites also has a ventral spiniform process, which increase in length from pleonite 1 to 5. Dorsally the pleonites are armed as shown in Fig. 21b.

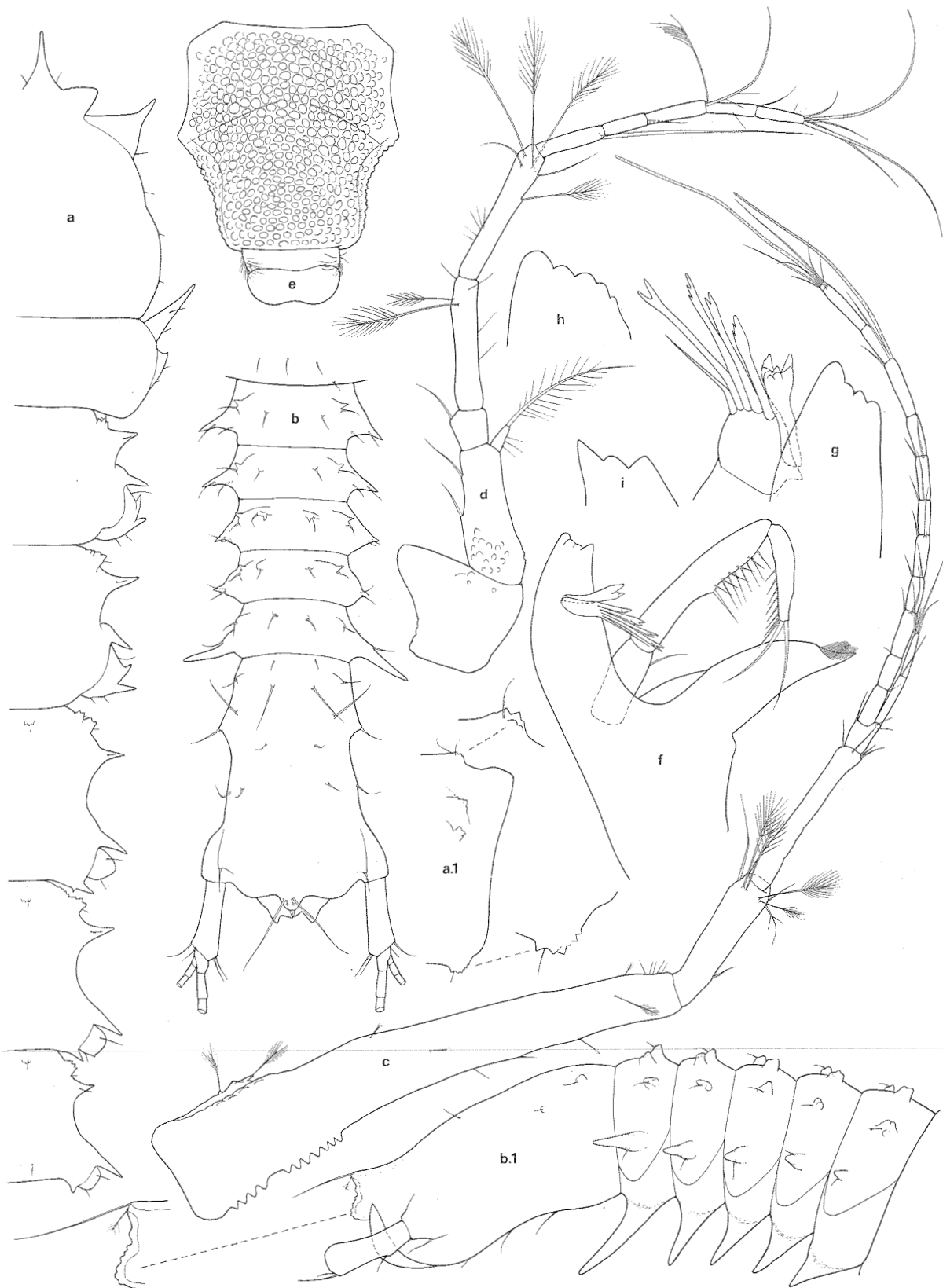


Fig. 21. *Aapseudes diversus* n.sp., ♀; a, right side of carapace and pereopod, dorsal view (×58); a.1, anterior end of pereopodite 5 of another ♀, lateral view (×50); b, pleon, dorsal view (×58); b.1, pleon of the same ♀ as a.1, lateral view (×69); c, antennula, ventral view (×108); d, antenna, ventral view (×160); e, labrum, rostral view (×103); f, right mandible, oblique internal view (×205); g, distal part of the same (×425); h-i, distal end of pars incisiva and lacinia mobilis of left mandible (×425).

Pleotelson almost as long as the pleonites together, somewhat widened in the distal part, and dorsally and laterally furnished with setae as shown in the figure. The posterior margin is undulated with a small projection in the middle which bears two long bare setae and two diminutive particular setae.

Antennula (Fig. 21c) about three times longer than carapace. The first peduncular joint is stout, subcylindrical, about four times longer than the second joint, and crenated in the proximal part of the inner surface and to a certain degree also of the outer one. First two joints with particular setae. Third joint about 1.2 times longer than second and much narrower. Inner flagellum three-jointed. Outer flagellum twelve-jointed, last joint very small, furnished with a long slender aesthetasc; also the ninth joint has an aesthetasc.

Antenna (Fig. 21d) much shorter than antennula, scarcely reaching to the third joint of the latter. The first peduncular joint is bare and extends inward as a triangular bulge. The second joint is about 1.3 times longer than the first and much more slender; at the base of the dorsal surface it is set with some scale-like formations. The squama, which is remarkably short, has a few outer hairs and a long long-plumose apical seta. Flagellum eight-jointed; first joint shortest with a single bare inner seta; second joint about 3.7 times longer than the first, with particular setae; third joint longest, a little longer than the second, with long particular setae. The succeeding joints are much narrower and shorter than the third one.

Labrum (Fig. 21e). The distal half of the proximal part is somewhat concave and crenated along and just inside the margins. The middle part is laterally furnished with some hairs and the distal part is slightly concave in the middle of the front margin.

Mandibles (Fig. 21f-i) with strong processus molaris, the distal part of which is bent backwards and outwards and set with fine hairs at the end. Pars incisiva of right mandible four-dentate, that of left mandible five-dentate. Lacinia mobilis of the latter three-dentate. The bunch of spines and setae number one simple and five forked spines, one of which is very strong, club-shaped and strongly tubercular around the end; the others are bi- or triforked at the tip.

Labium (Fig. 22a) with the distal half of the outer margin of the basal part finely serrate, the serrations being ciliated on the concave margin. The lobes are densely set with long hairs along the greater part of

the lateral margins, and furnished with three short spiniform terminal setae.

Maxillula (Fig. 22b) of the usual shape. The endites are set with hairs as shown in the figure. The outer endite is three-serrated just below the hairy part of the inner surface, and the serrations are finely ciliate on their concave margin. It bears eleven stout blunt terminal spines, and two caudal setae near the end. The palp is two-jointed and furnished with rows of diminutive spinules, the second joint moreover with two subterminal and three terminal setae, the outermost terminal seta being the longest, the uppermost subterminal seta the shortest. Along their distal part the setae are thinly serrate on the one margin and more or less ciliate on the opposite margin. The inner endite has five plumose terminal setae.

Maxilla (Fig. 22c-f). The caudal and rostral surfaces are partly set with short rows of tiny spinules. Setae of rostral row bare and bifid at the tip. The caudal row numbers five strong spines, the three shorter of which are shaped as in Fig. 22d, the two longer as in Fig. 22e. The fixed endite bears on the caudal surface one seta which is pectinate in the distal part; on the rostral surface it has one dwarfed spine, and distally three strong forked spines and nine setae, two of which are plumose. The outer lobe of the movable endite is furnished with six long and strong bare setae, the inner lobe with nine bare setae.

Maxilliped (Fig. 22g-k) with a small prominence on the proximal margin of the short coxa. Basis with two juxtaposed caudal setae just inside the middle of the distal margin. The first joint of the palp is furnished with a small outer seta, and with a long seta near the inner distal end; second joint with one seta at the outer distal end, and with eleven inner setae; third joint with five inner setae; fourth joint with six setae along the end, the outer seta of which is very short; the setae are bare. Right endite with three couplers, left endite with two; caudal surface with two long setae near the distal end; median vertical surface with nine (left maxilliped) or ten (right maxilliped) plumose setae on the free margin; the distal margin bears some bare setae and eight chitinous formations of different forms (Fig. 22h-i). The epignath is set with short hairs along the distal margin and has two anterior lobes, one of which is ciliate; the terminal spine is set with rows of diminutive spinules (Fig. 22j-k).

Cheliped (Fig. 23a-b) moderately slender. Coxa very small. Basis about 2.6 times longer than broad,

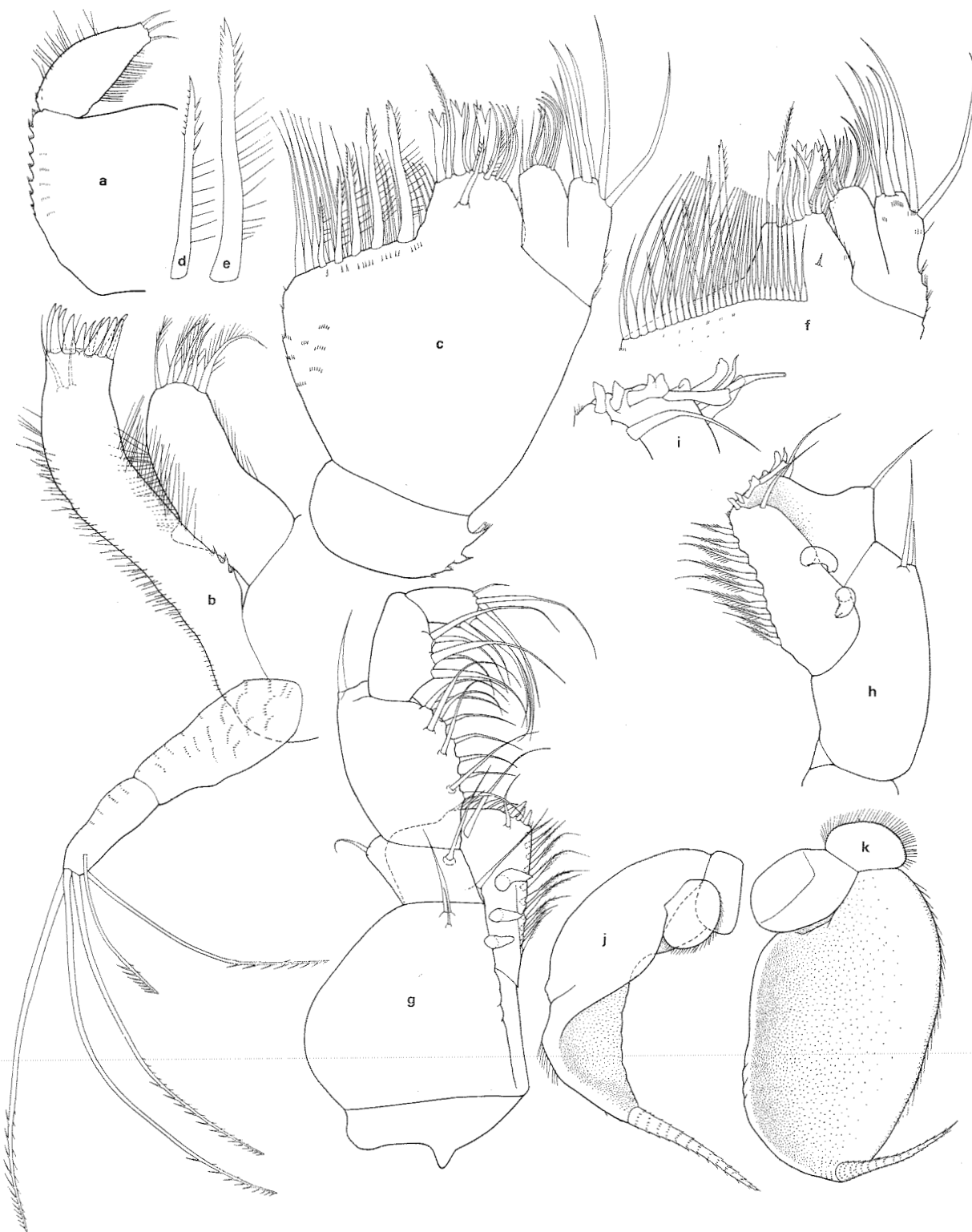


Fig. 22. *Aapseudes diversus* n.sp., ♀; a, right side of labium, caudal view ($\times 230$); b, maxillula, rostral view ($\times 320$); c, maxilla, caudal view ($\times 320$); d, the middle spine of the outer row of maxilla ($\times 770$); e, the spine nearest to the fixed endite of the same row ($\times 770$); f, distal part of maxilla, rostral view ($\times 320$); g, maxilliped, caudal view ($\times 230$); h, basis and endite of the same, obliquely rostral view ($\times 320$); i, distal end of the same ($\times 450$); j-k, epignath ($\times 250$).

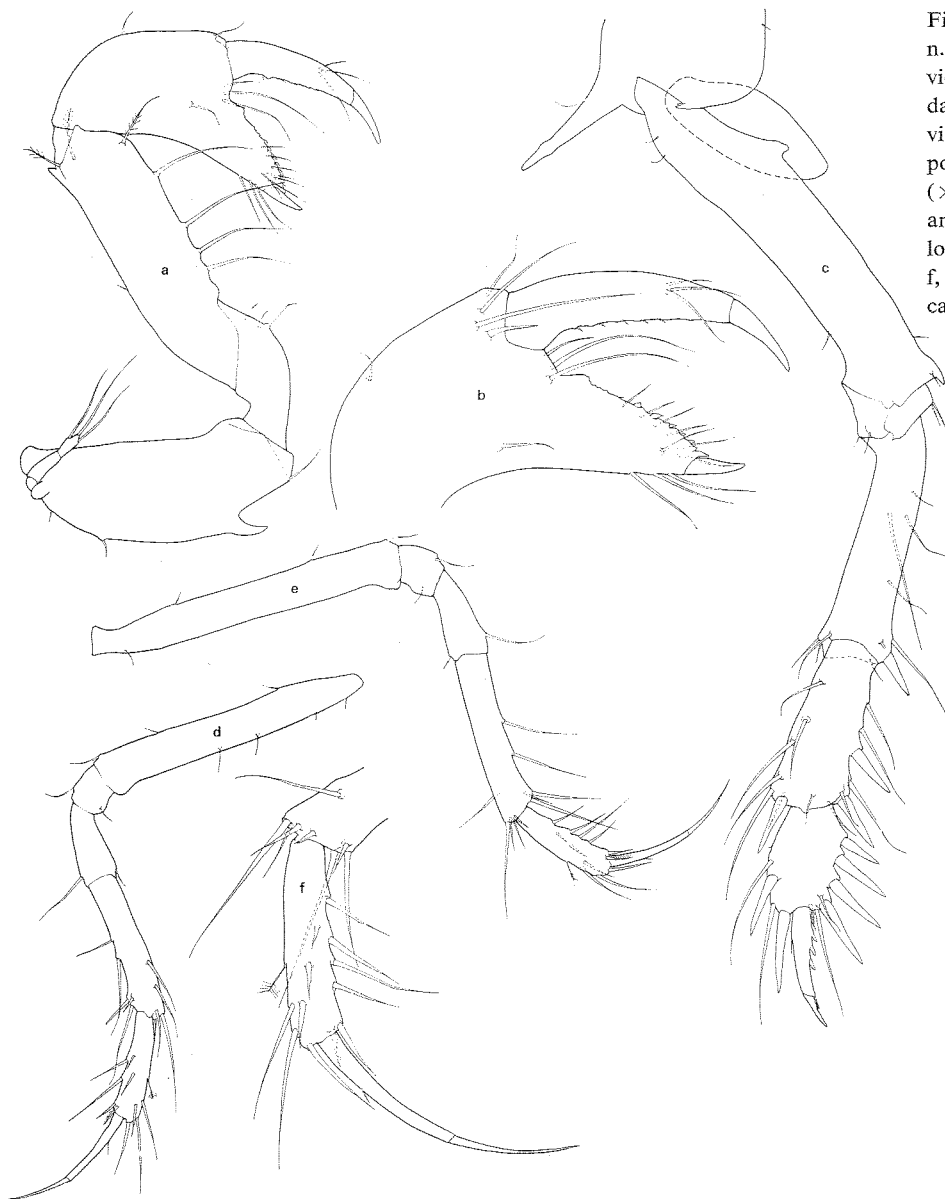


Fig. 23. *Aapseudes diversus* n.sp., ♀; a, cheliped, caudal view ($\times 64$); b, propus and dactylus of the same, rostral view ($\times 100$); c-d, peraeopods II and III, caudal view ($\times 64$); e, peraeopod III of another female from the type locality, rostral view ($\times 64$); f, distal part of the same, caudal view ($\times 116$).

with a sternal dentiform projection at about the distal third, and with three sternal setae, the two proximal of which are very small. Exopodite with three bare setae. Merus short with three sternal setae. Carpus longer than propus, with five sternal setae, the distal of which is plumose, the others bare; tergal surface with a small dentiform projection at the distal end, and with a dwarfed seta near the middle; caudal and rostral surfaces with one plumose seta near the distal tergal end. Propus about as long as basis, twice as long as broad; finger about as long as the rest of the joint and armed as shown in the figures. Dactylus somewhat longer than finger, set with three rostral setae behind the claw, and with a sternal row of spinules; claw longer than the one of the finger.

Peraeopod II (Fig. 23c) fossorial. Basis almost as long as the three succeeding joints together with the distal sternal end dentiformly prolonged; there is no exopodite. Ischium very short. Merus shorter than carpus and propus combined. Carpus about 1.6 times longer than propus. The latter is almost oval in shape and at the end furnished with a short one-sidedly ciliate caudal seta. Apart from the setae, merus has one, carpus two, and propus four sternal spines, and there is one tergal spine on the carpus, and two on the propus. Dactylus with claw longer than propus; dactylus with one short tergal seta, one short seta at the distal sternal end, and with three sternal spinules in the middle part, the spinules being set with a short hair near the apex; claw about 0.4 times as long as dactylus.

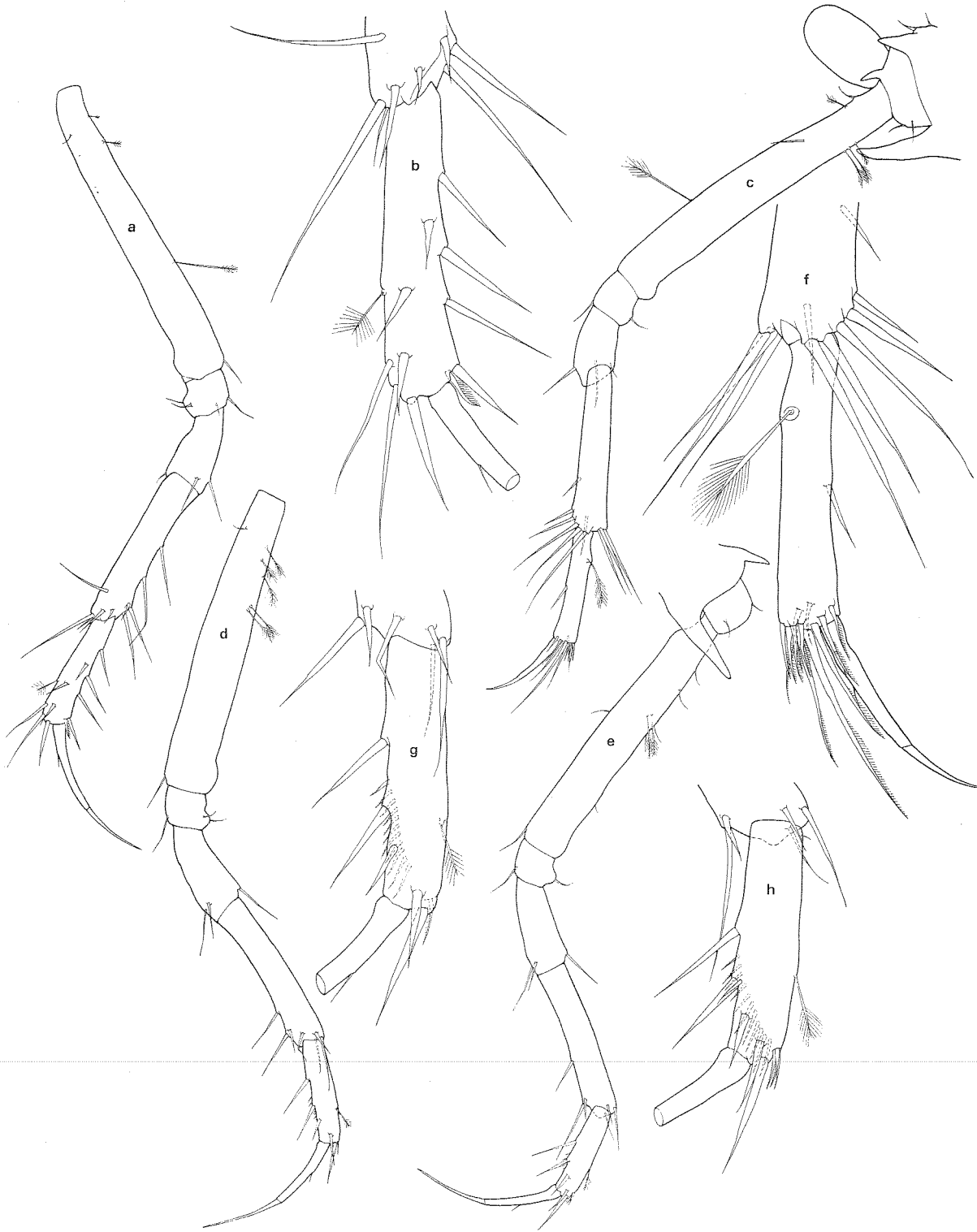


Fig. 24. *Aapseudes diversus* n.sp., ♀; a, peraeopod IV, caudal view ($\times 80$); b, distal part of carpus and propus of the same, caudal view ($\times 205$); c-e, peraeopods V-VII, rostral view ($\times 80$); f, distal part of peraeopod V, caudal view ($\times 205$); g-h, distal part of peraeopods VI-VII, rostral view ($\times 205$).

Peraeopods III-IV (Figs. 23d and 24a-b) very alike, but basis of peraeopod IV with particular setae, that of peraeopod III without. Basis longer than the three succeeding joints combined. Ischium about half as long as merus. Carpus about twice as long as merus. Propus with a tergal particular seta near the distal third. Dactylus with claw longer than propus; claw shorter than dactylus.

Peraeopod V (Fig. 24c and f), excluding dactylus, of the same length as peraeopods III and IV without dactylus. Basis longer than the three succeeding joints combined, with particular setae. Ischium and merus short. Carpus almost 1.5 times longer than propus, distally furnished with long spiniform setae. Propus about 2.3 times longer than dactylus + claw, with a long tergal particular seta near the proximal fourth, and with a single spiniform sternal seta near the middle. The distal end is surrounded with a great number of setae of different lengths, the setae being one-sidedly ciliate. Dactylus and claw shorter than in peraeopods III and IV.

Peraeopods VI and VII (Fig. 24d-e and g-h) almost alike, the only noticeable difference being that the oblique row of spines on the caudal surface of the propus runs to the tergal distal end on peraeopod VII, but not on peraeopod VI. The tergal particular seta on the propus is situated in the same place as on peraeopods III and IV. Dactylus with claw much longer than propus; claw a little longer than dactylus.

Pleopods (Fig. 25a) with unarmed coxa. Basis about three times longer than coxa, with a single bare seta near the inner distal corner. No exopodite. Endopodite long and narrow with two bare terminal setae.

Uropod (Fig. 25b) with long peduncle, furnished with setae as shown in the figure. Exopodite four-jointed, the joints increasing in length, counting distad; last joint with three bare terminal setae, the other joints bare. Endopodite seventeen-jointed, most of the joints bare, others armed with bare setae only, still others with bare and particular setae.

Description of male (from St. 626):

The male (Pl. IIc) differs from the female only in the following significant respects:

Body (Pl. IIc) somewhat more slender. Length about 4 mm.

Antennula (Fig. 25c) with more aesthetascs on the outer flagellum.

Mandibles (Fig. 25d-f) with six forked spines and one seta.

Cheliped (Fig. 25g-h) with somewhat shorter and broader carpus, and with a strong dentiform projection near the base of the finger.

Peraeopods (Fig. 26a-e). Dactylus with claw of peraeopods III-VII is longer in proportion to propus; peraeopods V and VI are alike. It may also be noted that there are three sternal spines on propus of right peraeopod II, four on the left.

Pleopods I and II are as in the female, while the three succeeding pairs have a shorter exopodite, carrying a single terminal seta (Fig. 25i). The terminal setae of all pleopods are long-plumose.

Variation:

One more female from the type-locality and one female from Station 726 have been dissected.

The only differences found are that in the female from St. 726 the propus of peraeopod II has but three sternal spines and the dactylus of the same leg only two sternal spinules, and that the female from the type-locality has two more sternal setae on the propus of peraeopod III (Fig. 23e-f) than the type specimen.

It may also be noted that in all the females the peraeonites and pleonites show some minor differences.

Remarks:

One might hardly have expected to find the same species in two such different localities as those mentioned. A careful examination, however, has proved the specimens to be conspecific.

In the combination of the absence of an exopodite on peraeopod II and the rudimentary conditions of the squama and of the pleopods, *A. diversus* seems to hold an isolated position within the genus. Owing to these differences, the species ought perhaps to be placed in a subgenus or genus by itself. The final decision, however, as to whether a separation is justified must await an examination of the other species of the genus, as some authors in their descriptions of species pass the characters mentioned over in silence.

Carpopseudes n. gen.

Syn. *Apseudes* Leach, NORMAN & STEBBING, 1886, p. 80 (partim).

Generotype: *C. serratispinosus* n. sp.

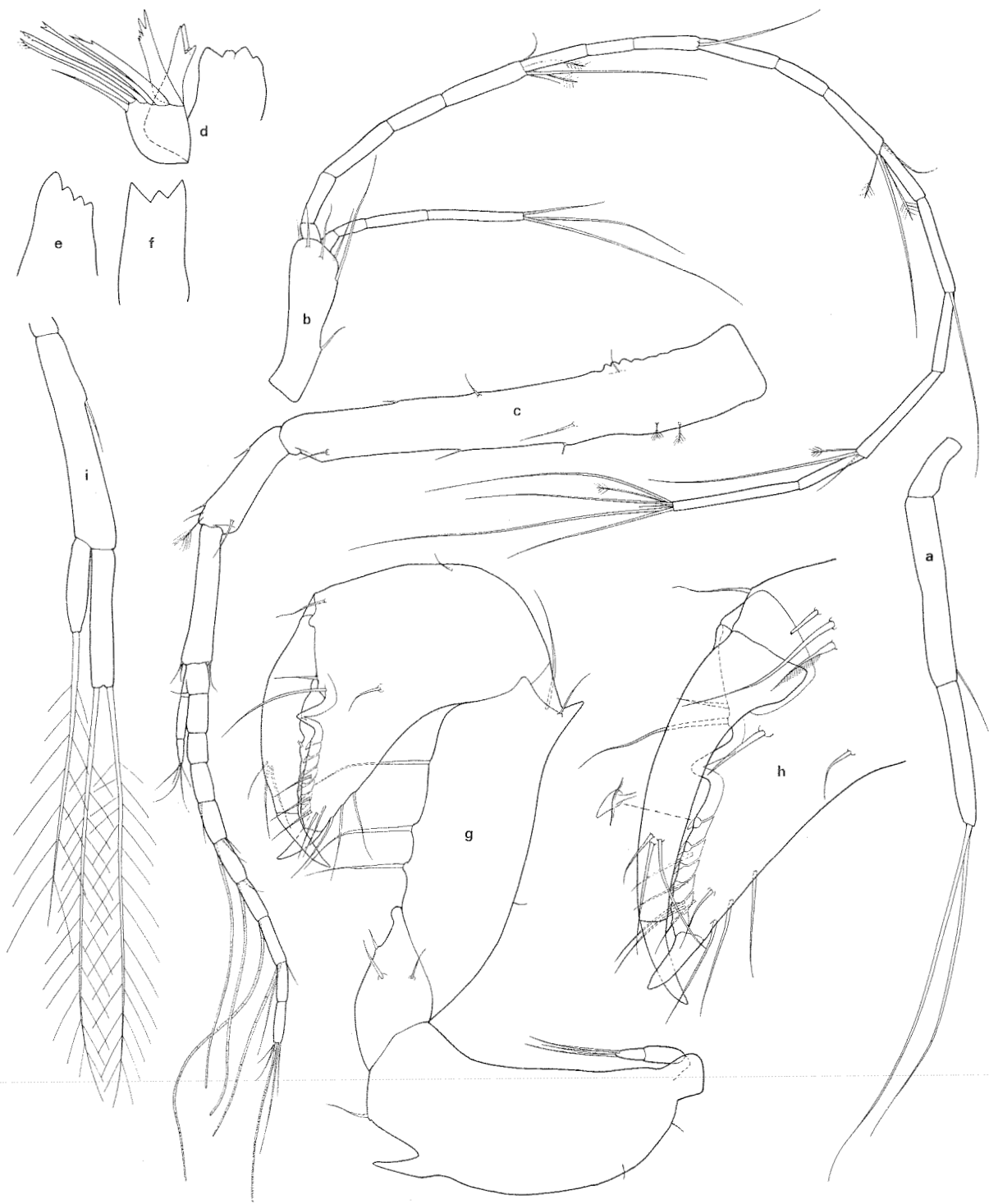


Fig. 25. *Aapseudes diversus* n.sp., a, pleopod I, ♀, caudal view ($\times 320$); b, uropod, ♀, dorsal view ($\times 145$); c, antennula, ♂ ventral view ($\times 108$); d, distal part of right mandible, ♂ ($\times 425$); e-f, pars incisiva and lacinia mobilis of left mandible, ♂ ($\times 425$); g, cheliped, ♂, caudal view ($\times 130$); h, distal part of propus and dactylus of the same, rostral view ($\times 205$); i, pleopod III, ♂, caudal view ($\times 320$).

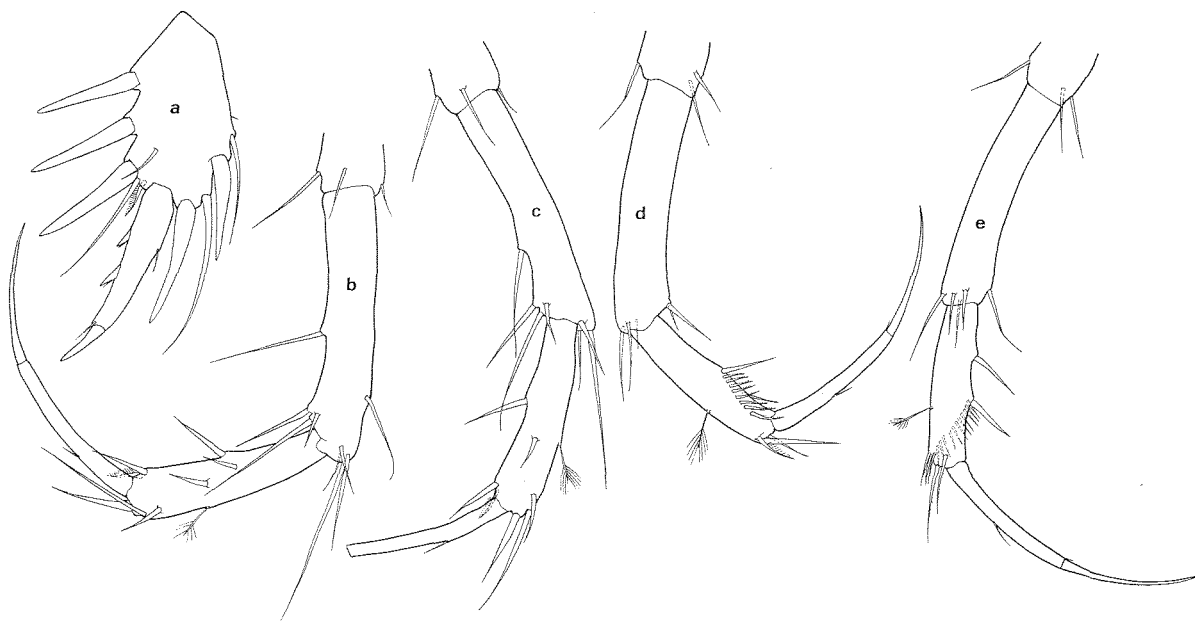


Fig. 26. *Apseudes diversus* n.sp., ♂; a-c, propus and dactylus of pereopods II-IV, caudal view ($\times 130$); d-e, last three joints of pereopods VI and VII, caudal and rostral views ($\times 130$).

Diagnosis:

Pleon with five pleonites. Ocular lobes well defined, extended on each side as a spiniform process (in *C. simplicirostris* each process is bent downwards, in the other species it is directed obliquely forwards and outwards), and without visual elements. Carapace without spiniform process in front of the respiratory chambers. Peraeonites 5 and 6 longest. Peraeonite 7 somewhat similar to a parallel trapezium. Pleonites much broader than long, as broad as the last peraeonite or slightly narrower, with the epimera extended as long spiniform processes. Antennae with squama. Maxillulae with two-jointed palp; outer endite with two caudal setae near the distal end, and with one dwarfed and eleven strong terminal spines; inner endite with five terminal setae or spines. Epignath of maxillipeds a large vaulted plate. Chelipeds and pereopods II with exopodite. Basis of chelipeds with-

out spine or spiniform process. Pereopods II slightly differing from the succeeding ones, not adapted for digging or swimming; coxa extended as a spiniform process directed obliquely forwards and downwards; carpus longer than merus (the generic name alludes to this character). Five pairs of pleopods; inner proximal seta of endopodite with a girdle of fine, short spinules or hairs below the plumose part. Pleotelson and mandibles without sexual dimorphism.

As far as hitherto known, the genus is restricted to the deep-sea.

Species:

- C. longissimus* n.sp. (see p. 72).
- C. oculicornutus* n.sp. (see p. 79).
- C. serratispinosus* n.sp. (see p. 63).
- C. simplicirostris* (Norman & Stebbing), 1886, p. 91.

Key to the species

1. Ocular lobes extended as a conspicuous long subcylindrical corniform process *C. oculicornutus* n.sp.
Ocular lobes otherwise 2
2. Rostrum quite straight at the base *C. longissimus* n.sp.
Rostrum not straight at the base 3
3. Rostrum with a notch on each side of the base *C. simplicirostris* (Norman & Stebbing)
Rostrum without notches at the base *C. serratispinosus* n.sp.

Carpopseudes serratispinosus n.sp.

Material:

St. 716, Acapulco-Panama (9°23'N, 89°32'W), 3570 m, 6 May 1952. Gear: herring otter trawl. Bottom: dark, muddy clay. Bottom temp.: c. 1.9°C. – 1 incomplete male.

St. 729, Gulf of Panama (7°22'N, 79°33'W), 875 m, 14 May 1952. Gear: Petersen-Grab 0.2 sq. m. Bottom: green clay. – 1 adult female (with no trace of oostegites).

Remarks:

The two sexes differ so materially from each other in the chelipeds that at first sight I assumed them to be different species. A careful examination, however, proved that in all probability this was not the case. As the male was dissected and figured first, for the female only the diverging characters have been mentioned.

In the male the labrum and the left mandible are lost, the right mandible is crushed, and most of the setae on the last three pairs of peraeopods and the uropods are lost.

Contrary to the general rule the male will be described first.

Description of male type:

Body (Fig. 27a and Pl. II d) slender, being about 6.4 times longer than broad. Length about 12 mm. Integument rather strongly calcified.

Carapace a little broader than long. Lateral surface undulated and set with two hairs just in front of the respiratory chambers. The somewhat vaulted dorsal surface has no transverse furrow. Ocular lobes strongly extended obliquely forwards and outwards, excavated in front. Rostrum strongly expanded at the base, and terminating in an acute, somewhat deflexed point. Epistome with a very small spiniform process.

Peraeonites 2 and 3 tubercular, the succeeding ones more or less areolated. Peraeonite 7 about as long as 3. Coxa of peraeopods III-VII small and rounded. Peraeonites 4-6 with an outwards directed spiniform lateral projection in front of the middle, and widened towards the posterior end. Peraeonites 1-6 with an acute hyposphenie, which on paraeonite 1 is situated just behind the chelipeds, on paraeonite 2 near the middle, on the succeeding paraeonites near the back. Peraeonite 7 with a strong genital cone, directed obliquely forwards.

Pleon somewhat longer than the last four peraeo-

nites together. Last two pleonites somewhat narrower than the preceding ones; a ventral spiniform process is present on all pleonites, shaped as in the female (see Fig. 32a); the pleonites are moreover adorned with small dorsal setae and hairs. Pleotelson about as long as the last four pleonites together, tapering behind but widening again near the end, dorsally and laterally richly set with small setae and hairs.

Antennula (Fig. 27b-b.1) much longer than carapace. First peduncular joint about twice as long as the two succeeding joints together, and second joint about twice as long as third. First two joints with particular setae. Inner flagellum nine-jointed. The third, fifth and eight joints have one particular seta each. Outer flagellum thirty-two-jointed. The flagellum of the left antennula has one aesthetasc on the joints 4, 5, 9-11, 15, 26 and 30, two on the joints 6, 8, 12, 16-19, 21, 23-25, and three on the joints 20 and 22; the right antennula diverges inasmuch as there is no aesthetasc on the joints 15 and 26, one on the joints 3, 6-8, 12, 16, 20, 30, and two on joint 22.

Antenna (Fig. 27c) much shorter than the antennula, reaching to about the seventh joint of the inner flagellum of the latter. The first joint extends inward as a blunt-ended triangular process. The second joint, which is fully three times longer than the first and much more slender, is girdled at the base with an almost complete area of small scale-like formations. The slender squama reaches to about the distal third of the second joint of the fifteen-jointed flagellum, and it bears eight bare marginal setae. The first joint of the flagellum is shortest. The second joint is about 4.6 times longer than the first, and about as long as the third. The third joint bears particular setae. The succeeding joints are more slender than the preceding ones. The seventh and tenth joints each have an aesthetasc, and the thirteenth joint one particular seta.

Labrum is missing.

Mandibles (Fig. 27d-g). As already pointed out (see above) the left mandible is missing and the right mandible crushed. Pars incisiva of the latter is lightly yellowish and very irregularly undulated; the spiniferous lobe has five strong forked spines and one acute spine. Processus molaris is in the distal part bent somewhat backwards and outwards, and at the tip set with some hairs. The first joint of the palp is about 0.3 times as long as the second joint, and it has three small setae. The second joint is fully twice as long as the third, in the distal part

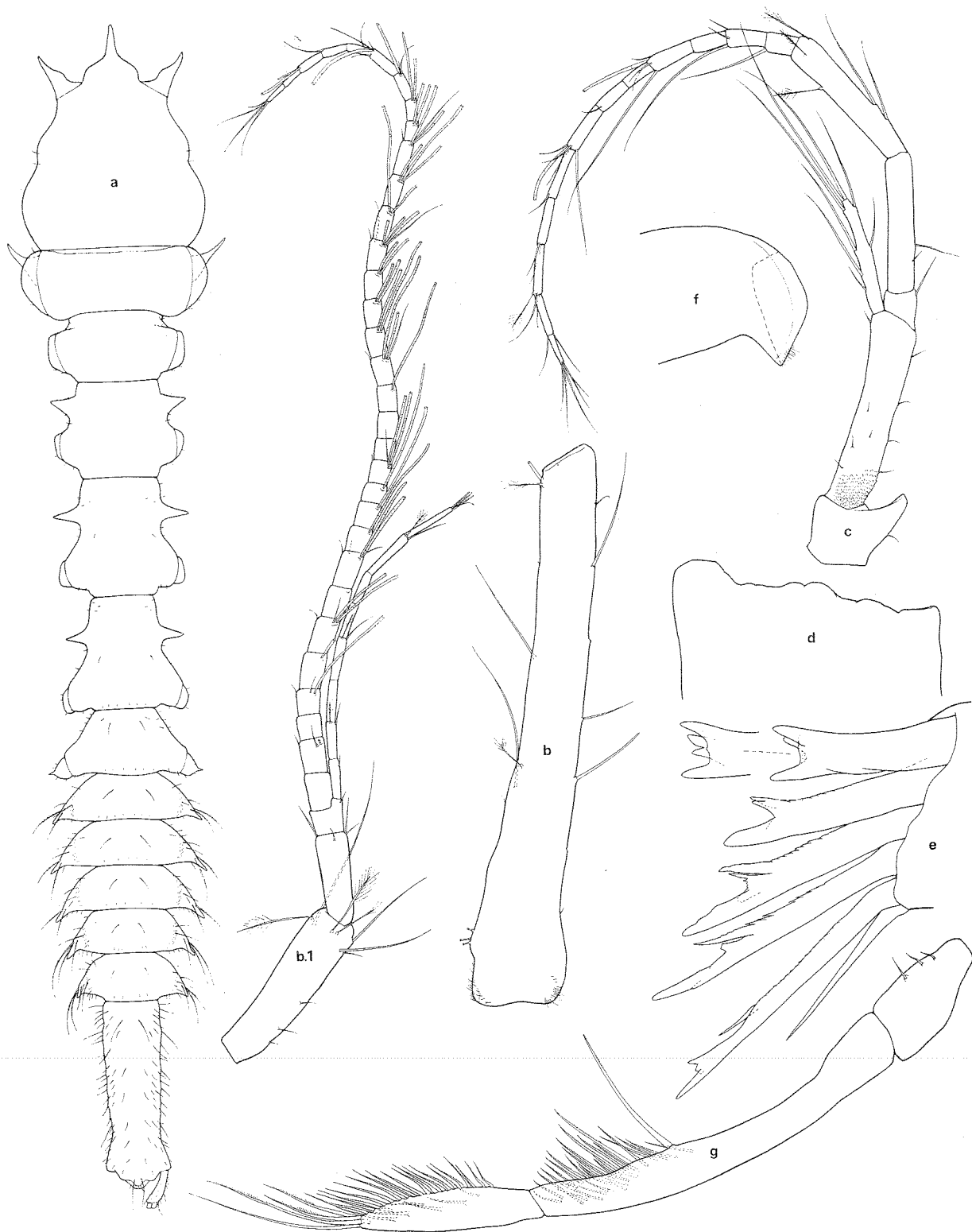


Fig. 27. *Carpoapseudes serratispinosus* n.sp., ♂; a, dorsal view (×16); b and b.1, antennula, ventral view (×47); c, antenna, ventral view (×47); d, pars incisiva of right mandible (×363); e, armament of the spiniferous lobe of the same (×363); f, distal part of processus molaris of the same (×92); g, palp of the same (×92).



Fig. 28. *Carpoapseudes serratispinosus* n.sp., ♂; a, labium, caudal view ($\times 115$); b, terminal lobe of the same, rostral view ($\times 115$); c, terminal spines of the same ($\times 450$); d, maxillula, caudal view ($\times 69$), seta of the same ($\times 320$); e-f, distal end of outer and inner endites of the same ($\times 205$); g, maxilla, caudal view ($\times 145$); h, distal part of the fixed endite of the same, caudal view ($\times 245$); i, maxilliped, caudal view ($\times 69$), setae of the same ($\times 363$).

richly set with setae. The third joint is set with numerous setae. The setae of the last two joints are exactly as in *C. longissimus* (see Fig. 35d-e).

Labium (Fig. 28a-c) with tiny hairs on and inside the lateral margins of the basal part. The terminal lobes are ovate, for the greater part margined with long hairs, the outer margin moreover with spinules, and there are also spinules on the caudal and rostral surfaces; terminally the lobes bear three spines, shaped as shown in Fig. 28c.

Maxillula (Fig. 28d-f). The endites are furnished with hairs as shown in Fig. 28d. The palp is distally set with eight setae which are distally serrated along the lateral margins. The inner endite has two setae and between them three forked spines (Fig. 28f).

Maxilla (Fig. 28g-h). Caudal and rostral surfaces partly adorned with spinules and hairs. Inner margin spinulose. Outer margin with a row of hairs just below the movable endite. Setae of rostral row ciliated on one side and bifid at the tip. The caudal row numbers seven finely plumose setae, the first and last of which are longest. The fixed endite bears two caudal spines, one of which is somewhat dilated at the base and set with hairs in the proximal part; rostral surface with four setae which are more or less ciliate on one side; distal margin with three strong forked spines and five setae. The outer lobe of the movable endite has nine bare setae, the inner lobe eleven setae, some of which are more or less plumose or ciliated on one side.

Maxilliped (Figs. 28i and 29a-d). Caudal surface of coxa and basis adorned as shown in Fig. 28i. The first joint of the palp is set with an inner row of hairs and bears one short bare outer seta opposite to which there is a longer seta; second joint with three small caudal seta in the proximal part, with five short outer setae and with a great number of inner setae which are shaped as shown in Fig. 28i; third joint with one short caudal seta near the middle, and with eight bare inner setae; last joint with eight setae, one of which has three small saw-teeth near the middle of the concave margin. Each endite with four couplers; inner caudal seta transformed into a somewhat leaf-like spine; median vertical surface (Fig. 29a) furnished with eight plumose setae on the free margin; distal margin armed as shown in Fig. 29a-b. Epignath with two frontal lobes, the proximal of which for the greater part is margined with hairs; just above the hairy terminal spine there is a longitudinal row of hairs (Fig. 29c-d).

Cheliped (Fig. 29e-g). Coxa very small, bare. Basis as long as carpus, with some diminutive spi-

nules or hairs in the proximal half of the tergal and sternal surfaces, and with a bunch of setae near the distal sternal end. Exopodite with four plumose setae. Merus long, constricted near the base and set with a few small setae. Carpus slenderer and somewhat shorter than propus, with a dentiform projection near the distal tergal end. The sternal surface is irregularly undulated and set with four setae, two of which are very short. Propus about 1.8 times longer than broad; sternal surface somewhat wavy with six setae; finger about as long as the rest of the joint, with a very long tergal projection near the base, and armed as shown in the figures; terminal claw very short. Dactylus with three juxtaposed rostral setae near the distal fourth; sternal surface (Fig. 29g) shallowly undulated with a conspicuous tubercular process at some distance from the base, with some setulae and spinules behind the process, and with a row of spinules in front of it; terminal claw very short.

Peraeopod II (Fig. 30a and d-e) much longer and somewhat more robust than the succeeding peraeopods. Basis nearly as long as merus and carpus together. Exopodite with six plumose setae. Ischium short. Merus about 0.8 times as long as carpus, with one spine at the distal sternal end, the spine being finely serrated and filamentous at the tip. Carpus about 0.6 times as long as basis with two sternal spines, shaped exactly as that of the preceding joint (the name of the species alludes to this character). Propus about half as long as carpus, with four or five sternal spines, and with one distal rostral spine which is short but strong, fine-haired on the tergal margin and strongly serrated on the opposite margin (Fig. 30d). The three last-mentioned joints are moreover furnished with numerous long bare sternal and tergal setae and merus and carpus furthermore with some short bare caudal setae. Dactylus with claw about half as long as propus; dactylus about 2.8 times longer than the claw, furnished with four sternal dentiform spinules accompanied by a slender spine or spiniform seta, with one terminal sternal seta, and with three juxtaposed tergal setae at about the distal fourth.

Peraeopods III-IV (Fig. 30b-c and g) are much alike, but the last four joints of peraeopod IV are shorter than those of peraeopod III, and near the distal sternal end of propus of peraeopod IV there is a short spine which is serrated along the distal part of the sternal margin and adorned with some hairs near the middle of the opposite margin. The carpus is longer than any of the other joints, except for the

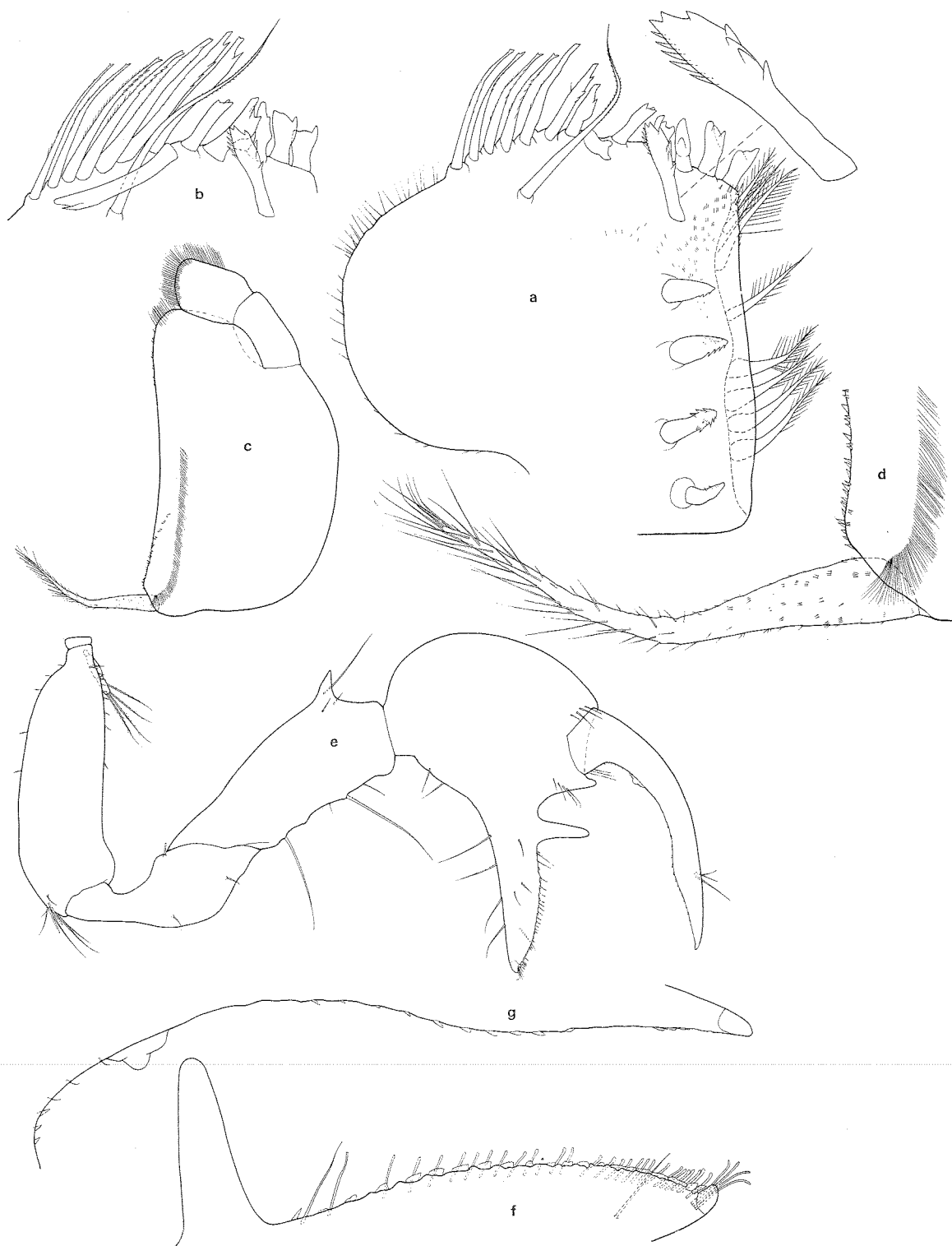


Fig. 29. *Carpoapseudes serratispinosus* n.sp., ♂; a, endite of maxilliped, caudal view (×205), spine of the same (×500); b, distal end of the same, somewhat oblique view (×205); c, epignath (×58); d, distal spine of the same (×205); e, cheliped, caudal view (×27); f, tergal part of the finger of the same, rostral view (×92); g, sternal part of the dactylus of the same, rostral view (×92).

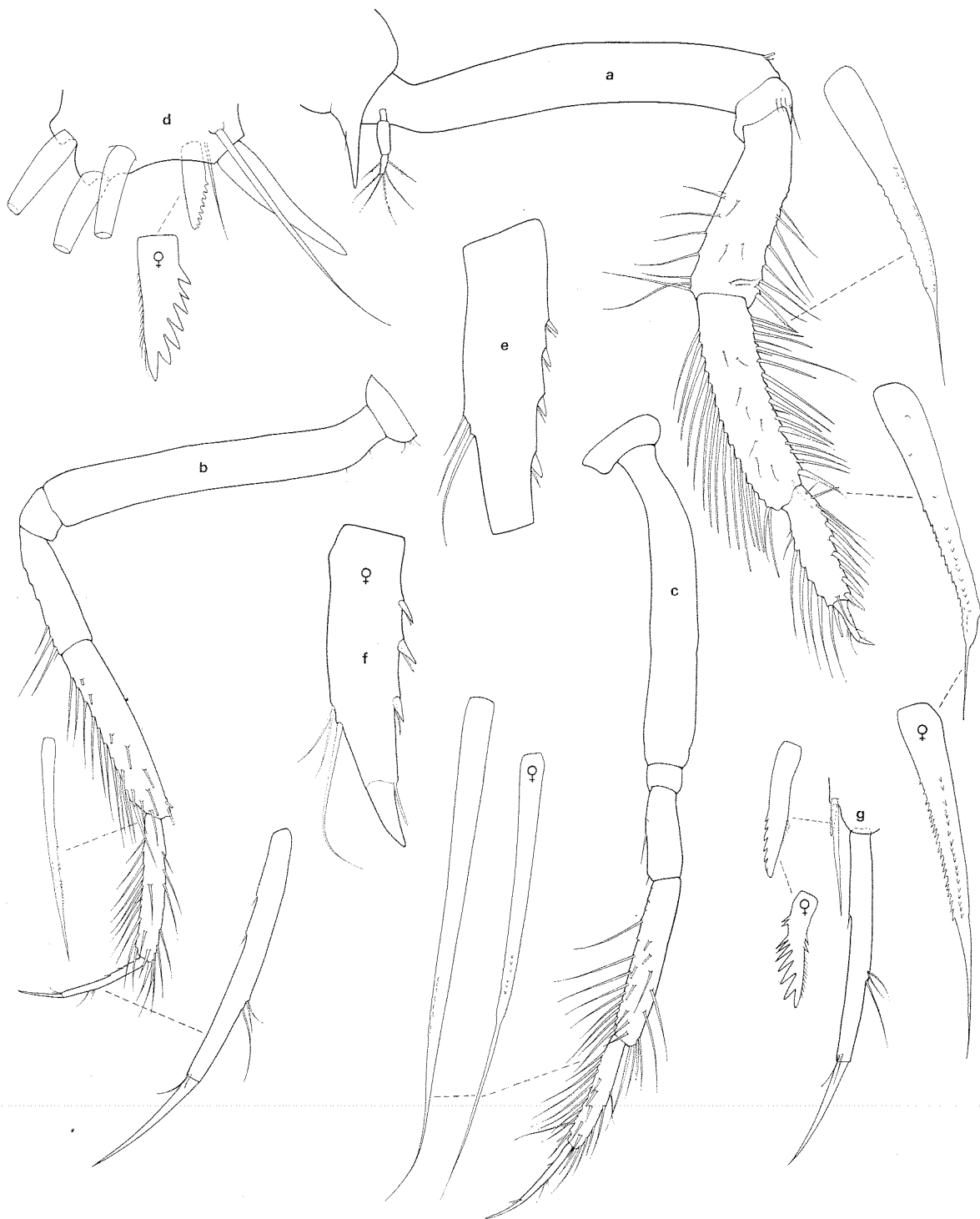


Fig. 30. *Carpoapseudes serratispinosus* n.sp.; a-c, peraeopods II-IV, ♂, caudal view ($\times 27$), spines of ♂ ($\times 160$), spine of ♀ ($\times 205$); d, distal end of propus of peraeopod II, ♂, caudal view ($\times 160$), spine of ♀ ($\times 320$); e-f, dactylus of peraeopod II, ♂ and ♀ ($\times 160$ and 205); spine and dactylus of peraeopod III ($\times 80$), spines of peraeopod IV ($\times 205$); g, distal sternal end of propus and dactylus of peraeopod IV, caudal view ($\times 80$), spine of the same ($\times 320$).

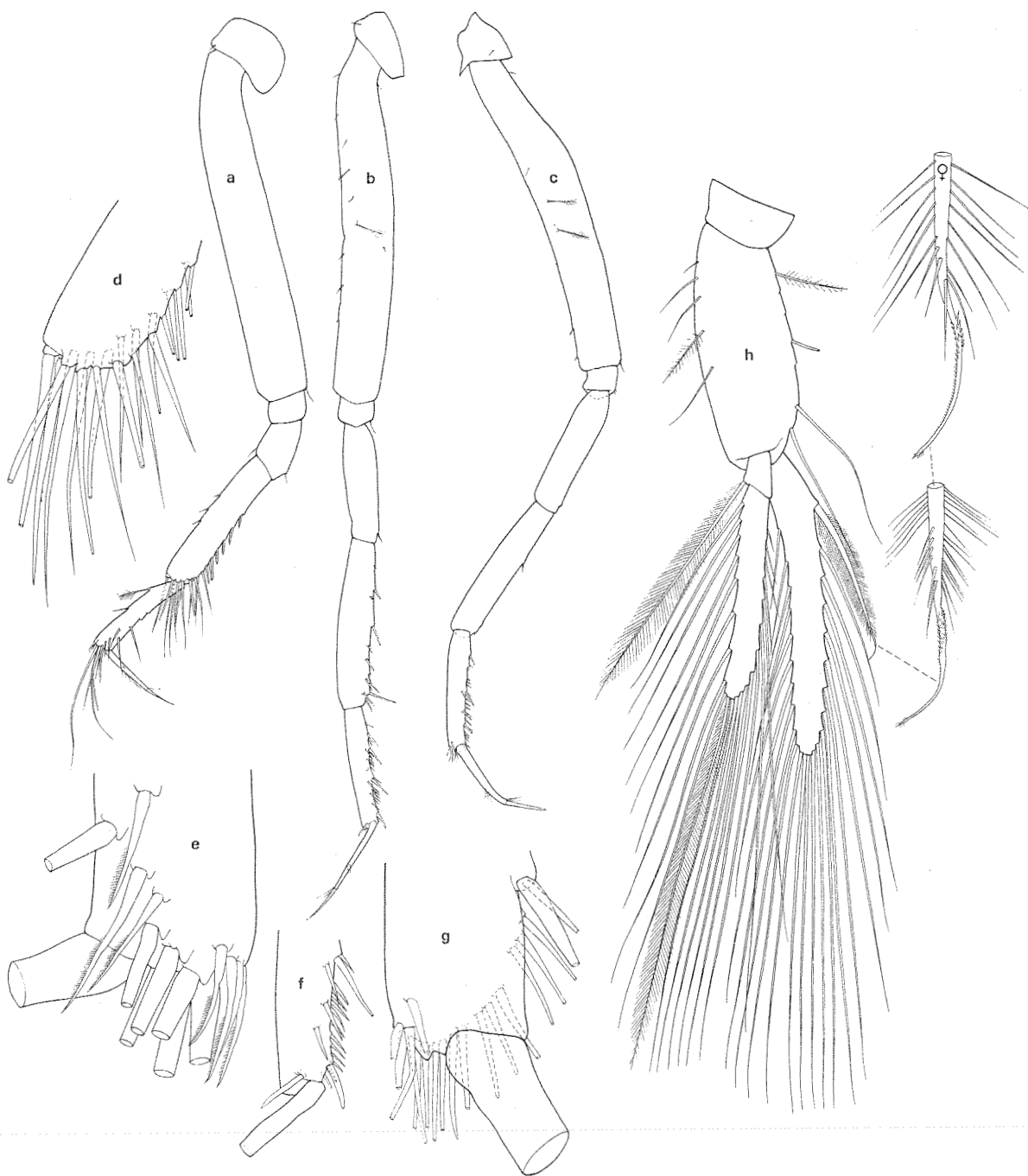


Fig. 31. *Carpoapseudes serratispinosus* n.sp., ♂; a-c, peraeopods V-VII, rostral view (×27); d, distal part of carpus of peraeopod V (×80); e, distal end of propus of the same (×205); f-g, distal end of propus of peraeopods VI and VII (×80 and 205); h, pleopod I, rostral view (×47), seta (×205).

basis, which is a little longer than (peraeopod IV) or as long as carpus and propus together (peraeopod III). Dactylus with claw shorter than propus; dactylus with three juxtaposed tiny tergal setae at about the distal third, with two tiny setae at the distal sternal end, and with one (peraeopod IV) or two (peraeopod III) tiny sternal spinules; claw much shorter than dactylus.

Peraeopod V (Fig. 31a and d-e). Basis a little longer than the succeeding four joints together. Merus only about 0.3 times as long as carpus, which is 1.5 times longer than propus. The latter has a tergal particular seta near the base; the rostral spines and the shorter distal spines are finely ciliate on the sternal side. Dactylus with claw somewhat shorter than propus; claw much shorter than dactylus.



Fig. 32. *Carpoapseudes serratispinosus* n.sp., ♀; a, lateral view ($\times 21$); b, labrum, rostral view ($\times 115$); c, left mandible, rostral view ($\times 92$); d, pars incisiva and lacinia mobilis of the same ($\times 363$); e-f, pars incisiva and spines of right mandible ($\times 363$).

Peraeopods VI-VII (Fig. 31b-c and f-g) longer than peraeopod V. Basis about 0.8 times as long as the succeeding four joints together, with particular setae. Merus of peraeopod VI about 0.7 times, that of peraeopod VII about 0.9 times as long as carpus. Propus and dactylus of each peraeopod completely alike. Dactylus with claw as long as propus; claw shorter than dactylus.

Pleopods (Fig. 31h) with short bare coxa. Basis about five times longer than coxa and with a number of inner and outer setae, some of which are plumose. Exo- and endopodite slender, the former two-jointed and shorter than the latter, both of them margined with long plumose setae. Distal part of proximal inner seta of endopodite shaped as shown in the figure.



Fig. 33. *Carpoapseudes serratispinosus* n.sp. ♀; a, cheliped, caudal view ($\times 38$); b, part of tergal armament of finger of the same ($\times 320$); c, part of sternal armament of dactylus of the same ($\times 320$); d, distal part of propus of peraeopod V, rostral view ($\times 205$); e-f, peraeopods VI and VII, rostral view ($\times 38$); g-h, distal part of propus and proximal part of dactylus of the same, rostral view ($\times 205$).

Uropod (Fig. 27a). Peduncle widened towards the distal end and set with tiny setae and hairs (exo- and endopodite are lost).

Description of the female:

Body (Fig. 32a) of the same shape as in the male. Length about 10.5 mm.

Carapace as in the male. Epistome with forwards directed spiniform process.

Peraeon with hyposphenians on all peraeonites.

Antennula. First three joints as in the male. Outer flagellum nineteen-jointed with one aesthetasc on the joints 11, 13, 15, and 17. Inner flagellum seven-jointed.

Antenna as in the male, but the flagellum is twelve-jointed and has no aesthetascs; the squama of the right antenna has nine setae, that of the left antenna eight.

Labrum (Fig. 32b) with long lateral hairs on the basal part and with tiny hairs on the lateral parts of the irregular frontal margin, which is incurved in the middle.

Mandibles (Fig. 32c-f). Corpus with hairs in front of processus molaris. Pars incisiva of right and left mandibles five- and seven-dentate, respectively. Lacinia mobilis of left mandible seven-dentate. Setiferous lobe of each mandible with five strong forked spines and one spiniform seta.

Labium, maxillula, maxilla and *maxilliped* as in the male.

Cheliped (Fig. 33a-c). Carpus shorter and propus longer and more slender than the corresponding joints of the male. Finger much longer than the rest of the joint with a very small tergal projection near the base, in front of which there is a caudal row of setae and a sternal row of lamellae (Fig. 33b).

Peraeopod II differing from that of the male inasmuch as the dactylus has only three sternal dentiform spinules (Fig. 30f).

Peraeopods III-IV as in the male, except that the distal sternal spine of propus of peraeopod IV is shaped in a somewhat different manner (see Fig. 30g).

Peraeopod V as in the male but the spines of the propus are set with a close sternal row of strong spines (Fig. 33d).

Peraeopods VI-VII (Fig. 33e-h) almost as in the male, but propus seems to be more spiniferous and setiferous and it has one tergal particular seta on peraeopod VI and two on peraeopod VII. The differences may, however, be fictive as most of the spines and setae are lost in the male.

Pleopods. The inner proximal seta of the endopodite differs a little from that of the male (Fig. 31h).

Remarks:

The species differs materially from the other species in the shape of the rostrum. From *C. simplicirostris* it differs moreover in the shape of the ocular lobes, in the carapace and in the outfit of peraeonites III-VI; from *C. longissimus* in the spines on peraeopod II and in the male cheliped; and from *C. oculicornutus* (see p. 79) in the ocular lobes.

The species seems to be most closely related to *C. simplicirostris*.

Carpoapseudes longissimus n.sp.

Material:

St. 716, Acapulco-Panama (9°23'N, 89°32'W), 3570 m, 6 May 1952. Gear: herring otter trawl. Bottom: dark, muddy clay. Bottom temp.: c. 1.9°C. – 1 somewhat incomplete male.

Description of male type:

Body (Pl. IIe) about 6.5 times longer than broad. Length about 27 mm. Integument rather strongly calcified.

Carapace (Pl. II f) about 1.2 times broader than long, contracted in the anterior part. The somewhat vaulted dorsal surface has a transverse furrow between the moderately swollen respiratory chambers, in front of which there is a small rounded bulge. Each ocular lobe is extended as a short obliquely forwards and outwards directed spiniform process. The lateral margins of the strongly prominent rostrum are quite straight at the base and abruptly excavated in front. The epistome lacks spiniform process. Just behind the chelipeds there is a strong hyposphenie.

Peraeonites (Fig. 34a) 2 and 3 dorsally tubercular, the succeeding ones more or less areolated. They increase in length from 2 to 5, which is longest and about 3 times longer than 2, while peraeonite 6 is somewhat shorter than 5, and 7 about as long as 3. Coxa of peraeopods III-VII small and rounded. Peraeonites 3-6 with a lateral outwards-directed spiniform process on either side, which on peraeonites 3 and 4 is very short, on peraeonites 5 and 6 much longer; on peraeonites 3 the process is situated at the anterior corner, on peraeonite 4 at the anterior fourth, and on the succeeding peraeonites nearer the middle. The lateral margins of peraeonites 5-7 are furnished with some tiny hairs. There are no hyposphenians. Peraeonite 7 with strong genital cone, directed obliquely forwards.

Pleon (Fig. 34a-b) nearly as long as the last four peraeonites together. Pleonites furnished with hairs and setae as shown in Fig. 34b. Pleotelson about as long as the pleonites together, subcylindrical, laterally sparsely and finely serrated and set with some tiny hairs.

Antennula (Fig. 34c-c.1, and d-e) much longer than carapace. (The antennulae are incomplete. Of the left antennula only the first peduncular joint remains, and on the right antennula the inner flagellum and the distal joints of the outer flagellum are lost.) First peduncular joint 1.7-1.8 times longer

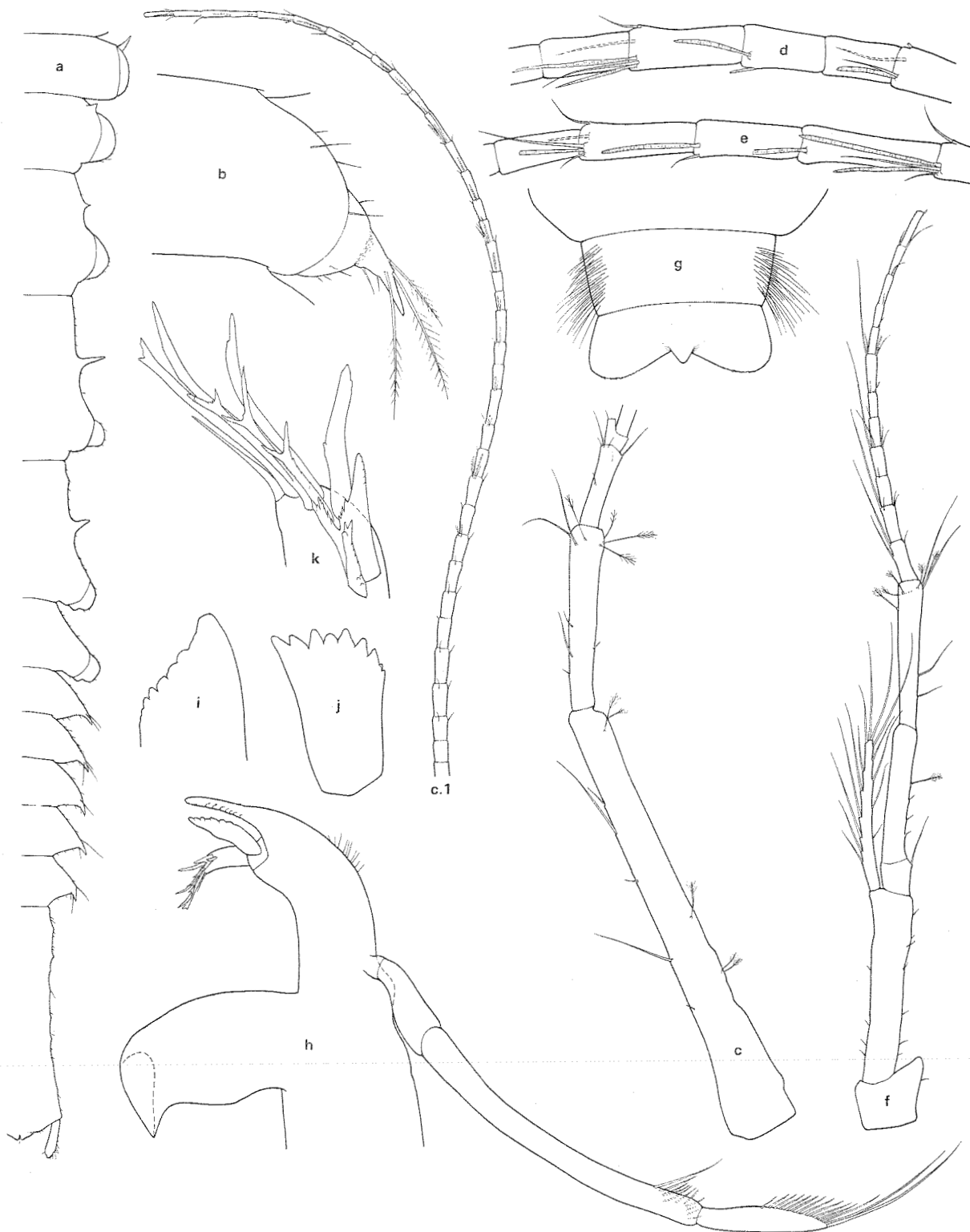


Fig. 34. *Carpoapseudes longissimus* n.sp., ♂; a, right side of peraeon and pleon, dorsal view (×8); b, right side of pleonite II, dorsal view (×30); c-c.1, antennula, ventral view (×21); d-e, joints 17-21, and 24-28 of the outer flagellum of the same (×80); f, antenna, ventral view (×21); g, labrum, rostral view (×39); h, left mandible, rostral view (×39); i-j, pars incisiva and lacinia mobilis of the same (×80); k, spiniferous lobe of the same (×205).

than second and third joints together. Second joint about twice as long as third. First two joints with particular setae. The outer flagellum consists most probably of thirty-seven or thirty-eight joints. Of the remaining joints 11, 20, 24 bear two aesthetascs, 13, 14, 16, 17, 22, 23, 25, 27, 29, 31-33, 35 one aesthetasc while the rest of the joints lack aesthetascs.

Antenna (Fig. 34f). The first joint extends inward as a triangular bulge. The second joint is much longer and slenderer than the first. The squama is very long and slender, reaching almost to the end of the second flagellum joint and it bears fourteen bare marginal setae. The first flagellar joint is short. The second joint is 5 times longer than the first and it bears at least one particular seta. The third joint is as long as the second, set with some particular setae. The succeeding joints are much more slender (the flagellum is incomplete).

Labrum (Fig. 34g) with broadly trapezoid basal part laterally set with long hairs. The terminal part has a conspicuous triangular median projection in front, and its anterior margin is strongly excavated and irregularly crenated laterally and set with some tiny hairs between the crenations.

Mandibles (Figs. 34h-k and 35a-e) strongly calcified. Processus molaris strong, subcylindrical, straight inwards-directed, with completely bare grinding surface. Pars incisiva of either mandible irregularly crenated, but in a quite different manner (cp. Figs. 34i and 35b). Lacinia mobilis of left mandible irregularly nine-dentate. The spiniferous lobe of the right mandible bears seven spines the one of the left mandible ten; one of the spines is simple and more slender than the others, the shape of which varies considerably according to the position they are studied in. The mandibular palps are alike. The first joint is bare. The second joint is longest, being about 4 times longer than the first and about 2.5 times longer than the third; in the distal part it is furnished with eleven to thirteen setae shaped as shown in Fig. 35d. The distal part of the last joint bears twelve one-sidedly serrate inner setae and two very long terminal setae, the one of which is serrated along the distal part of the inner margin, the other completely smooth (Fig. 35e).

Labium (Fig. 35f-g) set with tiny hairs on either side of the middle of the anterior margin and with rows of exceedingly small hairs on the caudal surface, as in the figure. The lobes are ovate, along the distal half margined with longer hairs, and at the end furnished with three setae, shaped as shown in Fig. 35g.

Maxillula (Fig. 35h-j). The endites are set with hairs as in Fig. 35h. The caudal setae on the endite are one-sidedly ciliate along the distal half. The palp is distally furnished with thirteen setae which are distally coarsely serrated on the one margin, finely serrated on the other. The terminal setae of the inner endite are shaped as shown in the figure.

Maxilla (Figs. 35k and 36a-b). Caudal and rostral surfaces adorned with hairs and spinules. Inner margin spinulose. Outer margin with a row of hairs just below the movable endite. Setae of rostral row bare and simple at the tip. The caudal row numbers one long inner seta which is finely plumose along the distal half and nine more or less spiniform setae, the length of which increases toward the fixed endite; they are finely pectinate in the distal part of the inner margin and the first six, moreover, set with some few diminutive hairs on the opposite margin. The fixed endite has seven subterminal rostral spines, two strong subterminal caudal spines, and three strong forked and four slender distal spines, the spines shaped as shown in Fig. 36a and b. The outer lobe of the movable endite bears nine long setae, the inner lobe sixteen shorter setae.

Maxilliped (Fig. 36c-h) with short coxa set with groups of extremely tiny hairs on the caudal surface. The caudal surface of the basis bears some scattered short setae and some tiny hairs, as shown in Fig. 36c. The first joint of the palp is furnished with a moderately long bare outer seta, with one longer bare seta near the inner distal end, and with one very short bare seta at some distance from the latter; second joint with five short bare outer setae and for the rest armed as in Fig. 36d; third joint with three short bare caudal setae and with eight inner bare setae, one of which is very short; last joint with seven setae, two of which are one-sidedly ciliate along the distal part. Each endite with five couplers; inner caudal seta transformed into a somewhat leaf-like spine; caudal and rostral surfaces set with numerous rows of extremely tiny hairs inside the hairy outer margin, rostral surface moreover with numerous tiny spinules inside the distal margin, which is armed as shown in Fig. 36e and f; the median vertical surface bears a row of ten plumose setae on the free margin. The epignath has two frontal lobes, the proximal of which is partly ciliate; the terminal spine is hairy (Fig. 36h).

Cheliped (Fig. 37a-c) rather slender. Coxa very small, bare. Basis 3 times longer than broad, with one sternal seta at about the distal fourth and with three bare setae at the distal sternal end; rostral sur-



Fig. 35. *Carpoapseudes longissimus* n.sp., ♂; a, right mandible (palp omitted), caudal view ($\times 39$); b, pars incisiva of the same ($\times 80$); c-e, spiniferous lobe, and distal part of the second and third joints of the palp of the same ($\times 205$); f, right side of labium, caudal view ($\times 39$); g, terminal spines of the lobe of the same ($\times 320$); h, maxillula, caudal view ($\times 39$), seta of the palp ($\times 320$); i-j, distal end of outer and inner endites of the same ($\times 80$); k, maxilla, rostral view ($\times 80$).



Fig. 36. *Carpoapseudes longissimus* n.sp., ♂; a-b, distal end of fixed endite of left and right maxillae, rostral and caudal views ($\times 320$); c, maxilliped, caudal view ($\times 39$); d, inner part of second joint of the palp of the same, caudal view ($\times 130$); e, endite of maxilliped, rostral view ($\times 118$); f, distal end of the same, caudal view ($\times 118$); g, coupler ($\times 205$); h, epignath, flattened ($\times 39$).



Fig. 37. *Carpoapseudes longissimus* n.sp., ♂; a, cheliped, caudal view ($\times 17$); b, distal part of propus and dactylus of the same, rostral view ($\times 30$); c, tergal armament of the finger, caudal view ($\times 80$); d-e, peracopods II and III, caudal view ($\times 17$); f, distal part of propus and dactylus of peracopod II, rostral view ($\times 69$).



Fig. 38. *Carpoapseudes longissimus* n.sp., ♂; a, pereopod IV, caudal view ($\times 17$); b, distal end of propus of the same ($\times 80$), spine ($\times 205$); c-e, pereopods V-VII, rostral view ($\times 17$); f, pleopod I, rostral view ($\times 25$) (all setae, except for the outer ones on the basis are plumose).

face with three small tubercles just inside the proximal part of the sternal surface. Exopodite with five plumose setae. Merus comparatively long, without spiniform projection but with two bare setae at some distance from the sternal end, and with one caudal seta. Carpus shorter than basis, with a dentiform projection at the distal tergal end; sternal surface irregularly undulated and furnished with three

setae and two tiny hairs; there are also two short setae near the distal tergal end and four tiny setae on the caudal surface just behind the distal margin. Propus longer than carpus with concave sternal surface and armed as shown in the figures; finger fully one third as long again as the rest of the joint, with a moderately strong tergal projection near the base in front of which it is armed as in Fig. 37b and c.

Dactylus with three juxtaposed sternal setae near the distal third; claw longer than that of the finger.

Peraeopod II (Fig. 37d and f) much longer and almost as slender as the succeeding peraeopods. Basis about as long as merus and carpus together. Exopodite with six plumose setae. Ischium short. Merus about 0.6 times as long as carpus, with one spine at the distal sternal end. Carpus very long, nearly 0.65 times as long as basis and twice as long as propus, with one spine at the distal sternal end. Propus with four sternal spines and with one distal rostral spine which is short but strong and serrated on the sternal margin. The three last-mentioned joints are moreover set with numerous bare setae. Dactylus with claw 0.5-0.6 times as long as propus; dactylus fully 4.5 times longer than the claw, furnished with four small sternal spines and two tiny setae at the end, and with three small juxtaposed tergal setae near the middle.

Peraeopods III-IV (Figs. 37e and 38a-b) very alike but the last four joints of peraeopod III are longer than those of peraeopod IV, and propus of peraeopod III has a short tergal particular seta while that of peraeopod IV has a short sternal spine near the distal end, the spine being serrated along the distal half of the outer margin. Carpus much longer than the other joints, except for the basis. Dactylus with claw somewhat longer than propus; dactylus about 3 times longer than the claw, set with two tiny hairs at the distal sternal end and with three juxtaposed tergal hairs somewhat below the middle. All joints are devoid of real spines.

Peraeopod V (Fig. 38c). Merus, carpus and dactylus are shorter, and propus slenderer and less setiferous than the corresponding joints of peraeopods III-IV. Basis has at least two particular setae, and propus one such seta near the base. Merus only twice as long as ischium. Dactylus with claw about as long as propus; claw half as long as dactylus.

Peraeopod VI-VII (Fig. 38d-e) as long as peraeopod II. Basis about as long as the combined length of ischium, merus, carpus and one third of propus. Basis of peraeopod VI with short particular setae. Ischium short. Merus and carpus longer than those of peraeopod V, and less setiferous. Propus as long as that of peraeopod V, but with fewer setae; propus of peraeopod VI with a tergal particular seta near the distal third. Dactylus with claw a little longer than propus; claw about 0.4 times as long as dactylus.

Pleopods (Fig. 38f) with small, bare coxa. Basis about 5 times longer than coxa, with four tiny bare outer setae or spinules, and with five inner plumose

setae, (only the first pair has been examined). Exopodite slender, somewhat longer than basis and distinctly two-jointed; first joint very short, with a plumose setae at the outer distal corner; second joint marginated with numerous plumose setae. Endopodite longer than exopodite, one-jointed and marginated with numerous plumose setae; inner proximal seta as in *C. serratispinosus*.

Uropod (Fig. 34a) with subcylindrical peduncle, furnished with some tiny setae or hairs. (Exo- and endopodite lost.)

Remarks:

C. longissimus differs conspicuously from the other species in the shape of the rostrum; from *C. simplicirostris* and *C. serratispinosus*, moreover, in the spines of peraeopod II and in the male cheliped; and from *C. oculicornutus* (described below) in the ocular lobes. It is the largest tanaid known.

Carpoapseudes oculicornutus n.sp.

Material:

St. 665, Kermadec Trench (36°38'S, 178°21'E), 2470 m, 25 Feb. 1952. Gear: herring otter trawl. Bottom: grey clay. Bottom temp.: 2.1°C. - 1 adult female (somewhat incomplete) with emptied marsupium, 1 adult male (also somewhat incomplete).

Remarks:

In both of the specimens one of the chelipeds is lost, in the male moreover peraeopods II; in the female the right peraeopod II, the distal part of propus and dactylus of the left peraeopod II and the spines on the spiniferous lobe of the left mandible are lost.

Description of female type:

Body (Pl. IIIa) slender, being about 7 times longer than broad. Length about 18 mm. Integument rather strongly calcified.

Carapace (Pl. IIIb) about as long as broad, considerably contracted in front of the respiratory chambers. The somewhat vaulted dorsal surface has a transverse furrow between the middle of the moderately swollen respiratory chambers. Each ocular lobe extended obliquely forwards and outwards as a conspicuous long subcylindrical corniform process (the name of the species alludes to this character). Rostrum triangular, with a long somewhat deflexed tip. Epistome without spiniform process.

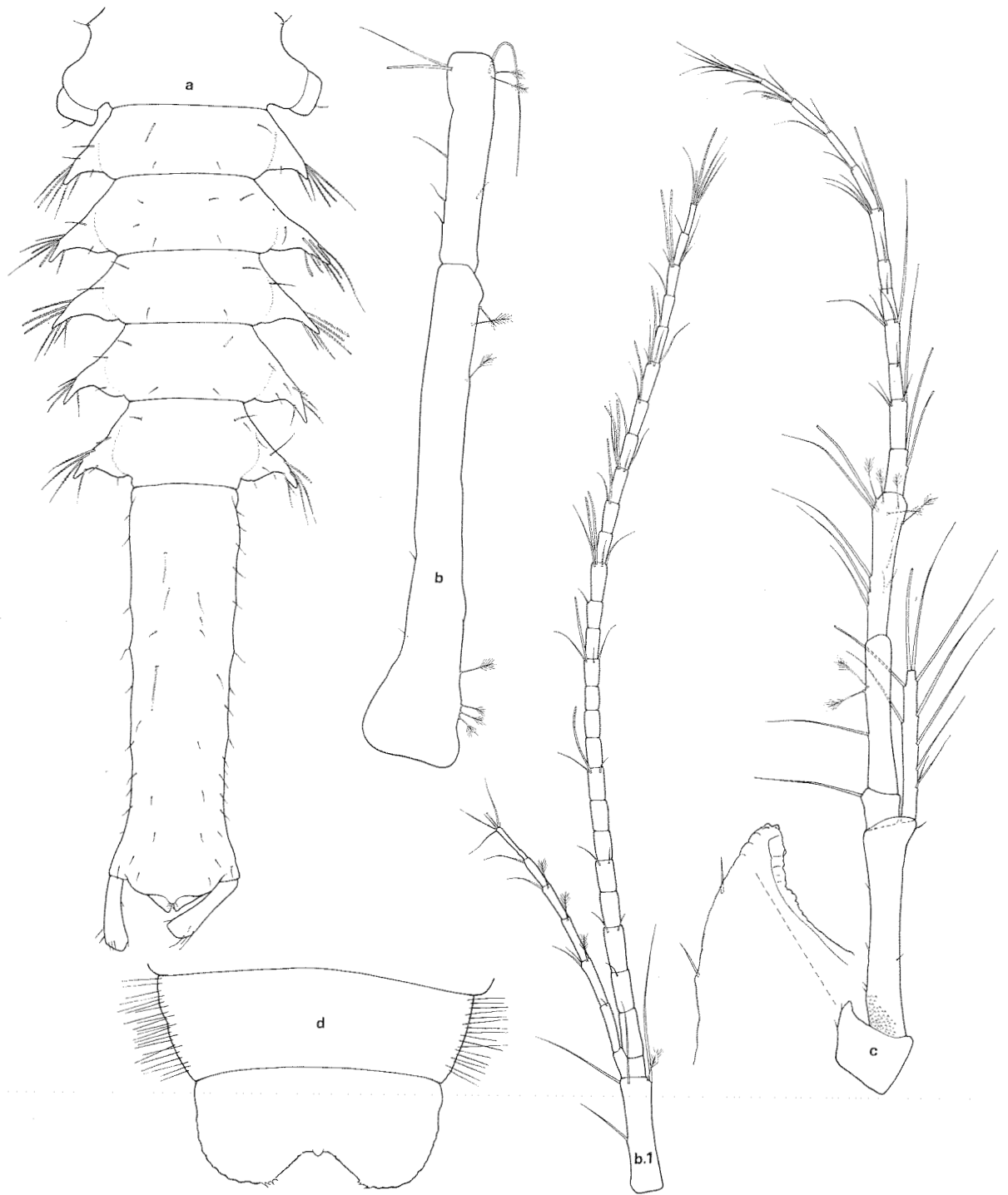


Fig. 39. *Carpoapseudes oculicornutus* n.sp., ♀; a, last peraeonite and pleon, dorsal view ($\times 21$); b-b.1, antennula, ventral view ($\times 38$); c, antenna, ventral view ($\times 38$), detail ($\times 205$); d, labrum, rostral view ($\times 80$).

Peraeonites 2 and 3 dorsally tuberculated, the succeeding ones more or less areolated. They increase in length from 2 to 5 and 6 which are equally long while 7 is a little shorter than 3. Coxa of peraeopods III-VII small and rounded. Peraeonites 3-6 with a lateral outwards-directed spiniform process which on peraeonite 3 is very short; on peraeonites

3 and 4 it is situated at about the anterior third, on 5 and 6 nearer the middle. Peraeonite 7 with a small triangular lateral process in front of the middle, set with a tiny seta or hair. Hyposphenians are present on the last two peraeonites and they are situated on a level with the peraeopods.

Pleon (Fig. 39a) somewhat shorter than the last

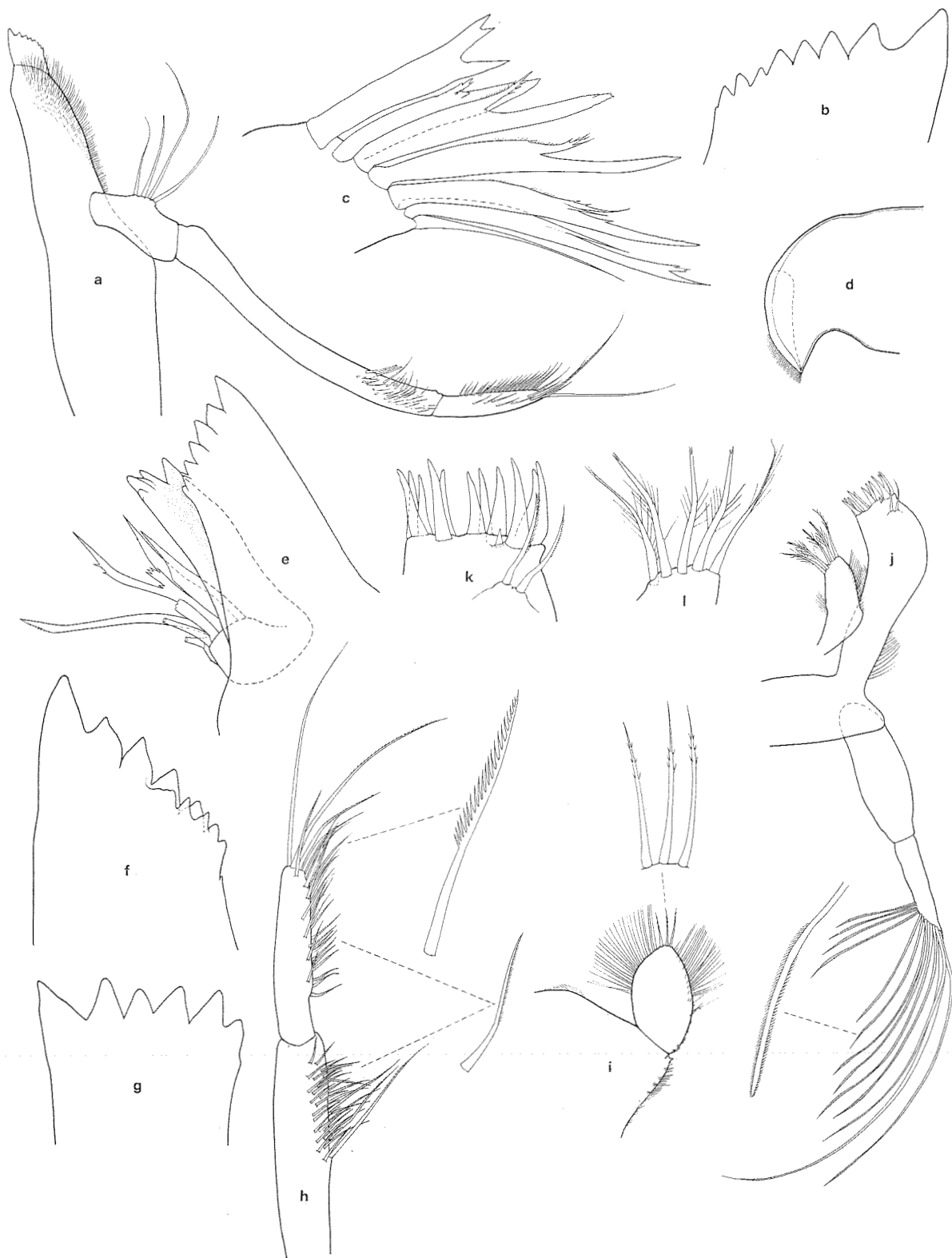


Fig. 40. *Carpoapseudes oculicornutus* n.sp., ♀; a, right mandible, oblique rostral view ($\times 53$); b-c, pars incisiva and spiniferous lobe of the same ($\times 320$); d, distal part of processus molaris of the same ($\times 80$); e, distal end of left mandible ($\times 205$); f-g, pars incisiva and lacinia mobilis of the same ($\times 320$); h, armament of last two joints of the mandibular palp ($\times 80$), setae ($\times 320$); i, left side of labium, caudal view ($\times 80$), setae ($\times 320$); j, maxillula, caudal view ($\times 58$), seta ($\times 270$); k-l, distal part of outer and inner endites of the same ($\times 175$).

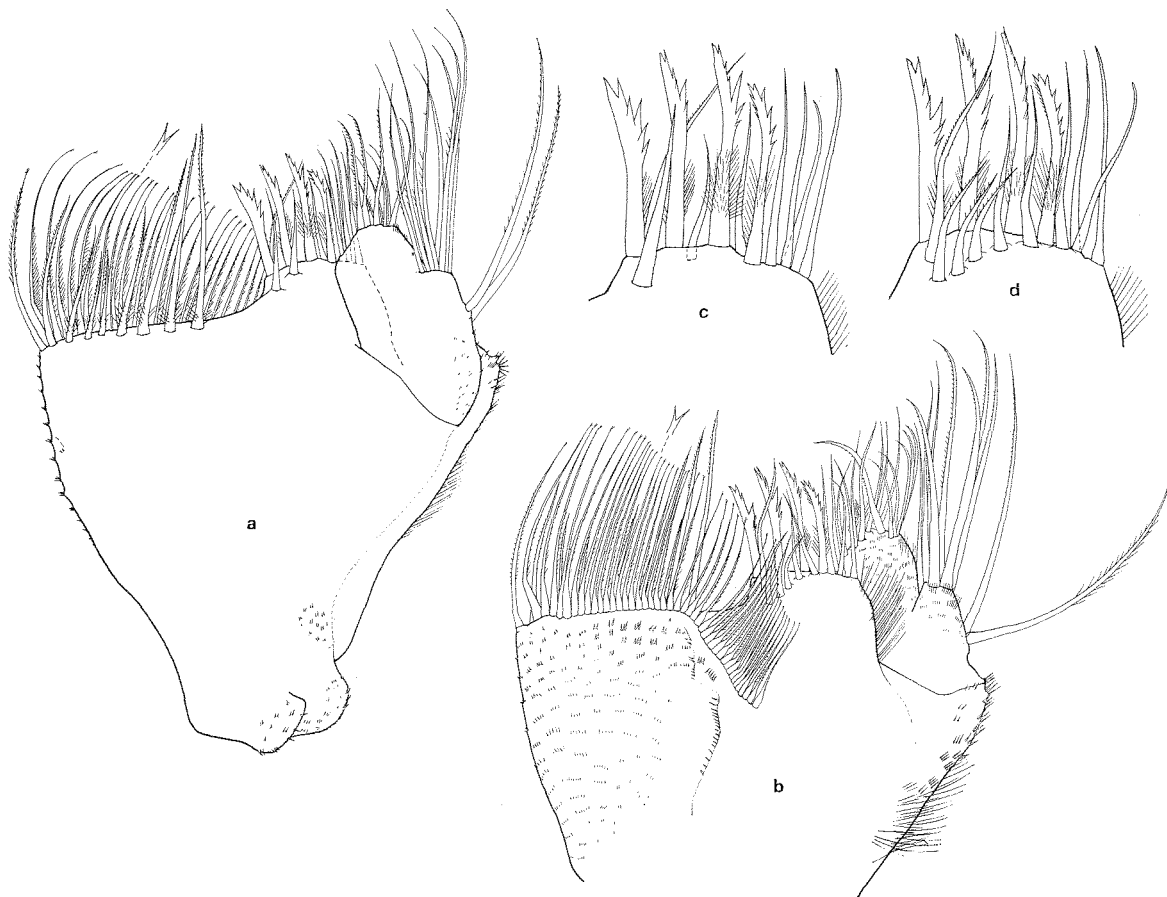


Fig. 41. *Carpoapseudes oculicornutus* n.sp., ♀; a-b, maxilla, caudal and rostral views ($\times 112$); c-d, fixed endite of the same, caudal and rostral views ($\times 205$).

four peraeonites together. Pleonite 5 somewhat longer and narrower than the others. Dorsally the pleonites are adorned with small setae as shown in the figure, and all of them have a ventral spiniform process. Pleotelson longer than the pleonites together and richly set with setae of different lengths.

Antennula (Fig. 39b-b.1) much longer than carapace. First peduncular joint about 1.5 times longer than the two succeeding joints combined. Second joint nearly twice as long as third. Particular setae are present on all peduncular joints. Inner flagellum with seven joints, the three middle ones of which bear a particular seta. The outer flagellum is twenty-six-jointed; the joints 8, 12, 17, 20, 21, and 26 have one aesthetasc, the joints 15, 18, and 24 two.

Antenna (Fig. 39c). The first joint extends inward as an irregular forwards-directed prominence set with two small setae. The second joint is much longer and slenderer than the first, with many scale-like formations at the base. The squama is very long and slender, reaching to about the last fifth of the second flagellum joint, and it bears ten bare marginal setae. The first joint of the fifteen-jointed fla-

gellum is short. The second joint is 5 times longer than the first, and the third joint is somewhat shorter than the second. Second and third joints have particular setae. The succeeding joints are much more slender than the preceding one; the thirteenth joint has a particular seta.

Labrum (Fig. 39d) with broad trapezoidal basal part, laterally set with long hairs. The margins of the terminal part are for the greater part irregularly crenated, the front margin strongly excavated, with a small rounded median process and with a few small serrations on each side of the excavation.

Mandibles (Fig. 40a-h) strongly calcified and set with hairs as shown in Fig. 40a. Processus molaris strong, subcylindrical, straight inwards-directed, with the distal part bent somewhat downwards and with the tip set with a row of short hairs (Fig. 40d). Pars incisiva of right mandible eight-dentate, that of left mandible nine-dentate, both of them also with a minute subterminal tooth on the anterior margin (Fig. 40b and f). Lacinia mobilis of left mandible six-dentate. Spiniferous lobe of right mandible armed as in Fig. 40c. The mandibular palps are alike. The

first joint has four bare setae. The second joint is about 3.3 times longer than the first and about 2.9 times longer than the third. The distal part of the second joint bears numerous one-sidedly ciliate setae, and the last joint numerous one-sidedly pectinate setae and one long bare terminal seta (Fig. 40h).

Labium (Fig. 40i) set with tiny hairs on both sides of the middle of the anterior margin and on the lateral margins. The ovate lobes are for the greater part margined with long hairs and at the end furnished with three setae, shaped as shown in the figure.

Maxillula (Fig. 40j-l). The endites are set with hairs as in Fig. 40j. The caudal setae on the outer endite are one-sidedly ciliate (Fig. 40k). The palp is distally furnished with thirteen setae which are finely serrated distally. The terminal setae on the inner endite are shaped as in Fig. 40l.

Maxilla (Fig. 41a-d). Caudal and rostral surfaces and lateral margins adorned as shown in Fig. 41a-b. Setae of rostral row finely ciliate on one side in the proximal part, and bifid at the tip. The caudal row numbers nine more or less spiniform setae which are finely ciliate in the distal part, the seven posterior ones also at the base. Fixed endite with seven subterminal rostral spines, shaped as in Fig. 41d, with two strong subterminal caudal spines, the posterior of which is hairy in the proximal part and serrated in the distal part (Fig. 41c), and with three strong forked spines and four slender distal spines. The outer lobe of the movable endite has ten long setae, the inner lobe twelve setae, shaped as shown in the figures.

Maxilliped (Fig. 42a-c) with short coxa adorned with some short setae and some groups of very tiny hairs on the caudal surface. The basis is adorned in the same way as the coxa but it is moreover richly set with long hairs on and near the outside. The first joint of the palp is furnished with one bare outer seta, and on and near the inside it is set with fine hairs and with two very small setae and one long seta; second joint with two short bare outer setae, with one short bare caudal seta and numerous inner setae, the two longest of which are bare, the proximal ones serrated and the distal ones finely plumose in the distal part, and there are fine hairs at the base of the outside and on and near the inside; third joint with seven bare setae and last joint with ten. Left endite with three couplers, right endite with four; inner caudal seta transformed into a somewhat leaf-like spine; caudal surface set with groups of shorter and longer hairs; rostral surface with groups

of tiny hairs inside the pilose outer margin and inside the distal margin which is armed as shown in Fig. 42b; median vertical surface with nine plumose setae on the free margin. The epignath (Fig. 42c) is a vaulted plate furnished with two frontal lobes, one of which is margined with long hairs; the terminal spine is hairy.

Cheliped (Figs. 42d-e, and 43a-b) rather slender. Coxa very small, unarmed. Basis about 3 times longer than broad, with one sternal seta at about the distal fourth and with a bunch of setae at the distal sternal end. Exopodite (Fig. 42e) with four plumose setae. Merus comparatively long, without spiniform process but with many setae arranged as in Fig. 42d. Carpus shorter than basis, with a small dentiform process at the distal tergal end; sternal surface irregularly undulated and furnished with four setae; caudal surface with one seta near the middle, and with one seta at the base of tergal process. Propus longer than carpus with concave sternal surface and armed as shown in Figs. 42d and 43a-b; finger about half as long again as the rest of the joint, with two tergal prominences at the base, in front of which it is armed as in Fig. 43a and b. Dactylus with three juxtaposed sternal setae near the distal third, and with a close-set sternal row of lamellae; claw longer than that of the finger.

Peraeopod II (Fig. 43c) longer and almost as slender as the succeeding peraeopods. Coxa with fine hairs near the spiniform projection. Basis as long as merus and carpus together with a dentiform tergal process near the base, and with particular setae. Exopodite with four plumose setae. Ischium short. Merus about 0.7 times as long as carpus, both joints with numerous bare setae but without real spines. Propus much longer than broad.

Peraeopods III-IV (Fig. 43d-e) very alike, but except for ischium and dactylus, the joints of peraeopod III are longer than those of peraeopod IV. Basis longer than the three succeeding joints together. Basis of peraeopod IV with particular setae, basis of peraeopod III without. Propus of peraeopod IV has a short tergal particular seta near the middle, and dactylus of peraeopod III has two small spiniform sternal projections while there is but one on peraeopod IV. Carpus much longer than the other joints except for the basis. Dactylus with claw longer than propus. All joints are devoid of real spines.

Peraeopod V (Fig. 44a). Basis longer than the four succeeding joints together with at least one particular seta. Merus only twice as long as ischium. Propus with a tergal particular seta near the base.



Fig. 42. *Carpoapseudes oculicornutus* n.sp., ♀; a, maxilliped caudal view ($\times 108$), setae ($\times 315$); b, left endite of the same, caudal view ($\times 205$); c, epignath ($\times 108$); d, cheliped, caudal view ($\times 25$); e, exopodite of the same ($\times 77$).

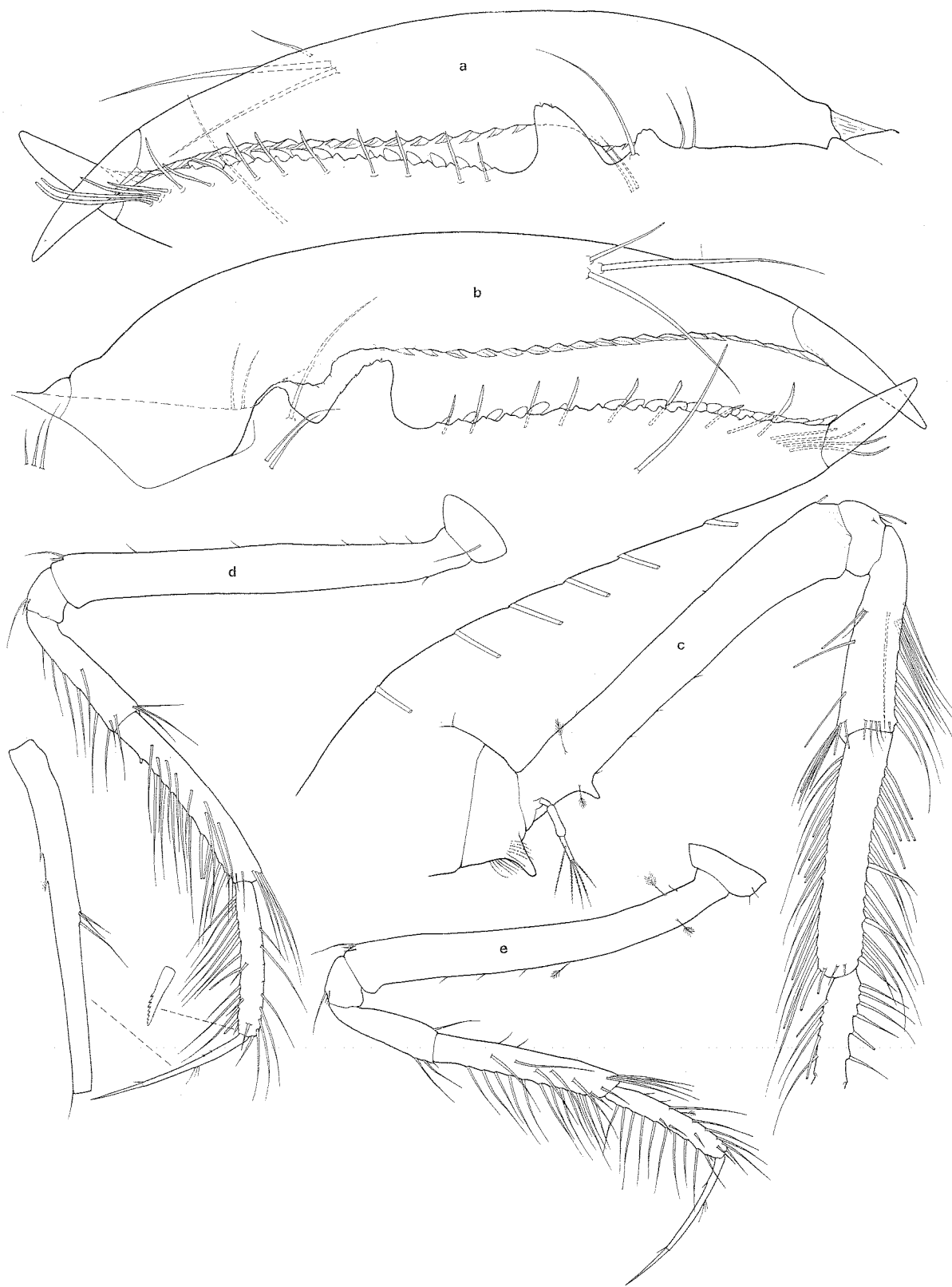


Fig. 43. *Carpoapseudes oculicornutus* n.sp., ♀; a, tergal part of finger and dactylus of cheliped, caudal view ($\times 80$); b, finger and dactylus of the same, rostral view ($\times 80$); c-e, peraeopods II-IV, caudal view ($\times 25$), dactylus of peraeopod III ($\times 80$).

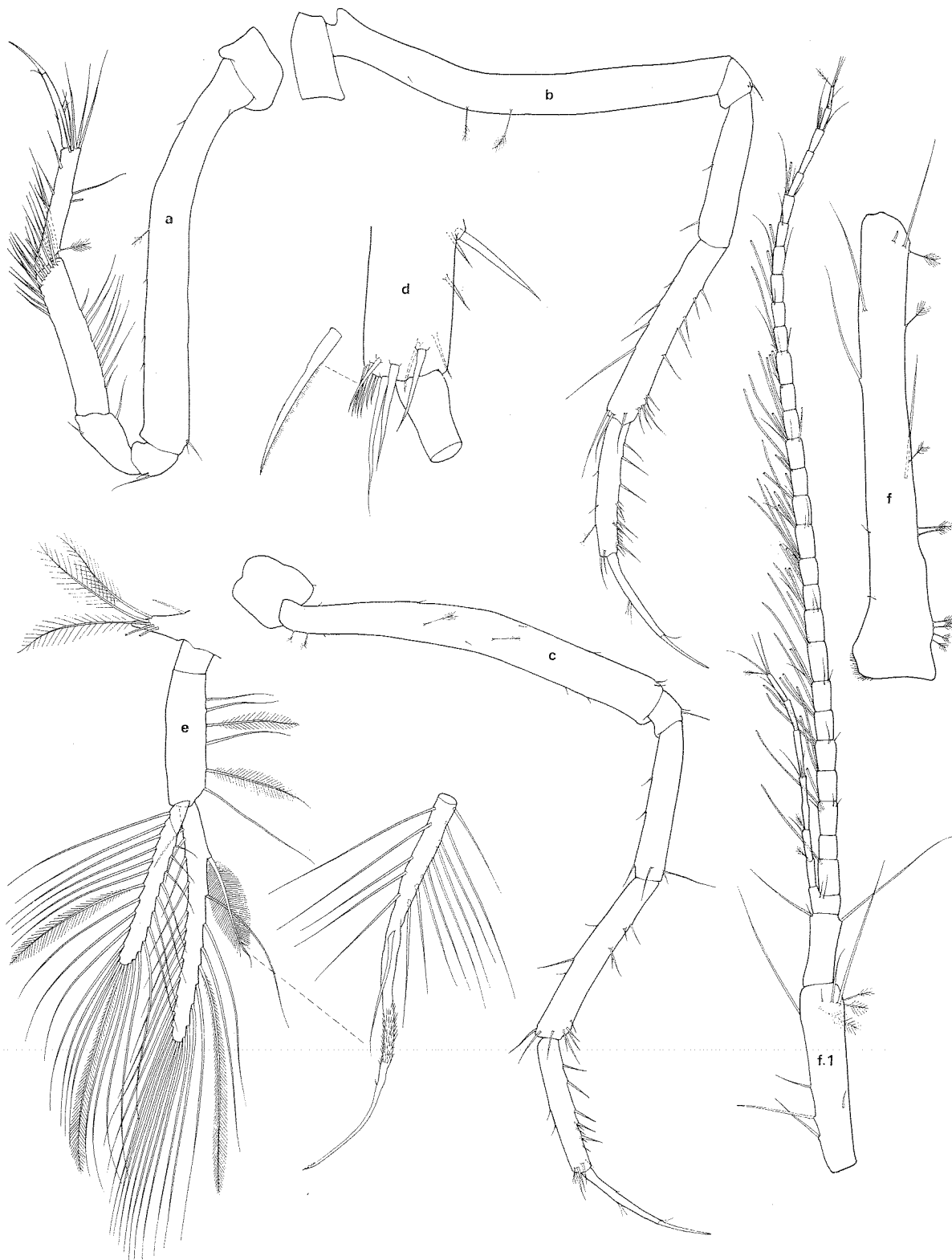
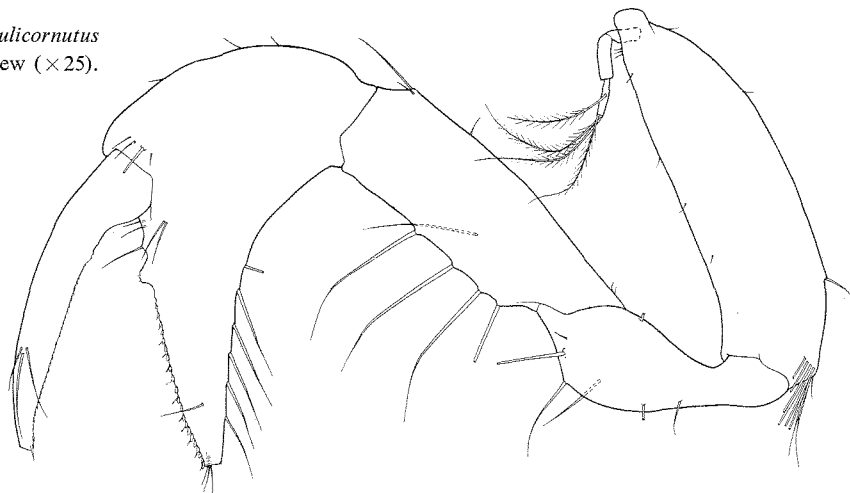


Fig. 44. *Carpoapseudes oculicornutus* n.sp., a-e, ♀; a-c, pereopods V-VII, rostral view ($\times 25$); d, distal end of propus of pereopod VI, rostral view ($\times 108$), spine ($\times 425$); e, pleopod I, rostral view ($\times 25$), (all setae are plumose), seta ($\times 320$); f-f.1, antennula, ♂, dorsal view ($\times 38$).

Fig. 45. *Carpoapseudes oculicornutus* n.sp., ♂; cheliped, caudal view ($\times 25$).



Dactylus with claw as long as propus; claw 0.6 times as long as dactylus.

Peraeopods VI-VII (Fig. 44b-d) much longer than peraeopod V. Basis somewhat longer than the three succeeding joints together, with particular setae. Merus and carpus longer than those of peraeopod V and less setiferous. Propus as long as that of peraeopod V, but with fewer setae; propus of peraeopod VI with a tergal particular seta in the distal part. Dactylus with claw somewhat longer than propus; claw about 0.6 times as long as dactylus.

Pleopods (Fig. 44e) with short, bare coxa. Basis five times longer than coxa with six inner plumose setae (only the first pair has been examined). Exopodite slender, about 1.2 times longer than basis, distinctly two-jointed; first joint very short with a plumose seta at the outer distal corner; second joint margined with numerous plumose setae. Endopodite longer than exopodite, one-jointed with numerous plumose marginal setae, the inner proximal of which is shaped as in *C. serratispinosus*.

Uropod (Fig. 39a) with long peduncle, widened towards the end and set with some small setae. (Exo- and endopodites lost).

Description of male:

Body as in the female but peraeonites 2-6 have hyposphenians situated on a level with the peraeopods, and peraeonite 7 has an obliquely forwards directed genital cone. Pleonites as in the female.

Antennula (Fig. 44f-f.1). The third peduncular joint has no particular setae. The inner flagellum is seven-jointed as in the female, but second, third and last joints have one particular seta each. The outer flagellum is twenty-nine-jointed; the joints 1, 16, 18, 20-22, 24, and 27 have one aesthetasc, the joints 3-5, 7, 8, 13, 14, and 17 two, and 6, 9-12, and 15 three

aesthetascs. The last joint has one terminal particular seta.

Antenna. The squama bears but eight setae. The flagellum is seven-jointed with one aesthetasc on the joints 5 and 12, and with two aesthetascs on the joints 7-9, and 11.

Mandibles. Pars incisiva of either mandible seven-dentate. Spines on the spiniferous lobes very similar to those on the right mandible of the female.

Cheliped (Fig. 45) very similar to the one of the female. The remaining appendages agree very well with those of the female.

Remarks:

The differences between this species and the other ones have already been pointed out (see pp. 72 and 79).

Leiopus Beddard, 1886

Leiopus Beddard, 1886a, p. 116.

Leiopus Beddard, BEDDARD, 1886b, p. 114.

Apseudes Leach, NORMAN & STEBBING, 1886, p. 80 (partim).

Apseudes Leach, HANSEN, 1913, p. 10 (partim).

Apseudes Leach, NIERSTRASZ, 1913, pp. 3-14 (partim).

Apseudes, LANG, 1949, p. 4 (partim).

Apseudes, WOLFF, 1956b, pp. 191-207.

Apseudes Leach, KUDINOVA-PASTERNAK, 1966, p. 518.

Generotype: *Leiopus leptodactylus* Beddard, 1886a, p. 116; *Leiopus leptodactylus* F. E. Beddard, BEDDARD 1886b, p. 114, pl. XII, fig. 1, pl. XV, figs. 5-12.

Diagnosis:

Pleon with five pleonites. Ocular lobes well defined, without visual elements. Peraeonite 7 not

similar to a parallel trapezium. Antennae with squama. Maxillulae with two-jointed palp; outer endite with two caudal setae near the distal end, and with one dwarfed and ten or eleven strong terminal spines; inner endite with four of five terminal setae or spines. Epignath of maxilliped a large, vaulted plate. Chelipeds and peraeopods II with exopodite. Basis of chelipeds with or without spiniform process. Peraeopods II fossorial; coxa produced into a spiniform process, directed obliquely forwards and downwards; carpus shorter than merus. Females with or without pleopods. Pleotelson and mandibles with sexual dimorphism.

To this may be added that the body is very slender, that peraeonites 5 and 6 are longer than broad, and that in all species, *L. weberi* (Nierstrasz) excepted, the caudal surface of the endite of the maxillipeds bears one long subterminal seta near the outer margin, and one subterminal somewhat leaf-like spine near the inner vertical surface.

As far as hitherto known, the genus is restricted to the deep-sea.

Species:

- L. aberrans* n.sp. (see p. 97).
- L. conspicuus* n.sp. (see p. 103).
- L. galathea* (Wolff), 1956b, p. 191 (see p. 205).
- L. gracilis* (Norman & Stebbing), 1886, p. 95 (see p. 195).
- L. gracillimus* (Hansen), 1913, p. 15 (see p. 203).
- L. hanseni* n.nom. (see p. 204).
- L. leptodactylus* Beddard (see p. 193).
- L. shiinoi* n.sp. (see p. 91).
- L. sibogae* (Nierstrasz), 1913, p. 3 (see p. 197).
- L. weberi* (Nierstrasz), 1913, p. 7 (see p. 200).
- L. wolffi* n.sp. (see p. 110).
- L. zenkevitchi* (Kudinova-Pasternak), 1966, p. 518.

Remarks on the species:

As *L. (Apseudes) gracilis* in HANSEN (1913, p. 13) is not the species described by NORMAN & STEBBING, I rename HANSEN's species *L. hanseni*. In this species

the claw on peraeopod V has sternal processes, in the true *L. gracilis*, the type of which I have re-examined, it does not, as is also to be seen in NORMAN & STEBBING's figure (*op. cit.*, pl. XX, fig. I.L).

The males of *L. aberrans*, *L. hanseni*, and *L. zenkevitchi* are unknown and consequently we do not know anything about the sexual dimorphism in these species. However, it is obvious that the two last-mentioned species belong to the present genus, the claw of peraeopod V having sternal spiniform processes, a character we find only in some other species of this genus.

L. aberrans, however, holds such an isolated position in the shape of the rostrum, the ocular lobes, the carapace and the pleonites that one may question whether it really belongs to the present genus. Most probably it does, for in other respects it only agrees with species of this genus.

As mentioned above, in some species the claw of peraeopod V has sternal spiniform processes. The following table gives a survey of this character. In the table the presence of processes are marked with +, the absence with —.

Table 1. Shape of the claw on peraeopod V.

Species of <i>Leiopus</i>	♀	♂
<i>aberrans</i>	—	unknown
<i>gracilis</i>	—	—
<i>leptodactylus</i>	—	—
<i>shiinoi</i>	unknown	—
<i>sibogae</i>	—	—
<i>weberi</i>	—	—
<i>hanseni</i>	+	unknown
<i>zenkevitchi</i>	+	unknown
<i>galathea</i>	+	—
<i>gracillimus</i>	+	—
<i>conspicuus</i>	+	+
<i>wolffi</i>	+	+

That the transformation of the claw does not take place during the postmarsupial development is clear from the fact that the processes are present already in the manca stages of *L. wolffi* (see p. 117).

Key to the females

1. Pleopods absent 2
Pleopods present 4
2. Rostrum with a process on each side at the base *L. conspicuus* n.sp. 3
Rostrum without processes at the base 3
3. Claw of peraeopod V about 2.5 times longer than broad at the base, with two sternal processes *L. zenkevitchi* (Kudinova-Pasternak)
Claw of peraeopod V fully 4.5 times longer than broad at the base, with six sternal processes *L. galathea* (Wolff)
4. Carapace without spiniform process in front of the respiratory chambers *L. aberrans* n.sp. 5
Carapace with spiniform process in front of the respiratory chambers 5
5. Peraeonites without lateral spiniform processes *L. sibogae* (Nierstrasz) 6
At least peraeonites 4-7 with lateral spiniform processes 6
6. Claw of peraeopod V with sternal processes 7
Claw of peraeopod V without sternal processes 9
7. Rostrum with a process on each side at the base 8
Rostrum without processes at the base *L. wolffi* n.sp.
8. Claw of peraeopod V about 3 times longer than broad at the base, with two sternal processes *L. hansen* n.nom. 10
Claw of peraeopod V about 5 times longer than broad at the base, with four sternal processes *L. gracillimus* (Hansen)
9. Basis of cheliped with sternal spiniform process 10
Basis of cheliped without sternal spiniform process *L. gracilis* (Norman & Stebbing)
10. Carpus of cheliped about as long as basis; propus about twice as long as the greatest width *L. weberi* (Nierstrasz)
Carpus of cheliped distinctly longer than basis; propus about 4 times longer than the greatest width *L. leptodactylus* Beddard

Key to the males

1. Peraeonites without lateral spiniform processes *L. sibogae* (Nierstrasz) 2
Peraeonites with lateral spiniform processes 2
2. Rostrum with a process on each side at the base 3
Rostrum without processes at the base 7
3. Claw of peraeopod V with sternal processes *L. conspicuus* n.sp. 4
Claw of peraeopod V without sternal processes 4
4. Basis of cheliped with sternal spiniform process 5
Basis of cheliped without sternal process 6
5. Pleonites parallel trapezoidal; pleotelson shorter than the last three pleonites together *L. shiinoi* n.sp.
Pleonites almost square; pleotelson longer than the last three pleonites together *L. leptodactylus* Beddard
6. Spiniform processes of peraeonites directed obliquely forwards; pleotelson irregularly serrated laterally *L. gracilis* (Norman & Stebbing)
Spiniform processes of peraeonites directed straight outwards; pleotelson not serrated laterally *L. gracillimus* (Hansen)
7. Claw of peraeopod V with two sternal processes *L. wolffi* n.sp. 8
Claw of peraeopod V without sternal processes 8
8. Propus of cheliped about twice as long as the greatest width; finger with a tergal tubercular process near the base *L. weberi* (Nierstrasz)
Propus of cheliped about 3 times as long as the greatest width; finger without tergal process *L. galathea* (Wolff)



Fig. 46. *Leiopus shiinoi* n.sp., ♂; a, lateral view ($\times 22$); b, last three peraeonites and pleon, dorsal view ($\times 25$); c, pleotelson, lateral view ($\times 80$); d-e, distal part of pleotelson, dorsal and ventral views ($\times 130$); f.f.1, antennula, ventral view ($\times 80$).

Leiopus shiinoi n.sp.

Material:

St. 193, off Durban (32° 34'S, 31° 52'E), 3680 m, 6 Feb. 1951. Gear: shrimp otter trawl. Bottom: globigerina ooze. Bottom temp.: 1.1°C. – 1 adult male.

St. 554, Great Australian Bight (37° 28'S, 138° 55'E), 1340-1320 m, 5 Dec. 1951. Gear: 3 m sledge trawl. Bottom: globigerina ooze. Bottom temp.: c. 3.5°C. – 2 adult males.

Description of male type (from St. 554):

Body (Fig. 46a-b, Pl. IIIc) about 8 times longer than broad, gradually tapering behind. Length about 8.4 mm. Integument rather strongly calcified.

Carapace (Pl. III d) slightly broader than long. The somewhat vaulted dorsal surface is devoid of transverse furrows. The respiratory chambers are moderately swollen, and just in front of them there is a spiniform process, shaped like the ocular lobes, but smaller. The latter extend obliquely forwards and outwards and are excavated in front. The rostrum (Fig. 47a) is very strongly prominent and acute, with a small triangular expansion on each side at the base. The epistome is furnished with a very long acute spiniform process, directed obliquely forwards, and there is a strong hyposphenie between the chelipeds.

Peraeonites dorsally with tubercular elevations on peraeonites 2 and 3 and with a longitudinal dumb-bell-shaped elevation in the middle of peraeonites 4-7. They increase in length from 2 to 5 and 6 which are equally long while 7 is about as long as 4. Coxa of peraeopodes III-IV small. Peraeonites 3-7 with a spiniform process on each side, which on peraeonite 3 is situated at the anterior corner, on the succeeding peraeonites somewhat behind this corner. Peraeonites 2-6 with hyposphenians which decrease in length, the peraeonites counted caudad. Peraeonite 7 with a strong genital cone. The peraeonites are furthermore furnished with some tiny setae or hairs as shown in Fig. 46a-b.

Pleon (Fig. 46a-e) longer than the last three peraeonites together. Pleonites almost parallel trapezoidal in form with the posterior corners somewhat extended. They decrease in width from 1 to 5. Dorsally and laterally they are furnished with some tiny setae or hairs, and they have a ventral spiniform process which is backwards-curved on peraeonite 5, almost straight on the others. Pleotelson slender, somewhat longer than the last two pleonites combined, and shaped as in the figures.

Antennula (Fig. 46f-f.1) much longer than carapace. First peduncular joint nearly 3 times longer than second and third joints together. Second joint fully 1.6 times longer than third. First two joints with particular setae. The inner flagellum is five-jointed. The outer flagellum is eighteen-jointed; except for the first and last joints, the joints are more or less richly furnished with long slender aesthetascs.

Antenna (Fig. 47b-c) much shorter than the antennula, reaching to about the middle of the second peduncular joint of the latter. The first joint extends inward as a rounded, somewhat tuberculated bulge which bears a short seta. The second joint is much longer and more slender. The squama is slender, somewhat longer than the first two flagellar joints together, and is furnished with seven setae. Flagellum eight-jointed with an indication of division of the fourth joint. The first joint is shortest, the second joint about 4 times longer than the first, and the third joint a little longer than the second. The succeeding joints are more slender than the preceding ones. The second and third joints are furnished with particular setae.

Labrum (Fig. 47d) incurved in front, with a small median prominence, and with some tiny hairs along the front margin and with groups of tiny hairs on the lateral parts of the rostral surface.

Mandibles (Fig. 47e-k) with strong, subcylindrical processus molaris, directed obliquely downwards; its grinding surface is finely granulated. Pars incisiva of right mandible irregularly six-dentate, that of left mandible irregularly five-dentate. Lacinia mobilis of left mandible irregularly five-dentate. The spiniferous lobe of the right mandible is furnished with six spines, one of which is much shorter than the others; the shape of the spines alters in a high degree according to the position they are studied in (cp. Fig. 47f and g). The setiferous lobe of the left mandible bears seven stiletto-shaped spines, one of which is very short. The mandibular palps are equal. The second joint is longest, being about 3 times longer than the first joint and about 1.8 times longer than the third; in the distal third it is furnished with numerous one-sidedly ciliate setae. The last joint is along most of the inner part set with short setae, and at the tip with two longer setae, the setae being one-sidedly ciliate.

Labium (Fig. 47l) with tiny hairs on and just inside the lateral margins of the basal part. The lobes are for the greater part marginated with long hairs and have three plumose setae at the end.

Maxillula (Fig. 48a-b). The outer endite is finely



Fig. 47. *Leiopus shiinoi* n.sp., ♂; a, rostrum, dorsal view (×80); b, antenna, ventral view (×80); c, first joint of the same (×205); d, labrum, rostral view (×205); e, right mandible, caudal view (×205); f-g, pars incisiva and spiniferous lobe of the same in different positions (×550); h, left mandible, rostral view (×205); i, distal part of the same (×550); j-k, pars incisiva and distal end of lacinia mobilis of the same (×550); l, left side of labium, caudal view (×205); m-n, pars incisiva and spiniferous lobe of right mandible of the other two males (×550); o, distal part of left mandible of the other two males (×550).



Fig. 48. *Leiopus shiinoi* n.sp., ♂; a, maxillula, rostral view ($\times 205$); b, distal end of outer endite of the same ($\times 320$); c, maxilla, caudal view ($\times 320$); d, maxilliped, caudal view ($\times 205$); e, palp of the same, obliquely rostral view ($\times 205$); f, endite of the same, caudal view ($\times 450$); g, epignath ($\times 205$).

serrated along the proximal half of the inner surface and is set with hairs as shown in Fig. 48a; the end is surmounted with ten long more or less unguiform spines, and one dwarfed spine. The palp is furnished with at least five setae (it is impossible to decide whether some setae have been lost), and the most distal part of each seta is sparsely pectinated or spiniferous. The inner endite has an outer projection

near the middle, and opposite to this a sharp curve; the distal margin bears five bare setae.

Maxilla (Fig. 48c) broadly lamellar with some spinules at the outer proximal end. Setae of rostral row bare, those of the caudal row but three in number and finely plumose in the distal part. The fixed endite has two subterminal caudal setae, the more distal of which seems to be pectinated on one side



Fig. 49. *Leiopus shiinoi* n.sp., ♂; a, right cheliped, caudal view ($\times 64$); b-b.1, exopodite of right and left chelipeds ($\times 205$); c-c.1, distal end of propus of right cheliped, caudal view, and finger of the same, rostral view ($\times 205$); d, peraeopod II, caudal view ($\times 64$); e, exopodite of the same ($\times 205$); f-g, peraeopods III-IV, caudal view ($\times 64$).

along the distal part, and a subterminal row of five rostral setae; the distal margin bears three forked spines, and two bare setae. The outer lobe of the movable endite bears seven long setae, and the inner lobe nine shorter setae.

Maxilliped (Fig. 48d-g) with bare basis. The first joint of the palp is furnished with a short outer seta, and a long seta near the inner distal end; second joint with two setae at the outer distal end, and with numerous inner setae; third joint with seven inner setae, and last joint with eight setae; the setae are bare. Each endite with two couplers; inner caudal seta transformed into a somewhat leaf-like spine; median vertical surface furnished with five one-sidedly plumose setae on the free margin; distal end with some simple setae and seven chitinous formations, the shape of which varies considerably according to the position in which they are studied (Fig. 48f). The epignath (Fig. 48g) has two oval lobes in front, one of which is for the greater part margined with long hairs; the terminal spine is set with short rows of very tiny hairs.

Cheliped (Fig. 49a-c.1) very slender. Coxa small with a tiny seta at the tergal and sternal ends and with an irregularly granular area just inside the distal sternal end. Basis successively widened towards the end, about 6 times longer than the greatest width, with a very strong sternal spiniform process somewhat in front of the distal third. Exopodite with two plumose setae on the right cheliped and with three on the left. Merus comparatively long, without spiniform projection, but with three setae. Carpus as long as basis and about 1.5 times longer than propus, with many setae. Propus with concave sternal surface, with one seta near the distal tergal end, with two rostral setae just behind the dactylus, and with one seta in the gap between the finger and the dactylus; finger about one third as long again as the rest of the joint, and armed as shown in Fig. 49c-c.1. Dactylus with three juxtaposed rostral setae and seven sternal spines; the exceedingly long terminal claw is about 1.5 times longer than the claw of the finger.

Peraeopod II (Fig. 49d-e). Basis as long as the combined length of ischium, merus and one third of the carpus, with the distal sternal end extended as a conspicuous spiniform process. Exopodite with five long-plumose setae. Ischium short. Merus successively widened towards the end, nearly as long as the two succeeding joints together, with one spine at the distal sternal end. Carpus about 1.5 times longer than propus, with one tergal spine and with two

sternal spines. Propus about 1.7 times longer than broad, with seven sternal and two tergal spines. Dactylus with claw fully as long as propus; dactylus with three small sternal spiniform processes, with a setiform process at the distal sternal end, and with two tergal setae of different lengths at about the proximal third; claw much shorter than dactylus, with some tiny rostral hairs.

Peraeopods III-IV (Fig. 49f-g) are very alike, but merus and propus of peraeopod III are longer than the corresponding joints of peraeopod IV, and peraeopod III is devoid of particular setae, while peraeopod IV has at least two such setae on the basis and one on the propus; the last-mentioned seta is situated near the distal third of the tergal surface. Dactylus with claw about as long as propus; claw about 0.7 times as long as dactylus. Dactylus of peraeopod IV has one tiny tergal seta near the middle, one tiny sternal setae in the middle and one at the end; peraeopod III differs inasmuch as it has one more tiny tergal seta in the middle.

Peraeopod V (Fig. 50a and d), dactylus excluded, somewhat shorter than peraeopod IV, excluding dactylus. Basis about 0.9 times as long as the four succeeding joints together, with particular setae. Ischium short. Merus much shorter, and carpus somewhat shorter than the corresponding joints of peraeopod IV. Carpus with comparatively long spiniform setae around the distal end. Propus about 0.8 times as long as the one of peraeopod IV, with one tergal particular seta somewhat in front of the middle, and with the distal end surrounded with one-sidedly ciliate setae of very different lengths. Dactylus with claw fully as long as propus; claw about 0.6 times as long as dactylus, which has two tiny tergal setae and one tiny sternal seta near the middle.

Peraeopods VI-VII (Fig. 50b-c and e) very similar to peraeopod V, but differing from it mainly in the following respects. The distal end of carpus is not surrounded with long spiniform setae, and the caudal surface of propus has a row of spinules extending from the proximal sternal spine to near the distal tergal end; the dactylus with claw is considerably longer than the propus. Merus of peraeopod VI is somewhat shorter than that of peraeopods V and VII, and dactylus of peraeopod VI has only one tiny tergal seta while there is a bundle of three such setae on peraeopod VII.

Pleopods (Fig. 50f) with a short, but distinct coxa. Basis about 9 times longer than the coxa and nearly 5 times longer than broad, with five inner setae, the three distal of which are plumose (only the first pair

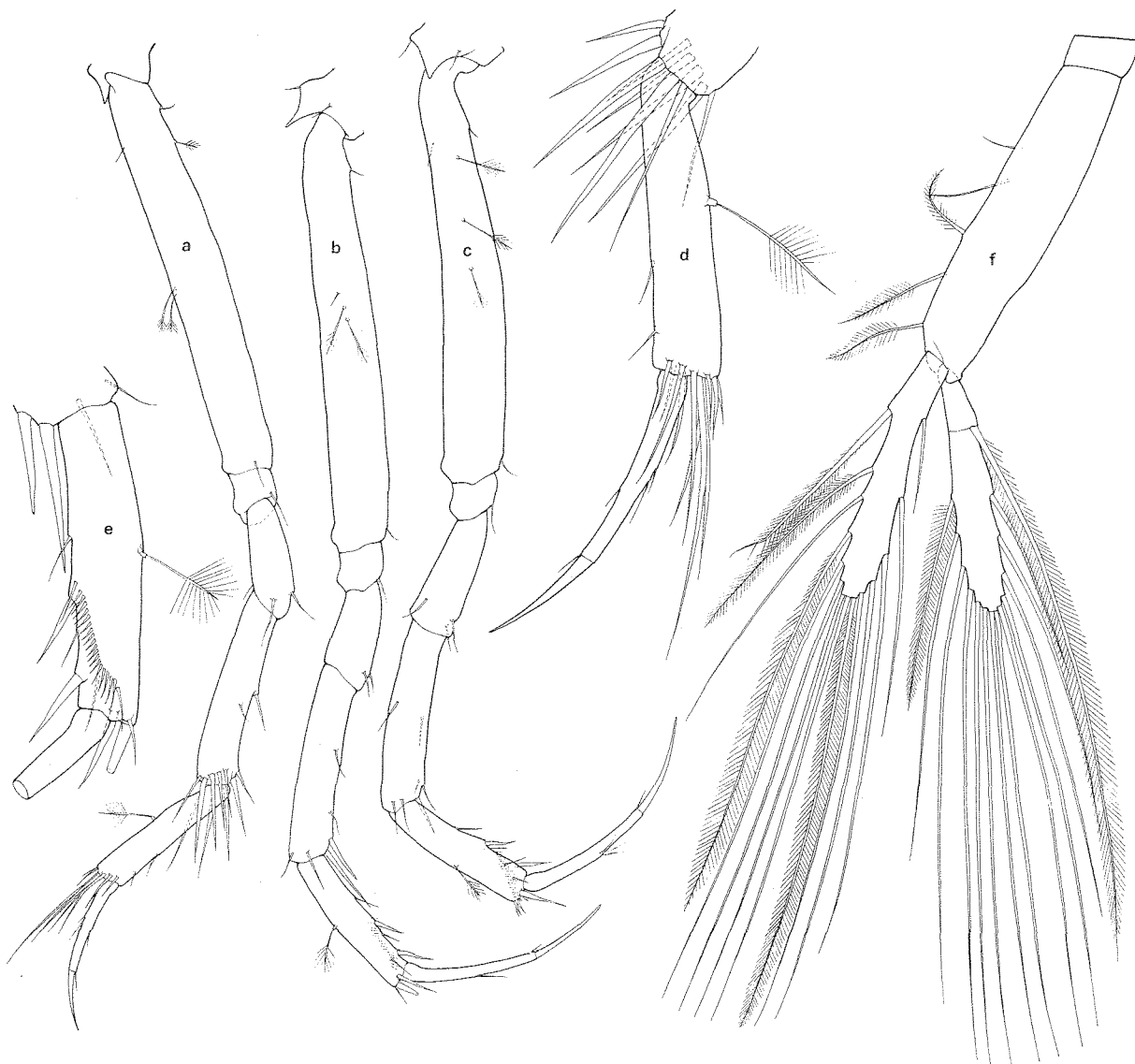


Fig. 50. *Leiotopus shiinoi* n.sp., ♂; a-c, pereopods V-VII, rostral view ($\times 64$); d-e, distal end of pereopods V and VI, caudal view ($\times 130$); f, pleopod I, rostral view (all setae on exo- and endopodite are plumose) ($\times 80$).

has been examined). Exo- and endopodites slender, shorter than basis and furnished with many plumose setae; exopodite distinctly two-jointed.

Uropod (Fig. 46a-e) with longish subcylindrical peduncle, furnished with many tiny setae or hairs. (The exo- and endopodites are completely lost; in the two other specimens they are incomplete).

Variation:

Of the other two specimens only the mandibles and the propus of pereopod II have been examined. The latter is armed in the same way as in the type specimen.

Contrary to the case in the type specimen, the pars incisiva of the right mandible is irregularly five-dentate in these specimens (Fig. 47m); the number

of spines on the spiniferous lobe of this mandible is the same, but all of them are quite stiletto-shaped (Fig. 47n). The spines on the left mandible agree exactly with those of the type specimen, but lacinia mobilis is only irregularly four-dentate (Fig. 47o).

Remarks:

Of the species having a spiniform process in front of the respiratory chambers, *Apseudes coecus* (*Apseudes caeca*) Willemoes-Suhm (1879, p. 24), and *Apseudes armatus* Richardson (1911, p. 518) are described in such a manner that they cannot be identified. The former, which was taken by the *Challenger* Expedition, is not deposited in British Museum, and no one knows where it is. The latter species is based upon a single incomplete specimen.

RICHARDSON gives no figures of it and her description is very fragmentary. By the courtesy of Dr. J. FOREST, Musée d'Histoire Naturelle, Paris, I have had an opportunity to see the specimen. It is in a very bad condition. Most of the legs, the last peraeonite and the pleon are lost, and the rest of the specimen is thin and flabby. No exopodite could be found on the cheliped and peraeopod II, but whether or not this is due to loss is impossible to decide. The propus of the cheliped, however, is so characteristic that there can be no doubt about the validity of the species. The descriptions of the pleon of the two species mentioned are such that its real nature cannot be ascertained.

From the other males which agree with *L. shiinoi* in the shape of the peraeon and more or less in the pleon, and which have an outwards-directed process on each side at the base of the rostrum and no sternal processes on the claw of peraeopod V, *L. shiinoi* differs, among other things, in the following respects: from *L. leptodactylus* in the much broader and parallel trapezoidal pleonites and the much shorter pleotelson (I have made a direct comparison between the two species); from *L. gracilis* and *L. gracillimus* in the presence of a strong sternal spiniform process on the basis of the cheliped and in the much longer rostrum; and from *L. weberi* in the carpus and propus of the cheliped.

The species, which seems to be most closely related to *L. leptodactylus*, is named in honour of the distinguished crustacean specialist, Professor Dr. SUEO SHIINO, Prefectural University of Mie, Japan.

Leiopus aberrans n.sp.

Material:

St. 664, Kermadec Trench (36°34'S, 178°57'W), 4540 m, 24 Feb. 1952. Gear: herring otter trawl. Bottom: brown sandy clay with pumice. Bottom temp.: 1.1°C. – 1 adult female (with rudimentary oostegites and in moulting phase).

Description of female type:

Body (Pl. IIIe) about 7.6 times longer than broad. Length about 8.5 mm.

Carapace (Fig. 51a) about as broad as long. (As the specimen is in a moulting phase and the old integument is loosened and dilated, I cannot get a clear idea of the respiratory chambers and if there is any transverse furrow). Rostrum very broad, with a short tip which seems to issue from the ven-

tral surface. Epistome with a rather long spiniform process, directed obliquely forwards and downwards.

Peraeonites (Fig. 51b-c) increase in length from 2 to 5 while 6 is a little shorter than 5, and 7 a little shorter than 4. Coxa of peraeopod II extended as a short spiniform process, set with three short setae. Coxa of the succeeding peraeopods rounded. Peraeonites 4-7 with a short lateral spiniform process near the anterior margin. Hyposphenians are present on all peraeonites, the first one included.

Pleon (Fig. 51b-c) somewhat shorter than the last four peraeonites together, decreasing a little in width, counting caudad, 1.5-1.25 times broader than long, with the epimera extended as a short process which is truncated at the end and set with three (pleonites 1 and 5) or four (pleonites 2-4) long plumose setae and one very tiny seta. A ventral spiniform process is present on all pleonites. Pleotelson as long as the last three pleonites together.

Antennula (Fig. 51d). First peduncular joint fully twice as long as the two succeeding joints together, with particular setae. Second joint about 2.5 times longer than the third. The first joint of the six-jointed inner flagellum has at least two particular setae. Outer flagellum eight-jointed; the fifth joint bears an aesthetasc and the last joint a particular seta.

Antenna (Fig. 51e). First joint irregularly serrated along the inner distal part. Second joint about twice as long as the first. Squama reaching beyond the end of the second flagellar joint, margined with six (right antenna) or five (left antenna) bare setae. Flagellum ten-jointed. First joint shortest. Second joint about 3 times longer than the first and about 0.7 times as long as the third; second and third joints with particular setae. The succeeding joints are more slender than the preceding ones; the antepenultimate joint bears a particular seta.

Labrum (Fig. 51f) with broad trapezoidal basal part, laterally set with some long hairs. Front margin irregularly crenated and incurved in the middle.

Mandibles (Fig. 52a-d.1 and e-f) with strong, straight inwards-directed processus molaris set with a row of hairs on the somewhat tongue-like end. Pars incisiva of either mandible and lacinia mobilis of left mandible five-dentate. The spiniferous lobe of the right mandible bears five strong forked spines and one slender simple spine. The spines of the left mandible are lost, but the new rudiments seem to resemble the spines of the right mandible. First joint of the palp short, with two bare setae. Second

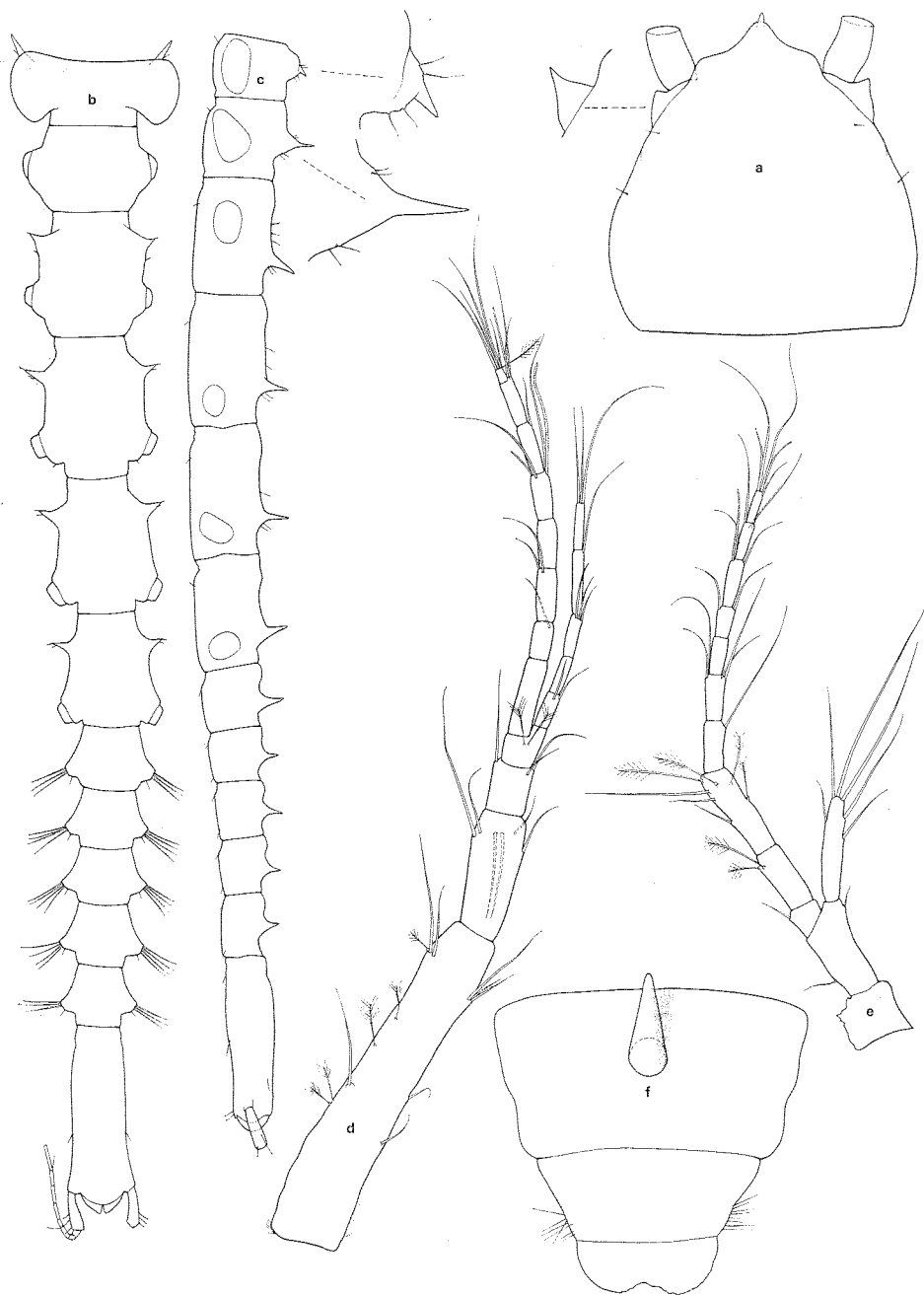


Fig. 51. *Leiopus aberrans* n.sp., ♀; a, carapace, dorsal view ($\times 37$); b-c, peraeon and pleon, dorsal and lateral view ($\times 21$ and 20), detail figures ($\times 78$); d, antennula, dorsal view ($\times 74$); e, antenna, ventral view ($\times 74$); f, labrum caudal view ($\times 88$).

joint about 4 times longer than the first, and about twice as long as the third; second and third joints bear one-sidedly ciliate setae, third joint moreover two long bare terminal setae.

Labium (Fig. 52g). Basal part set with hairs as shown in the figure. The lobes are for the greater part margined with long hairs and have three bifid terminal spines.

Maxillula (Fig. 52h-j.1). Endites adorned with hairs as in the figures. Outer endite with one dwarfed and eleven strong spines around the distal end. The palp bears seven setae, the distal parts of which are

serrated. The inner endite has a small outer dentiform projection near the base and it bears five one-sidedly long-haired terminal setae.

Maxilla (Fig. 53a-c). Caudal and rostral surfaces adorned with groups of tiny spinules and hairs. Inner margin sparsely serrated along the distal half. Outer margin partly set with hairs. Setae of inner row bare and simple at the tip. The outer row numbers five setae which are plumose in the distal part; the seta closest to the fixed endite is very strong and spiniform. The fixed endite bears two caudal spines, shaped as in Fig. 53b; rostral surface with a sub-



Fig. 52. *Leiopus aberrans* n.sp., ♀; a, right mandible, rostral view ($\times 130$); b, distal part of the same ($\times 363$); c-d.1, pars incisiva and lacinia mobilis of left mandible in different positions ($\times 363$); e, spiniferous lobe of right mandible ($\times 363$); f, palp of left mandible ($\times 205$); g, left side of labium, caudal view ($\times 205$), seta ($\times 450$); h, outer endite of maxillula, rostral view ($\times 160$); i, distal end of outer endite of the same, rostral view ($\times 363$); j-j.1, inner endite and distal end of the same ($\times 160$ and 363).



Fig. 53. *Leiopus aberrans* n.sp., ♀; a, maxilla, rostral view ($\times 245$); b-c, distal part of fixed endite, caudal and rostral view ($\times 450$); d, left maxilliped, caudal view ($\times 160$); e, endite of right maxilliped, rostral view ($\times 320$); f, epignath ($\times 160$); g, cheliped, rostral view ($\times 64$).

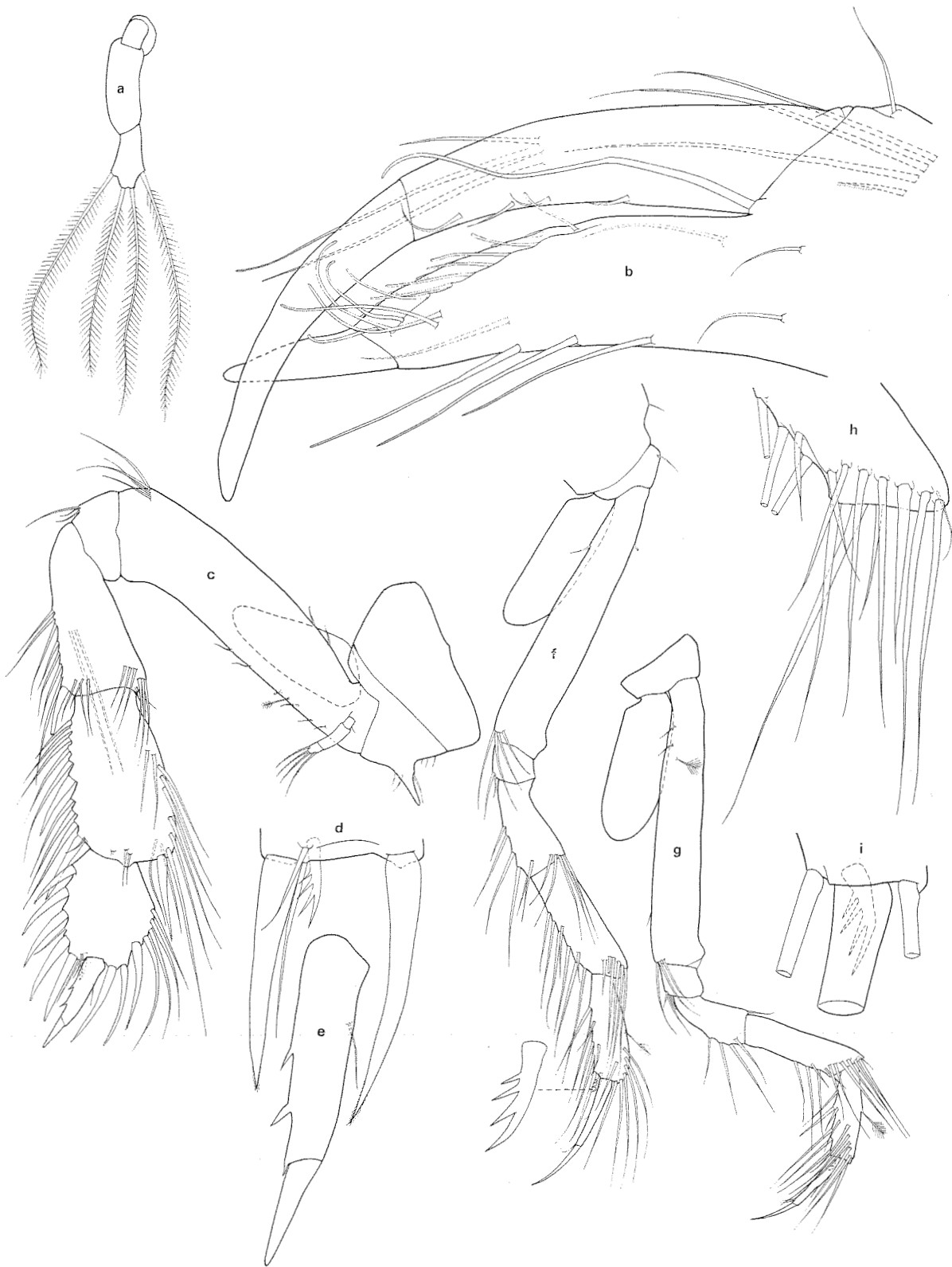


Fig. 54. *Leiopus aberrans* n.sp., ♀; a, exopodite of cheliped ($\times 130$); b, distal part of propus and dactylus of cheliped, caudal view ($\times 230$); c, peraeopod II, caudal view ($\times 64$); d-e, distal end of propus and dactylus of the same, caudal view ($\times 205$); f-g, peraeopods III-IV, caudal view ($\times 64$); h, distal part of carpus of peraeopod IV, caudal view ($\times 205$); i, distal part of propus of the same, caudal view ($\times 320$).

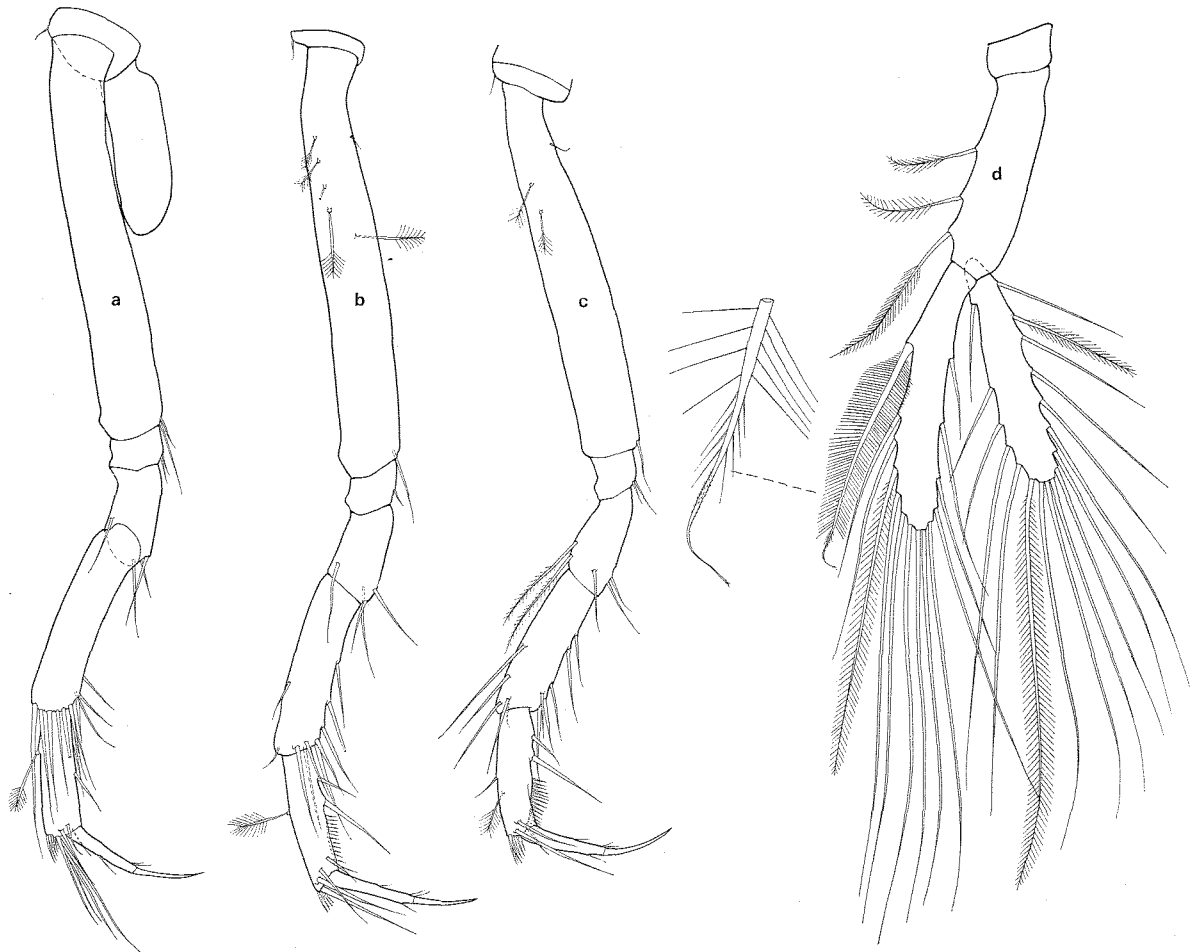


Fig. 55. *Leiotopus aberrans* n.sp., ♀; a-c, peraeopods V-VII, rostral view ($\times 64$); d, pleopod I, rostral view (all setae are plumose) ($\times 98$), seta ($\times 320$).

terminal row of five one-sidedly ciliate spiniform setae; distal end with two cylindrical setae and three forked spines. The outer lobe of movable endite bears eight setae which are one-sidedly ciliate along the distal part, and the inner lobe has eleven setae, some of which are one-sidedly ciliate.

Maxilliped (Fig. 53d-f). Coxa short, bare. Basis with three short bare caudal setae and for the rest ornamented as shown in Fig. 53d. The first joint of the palp is furnished with a short bare outer seta, and has a long seta near the inner distal end; second joint with one long outer distal seta, and with numerous inner setae, the longest of which are bare and end in a long lash, the others finely plumose along the distal part; third joint with six inner bare setae, and last joint with seven bare setae. Left endite with three couplers, right endite with two; inner caudal seta transformed into a somewhat leaf-like spine; rostral surface with numerous rows of short spinules or hairs; outer margin set with somewhat longer hairs; distal end armed as in Fig. 53e;

median vertical surface with six plumose setae on the free margin. Epignath (Fig. 53f) with two oval lobes in front, the proximal of which is partly margined with hairs; terminal spine with numerous scattered hairs.

Cheliped (Figs. 53g and 54a-b) very slender. Basis much shorter than carpus with a strong sternal dentiform projection. Exopodite with four plumose setae. Merus with four sternal setae. Carpus longer than propus, richly set with setae. Propus almost as slender as carpus and about 3 times longer than broad, with two tergal setae and a rostral row of four setae behind the dactylus, the inner seta being one-sidedly ciliate and much shorter than the others; the caudal surface has two short setae near the finger; the latter, which is somewhat more than twice as long as the rest of the joint, is armed as in Fig. 54b, and its claw is much shorter than the one of the dactylus. The latter bears three long juxtaposed sternal setae.

Peraeopod II (Fig. 54c-e). Basis about as long as

merus and carpus together, with at least one particular seta. Exopodite with four plumose setae. Ischium short. Merus about 0.8 times as long as carpus with one distal sternal spine. Carpus 1.6-1.7 times longer than propus, with one tergal and two sternal spines. Propus with two tergal, two distal and four strong sternal spines, which are finely ciliated along the tip, as is also the case with the spines on the preceding joint; the rostral surface bears one short, strongly tri-serrate subterminal spine. Dactylus with claw as long as propus; dactylus with one tergal seta, and with three rostral spiniform processes; claw about half as long as dactylus.

Peraeopods III-IV (Fig. 54f-i) very alike, but the last four joints of peraeopod IV are shorter than the corresponding joints of peraeopod III. Basis of peraeopod III somewhat shorter than merus, carpus and propus together, basis of peraeopod IV somewhat longer than these joints. Propus with one tergal particular seta near the middle, and with one short subterminal sternal spine shaped as the corresponding spine on peraeopod II. Dactylus with claw longer than propus; claw shorter than dactylus.

Peraeopod V (Fig. 55a). Basis about as long as the four succeeding joints together. Ischium short. Merus about 0.4 times as long as carpus which is fully 1.6 times longer than propus. The latter has a tergal particular seta near the proximal third. Dactylus with claw longer than propus; claw as long as dactylus.

Peraeopods VI-VII (Fig. 55b-c) very alike, but basis, carpus and propus of peraeopod VI are somewhat longer while merus is somewhat shorter than the corresponding joints of peraeopod VII. Basis about as long as the four succeeding joints together, furnished with particular setae. Propus with one tergal particular seta which on peraeopod VI is situated above the middle, on peraeopod VII below the middle; the sternal surface is set with two proximal setae and a distal row of one-sidedly ciliate spinules. Dactylus with claw longer than propus; claw shorter than dactylus.

Pleopods (Fig. 55d). Coxa short, bare. Basis about 5.5 times longer than coxa, with three inner plumose setae. Exo- and endopodites one-jointed; endopodite a little longer than exopodite; both rami margined with long plumose setae. Inner proximal seta of endopodite as in the figure.

Uropod (Fig. 51a-b) with long peduncle widened towards the end and set with some setae. (Exo- and endopodite lost except for some joints of the left endopodite).

Remarks:

The species differs materially from all other members of the genus in the shape of the carapace and the pleonites.

Leiopus conspicuus n. sp.

Material:

St. 575, Tasman Sea (40°11'S, 163°35'E), 3710 m, 19 Dec. 1951. Gear: shrimp otter trawl. Bottom: pteropod ooze. Bottom temp.: c. 1.1°C. — 6 adult females (3 with rudimentary oostegites, 1 incomplete), 1 incomplete, subadult male.

Description of female type (with rudimentary oostegites):

Body (Pl. III f) slender, 8 times longer than broad. Length about 21 mm. Integument strongly calcified.

Carapace (Pl. III g) a little broader than long, with a lateral process like the ocular lobes in front of the somewhat swollen respiratory chambers; in front of the latter the outline is almost circular, the rostrum excepted. Each ocular lobe extended as an obliquely forwards- and outwards-directed process, excavated in front. Rostrum with an obliquely forwards- and outwards-directed process on each side at the base and running out into a long somewhat deflexed point. There is a distinct transverse furrow between the middle of the respiratory chambers and two longitudinal impressions in front of it. (The name of the species alludes to the conspicuous shape of the carapace). Epistome with a short spiniform process, directed obliquely forwards and downwards.

Peraeonites with four dorsal tubercular elevations on peraeonite 2 and with a dumb-bell-shaped elevation along the middle of the succeeding peraeonites. They increase in length from 2 to 5-7 which are equally long. Coxa of peraeopod II running out into a very short blunt triangular process. Coxa of succeeding peraeopods small and rounded. Peraeonites 3-7 with a lateral spiniform process at some distance from the anterior margin. Hyposphenians are present on peraeonites 1-7, and they are situated on a level with the legs.

Pleon about as long as half of peraeonite 5 and 6-7 together. Pleonites equally long with the epimera extended as a short spiniform process. They are perfectly bare and ventrally they have a straight downwards-directed spiniform process. Pleotelson somewhat shorter than the last three pleonites together, with two very low ventral bulges at the end.



Fig. 56. *Leiopus conspicuus* n.sp., ♀; a-a.1, antennula, ventral view ($\times 53$); a.2, distal part of outer flagellum of the same ($\times 205$); b, antenna ventral view ($\times 53$); c, labrum, rostral view ($\times 75$); d-e, right and left mandibles, caudal view ($\times 75$); f-g, distal end of the same, caudal view ($\times 205$); h, distal end of processus molaris of left mandible, caudal view ($\times 205$); i, palp of right mandible ($\times 130$).

Antennula (Fig. 56a-a.2) much longer than carapace. First peduncular joint with particular setae, about 1.8 times longer than the two succeeding joints together. Second joint about 2.6 times longer than the third. The first joint of the five-jointed inner flagellum has a particular seta. The antepenultimate joint of the twenty-jointed outer flagellum bears a long strong aesthetasc and the last joint a particular seta.

Antenna (Fig. 56b) much shorter than the antennula, reaching to about the end of the fourth joint of the inner flagellum of the latter. The first joint extends inward as a pointed bulge. The second joint is about 1.5 times longer than the first. The squama reaches to about the distal third of the second joint of the nine-jointed flagellum, and bears five bare marginal setae. The first joint of the flagellum is about 0.3 times as long as the second, which is somewhat shorter than the third. The succeeding joints are more slender. The flagellar joints 2, 3, 5, and 7 have particular setae.

Labrum (Fig. 56c) with some lateral hairs on the basal part, and with tiny hairs on the lateral parts of the irregular frontal margin which is incurved in the middle and furnished with a triangular median prominence.

Mandibles (Fig. 56d-i) with straight inwards-directed subcylindrical processus molaris, the distal part of which is bent somewhat backwards and outwards and set with tiny hairs (Fig. 56h). Pars incisiva of either mandible eight-dentate, lacinia mobilis of left mandible six-dentate. Spiniferous lobes armed as in Fig. 56f and g. First joint of the palp short, set with one short and two very long bare setae. Second joint about 3.8 times longer than the first and about 1.4 times longer than the third. The last two joints are armed as in Fig. 56i.

Labium (Fig. 57a) with tiny hairs on the lateral margins and with hairs of different lengths on the anterior margin. The lobes are armed as shown in the figure, the outer terminal spine not being defined at the base.

Maxillula (Fig. 57b-d) with the endites set with hairs and spinules as in Fig. 57b. Caudal setae on outer endite one-sidedly ciliate; end surmounted with one dwarfed and eleven strong spines. The palp is set with nine setae which are finely ciliated along the distal part. The inner endite bears five plumose terminal setae, the middle of which is spiniform and serrated along the distal part (Fig. 57d).

Maxilla (Fig. 57e-f) broadly lamellar with numerous groups of tiny hairs or spinules on the caudal

and rostral surfaces. Inner and outer margins adorned as in Fig. 57e. Setae of inner row bare and bifid at the tip. The outer row numbers seven more or less spiniform setae which are finely ciliated along the distal part. The fixed endite has two subterminal caudal spines, the outer of which is very strong and plumose in the proximal part and serrated in the widened distal part, while the inner one is much more slender and plumose along the distal part; the rostral surface bears seven setae which are plumose near the base and one-sidedly ciliate along the distal part; the distal end is furnished with three strong spines which are serrated along the distal margin, and with two setae which are similar to those of the rostral row but bare in the proximal part. The outer lobe of the movable endite has six setae, the two outer of which are plumose along the middle, the others one-sidedly ciliate; the inner lobe has nine or ten setae, one of which is spiniform and plumose along the distal part while the others are one-sidedly ciliate.

Maxilliped (Figs. 57g-h and 58a-b) with bare coxa and basis. The first joint of the palp is set with one short bare outer seta, and bears a very long bare seta on the caudal surface near the inner distal end; second joint with six bare distal setae and numerous inner setae, the longest of which are bare, the others plumose or set with fine spinules along the distal part; the third and fourth joints have five and seven bare setae, respectively. Each endite with three couplers; inner caudal seta transformed into a somewhat leaf-like spine; median vertical surface with seven plumose setae on the free margin; distal end armed as in Fig. 58a-b. The epignath (Fig. 57h) is furnished with two anterior lobes, the proximal of which is for the greater part fringed with hairs; the terminal spine is richly set with hairs or slender spinules.

Cheliped (Fig. 58d-f) slender. Coxa small, bare (it has a rudimentary oostegite). Basis a little longer than carpus, fully 3 times longer than the greatest width, without spine or spiniform process. Exopodite with four plumose setae. Merus with five setae. Carpus about as long as propus, richly set with setae. Propus 2.3-2.4 times longer than broad, set with setae as shown in Fig. 58d; finger about as long as the rest of the joint, with one sternal seta at some distance from the claw and with a caudal row of cylindrical setae inside the tergal surface and a rostral row of lamellae (Fig. 58e). Dactylus with three juxtaposed rostral setae and with a continuous row of sternal spines or lamellae (Fig. 58f).



Fig. 57. *Leiopus conspicuus* n.sp., ♀; a, labium, caudal view ($\times 75$), detail ($\times 320$); b, maxillula, rostral view ($\times 75$); c-d, distal part of outer and inner endites of same, rostral view ($\times 205$); e, maxilla, rostral view ($\times 118$), seta ($\times 300$); f, distal part of fixed endite, rostral view ($\times 320$); g, maxilliped, caudal view ($\times 75$), spine ($\times 220$); h, epignath ($\times 75$), terminal spine ($\times 160$).

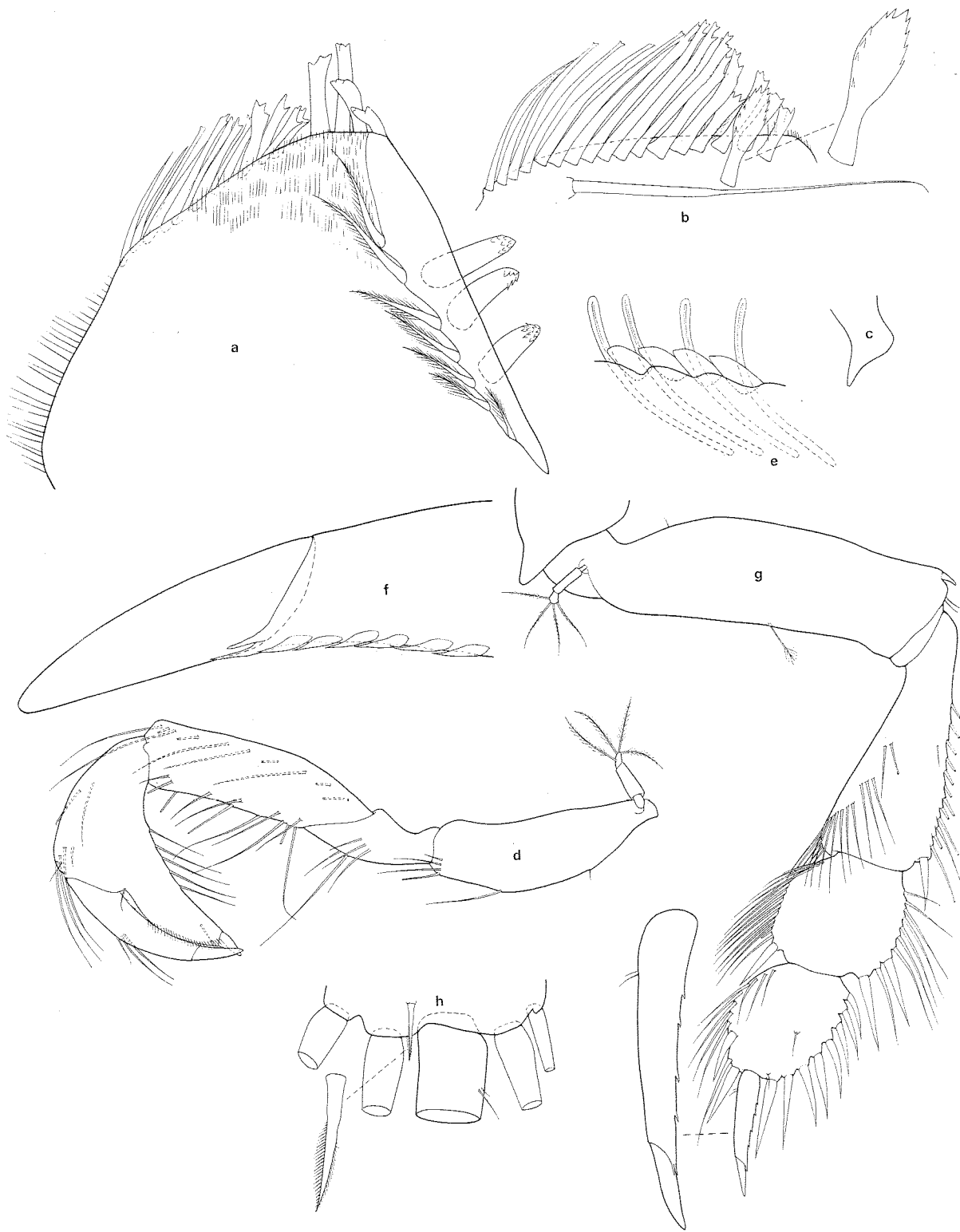


Fig. 58. *Leiopus conspicuus* n.sp., ♀; a, endite of maxilliped, rostral view ($\times 205$); b, distal end of same, caudal view ($\times 205$); c, hyposphenie of pereopod I ($\times 21$); d, cheliped, caudal view ($\times 25$); e, detail of tergal part of finger of same, rostral view ($\times 320$); f, distal part of dactylus of same, rostral view ($\times 145$); g, pereopod II, caudal view ($\times 25$), dactylus ($\times 64$); h, distal end of propus of same, rostral view ($\times 80$).



Fig. 59. *Leiorius conspicuus* n.sp., a-g, ♀; a-b, peraeopods III-IV, caudal view ($\times 25$); c-e, peraeopods V-VII, rostral view ($\times 25$); f-g, claw of right and left peraeopod V, caudal and rostral views ($\times 255$); h, ♂, cheliped, caudal view ($\times 58$).

Peraeopod II (Fig. 58g-h). Basis as long as the three succeeding joints together, with a short, blunt spine near the distal sternal end. Exopodite with four plumose setae. Ischium very short. Merus about 1.9 times as long as carpus, with one spine near the distal sternal end. Carpus and propus equally long, the former furnished with one tergal and two sternal spines, the latter with one tergal, two distal, and seven sternal spines. Propus with one two-sidedly ciliate rostral spine near the distal end. Dactylus as long as propus, with four sternal dentiform processes and with two juxtaposed small tergal setae near the base; claw about 0.4 times as long as dactylus.

Peraeopods III-IV (Fig. 59a-b) very alike, but merus, propus and dactylus of peraeopod III are longer than the corresponding joints of peraeopod IV. Basis with at least one particular seta. Propus with four sternal and two distal spines, with one two-sidedly ciliate rostral spine near the distal end, and with one tergal particular seta which on peraeopod III is situated below the middle, on peraeopod IV above the middle. Dactylus with claw longer than propus; dactylus with three juxtaposed tiny tergal setae near the middle, with two tiny sternal setae at the tip, and with two tiny sternal spinules; claw of peraeopod III about as long as dactylus, the one of peraeopod IV about 0.6 times as long as dactylus.

Peraeopod V (Fig. 59c and f-g). Basis about as long as merus, carpus and propus together, with at least one particular seta. Carpus about 2.3 times longer than merus and about 1.3 times longer than propus which has one tergal particular seta somewhat above the middle and numerous distal setae, but no sternal spines. Dactylus with claw shorter than propus; dactylus with three juxtaposed tiny tergal setae near the middle, with one tiny sternal seta at some distance from the end, and with two longer setae at the distal sternal end; claw about 0.6 times as long as dactylus, with five or six sternal processes (Fig. 59f-g).

Peraeopods VI-VII (Fig. 59d-e) very alike. Basis as long as that of peraeopod V. Carpus much less setiferous than the one of peraeopod V. Propus with one tergal particular seta above the middle and with a caudal oblique row of spinules; propus of peraeopod VI with two distal and five sternal spines, propus of peraeopod VII with one distal and four sternal spines. Dactylus with claw much longer than propus; dactylus as in peraeopods III and IV, but with a single sternal spinule; claw about as long as dactylus.

Pleopods are lacking.

Uropods lost, but in another female the exopodite is eight-jointed, the endopodite twenty-five-jointed.

Description of subadult male:

Body 9 times longer than broad. Length about 14 mm.

Carapace (Pl. IIIh) and peraeon as in the female, except for the last peraeonite which has a moderately strong genital cone.

Pleon about as long as the last three peraeonites together. Pleonites as in the female. Pleotelson about half as long as the pleonites together, differing from that of the female inasmuch as the ventral bulges are much stronger (Fig. 60a-c).

Antennula (Fig. 60d-d.1). First two peduncular joints with particular setae. Inner flagellum six-jointed, fourth joint with two particular setae, last two joints with one such seta. Outer flagellum twenty-five-jointed, the joints 2-11 being broader than long; most of the joints are bare; antepenultimate joint with short aesthetasc, last joint with particular seta.

Antenna (Fig. 60e). Second peduncular joint not fully 1.3 times longer than the first joint. Flagellum eight-jointed; third joint with particular setae.

Oral parts exactly as in the female.

Cheliped (Fig. 59h) as in the female but more slender.

Peraeopods II-V as in the female, but claw of peraeopod V with only four sternal processes (Fig. 60f).

Peraeopod VI or VII. In the sample one peraeopod was found which must be one of the last two peraeopods. Carpus of this peraeopod is longer and more curved than in the female (Fig. 60g).

Pleopods (Fig. 60h). Coxa short, bare. Basis about 5.7 times longer than the coxa, bare. Exopodite two-jointed, with one bare seta at the outer distal corner; second joint fully twice as long as the first with the distal part margined with short bare setae. Endopodite somewhat longer than the exopodite, with one outer and one inner seta near the proximal third, the inner one being plumose near the tip; the distal part is margined with short bare setae.

Remarks:

In the absence of pleopods, the female of *L. conspicuus* agrees with *L. galathea* and *L. zenkevitchi*; and in the presence of sternal processes on the claw of peraeopod V, the male agrees with *L. wolffi*.

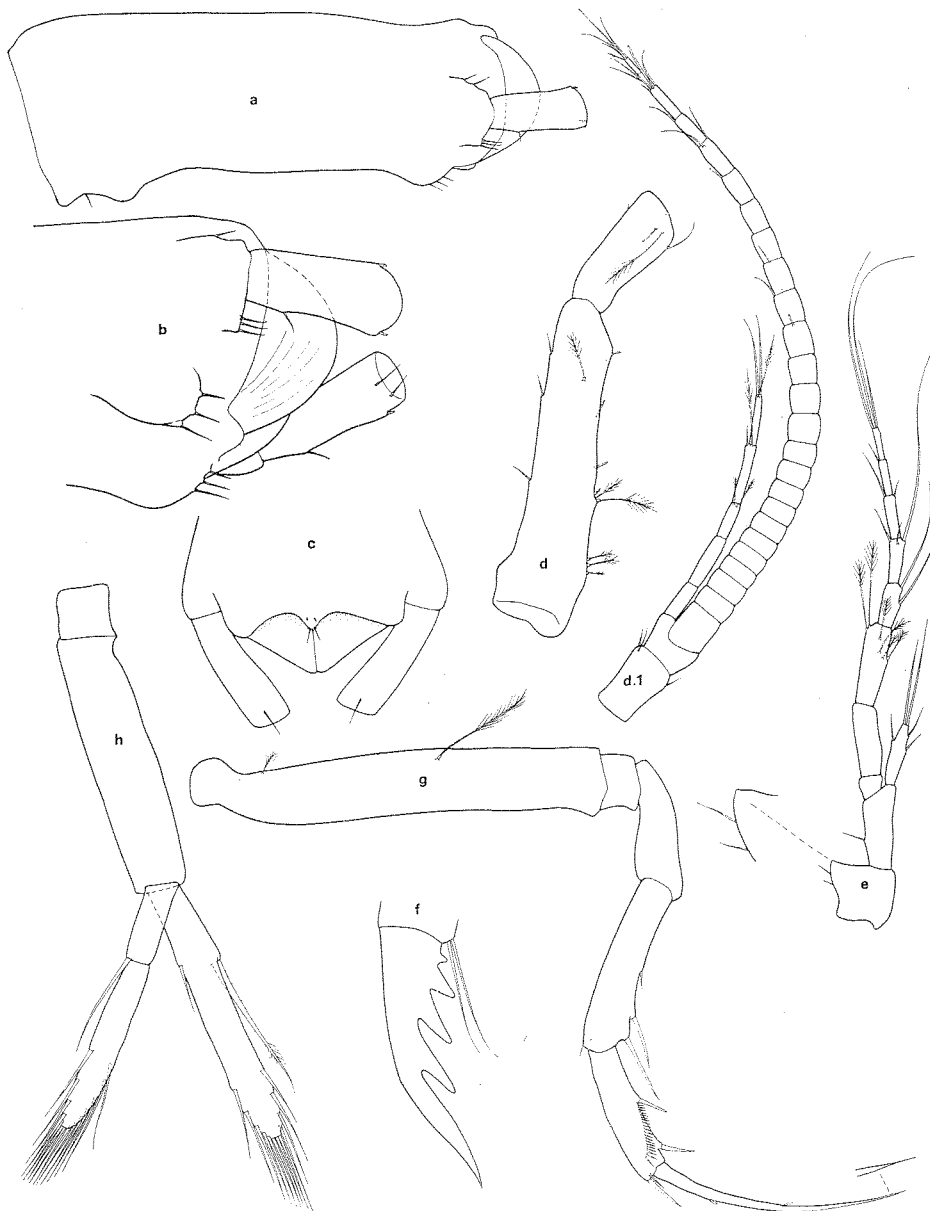


Fig. 60. *Leiopus conspicuus* n.sp., subad. ♂; a, pleotelson, lateral view ($\times 42$); b, posterior part of same, obliquely ventral view ($\times 64$); c, posterior part of same, dorsal view ($\times 46$); d-d.1, antennula, ventral view ($\times 42$); e, antenna, ventral view ($\times 42$); f, claw of peraeopod V ($\times 256$); g, peraeopod VI or VII, caudal view ($\times 37$); h, pleopod I, caudal view ($\times 60$).

From these species *L. conspicuus* differs materially in the shape of the rostrum, from *L. zenkevitchi* and *L. wolffi* moreover in the claw of peraeopod V, and from *L. galathea* in the cheliped.

Leiopus wolffi n.sp.

Material:

St. 723, Gulf of Panama ($5^{\circ}38'N$, $79^{\circ}30'W$), 3230 m, 12 May 1952. Gear: Petersen-Grab 0.2 sq. m. Bottom: dark clay. Bottom temp.: $c. 2.0^{\circ}C$. – 8 adult females (3 with rudimentary oostegites), 5 adult and 3 subadult males, 4 youth stages, 7 manca.

St. 726, Gulf of Panama ($5^{\circ}49'N$, $78^{\circ}52'W$),

3670-3270 m, 13 May 1952. Gear: herring otter trawl. Bottom: clay. Bottom temp.: $c. 2.0^{\circ}C$. – 1 incomplete adult female with emptied marsupium.

Description of female type (from St. 723) (with rudimentary oostegites):

Body (Pl. IVa) extremely elongated, being about 9.3 times longer than broad. Length about 9 mm.

Carapace (Pl. IVb) somewhat broader than long, a little contracted ahead of the respiratory chambers, in front of which there is a process similar to the ocular lobes but smaller. Dorsal surface somewhat vaulted with a slight backwards-curved transverse furrow just in front of the respiratory cham-

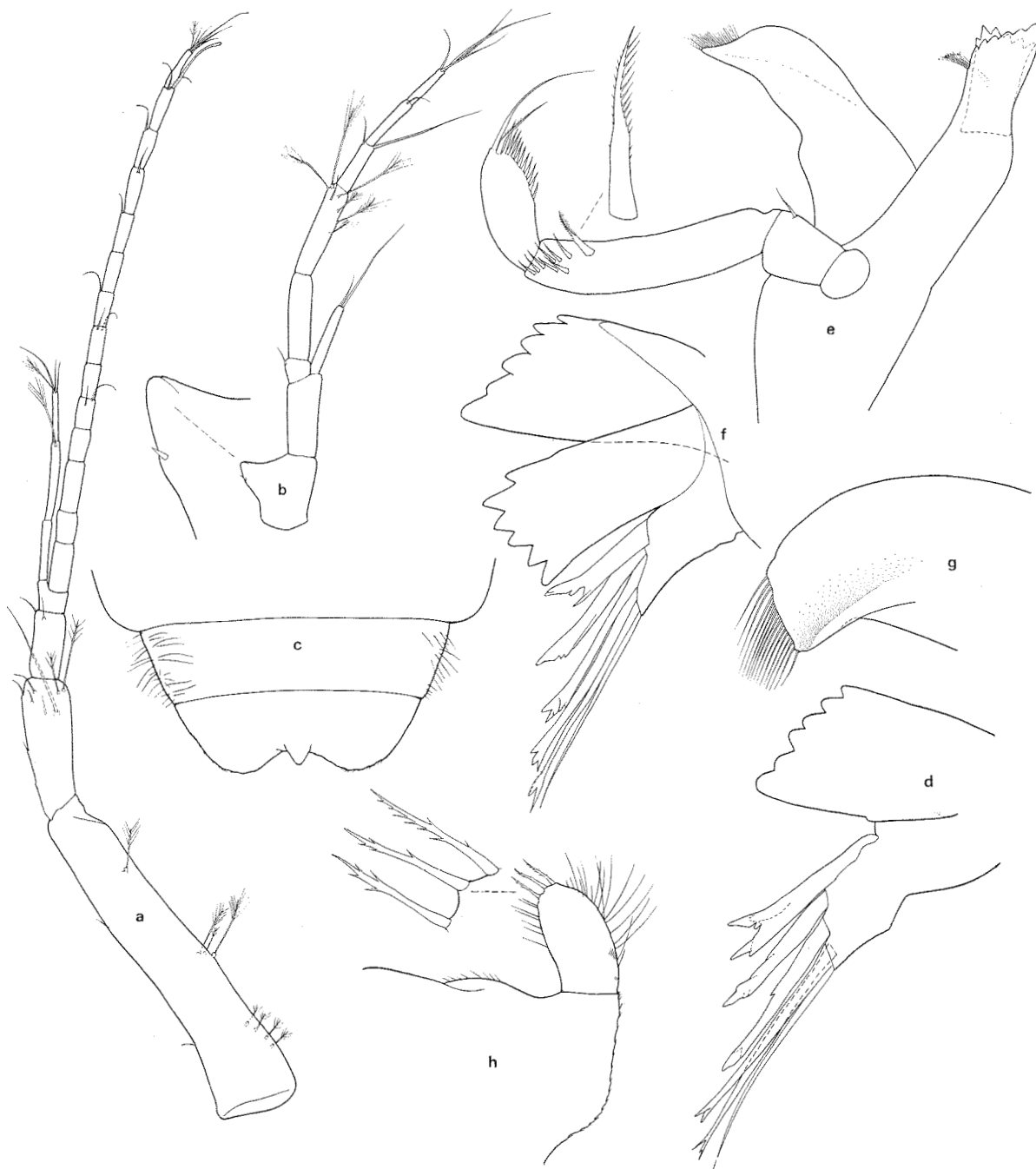


Fig. 61. *Leiopus wolffi* n.sp., ♀; a, antennula, ventral view ($\times 80$); b, antenna, ventral view ($\times 80$), detail ($\times 320$); c, labrum, rostral view ($\times 205$); d, distal part of right mandible ($\times 450$); e, left mandible, obliquely rostral view ($\times 205$); f, distal part of same ($\times 450$); g, distal part of processus molaris of same ($\times 450$); h, left side of labium, caudal view ($\times 205$), spines ($\times 750$).

bers. Ocular lobes extended obliquely forwards and outwards and excavated in front. Rostrum somewhat expanded at the base and completely without lateral processes. Epistome with a long acute and almost straight downwards directed spiniform process. A hyposphenie is present between the chelipeds.

Peraeonites dorsally patterned in the same way as those of *L. conspicuus*. They decrease in width from

2 up to and including 7, and they increase in length from 2 to 5 and 6 which are equally long while 7 is as long as 4. Peraeonites 2 and 3 broader than long, the other peraeonites longer than broad. Coxa of peraeopod II (Fig. 63e) extended as a moderately long spiniform process, directed obliquely forwards and downwards. Coxa of succeeding peraeopods small and rounded. Peraeonite 2 with a very small spiniform process at the anterior corners, the suc-

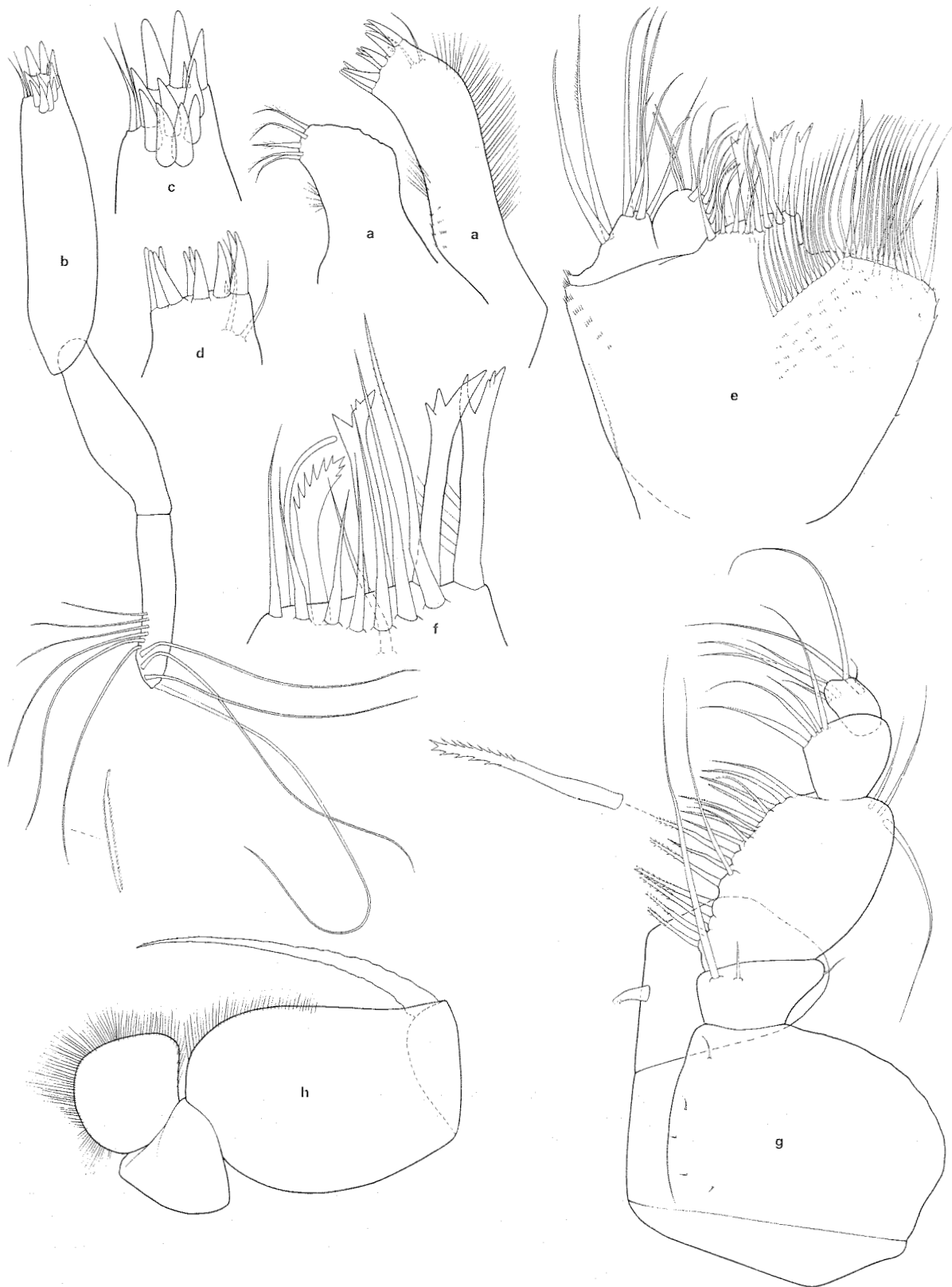


Fig. 62. *Leiopus wolffi* n.sp., ♀; a, endites of maxillula, rostral view ($\times 205$); b, outer endite of same from inner side ($\times 205$); c-d, distal end of same from inner and rostral sides ($\times 450$ and $\times 320$); e, maxilla, rostral view ($\times 320$); f, distal end of fixed endite of same, rostral view ($\times 750$); g, maxilliped – except for the coupler, the armament of the endite has been omitted –, caudal view ($\times 205$), seta ($\times 450$); h, epignath ($\times 205$).

ceeding peraeonites with a longer spiniform process at some distance from these corners. Hyposphenians present on peraeonites 6 and 7, situated on a level with the peraeopods.

Pleon very slender, somewhat shorter than the last three peraeonites together. Pleonites almost parallel trapezoidal with each of the posterior corners extended as a small spiniform process, evenly rounded ventrally. Pleotelson scarcely as long as the last three pleonites together, subcylindrical and somewhat widened near the end.

Antennula (Fig. 61a) much longer than carapace. First peduncular joint almost twice as long as the two succeeding joints together. Second joint twice as long as third. First two joints with particular setae. Inner flagellum four-jointed; last three joints very long; third and fourth joints with particular seta at the tip. Outer flagellum fourteen-jointed; penultimate joint with aesthetasc, and last joint with particular seta; otherwise the joints are bare or set with one or two short bare setae.

Antenna (Fig. 61b) very short, scarcely reaching to the third peduncular joint of the antennula. The first joint extends inward as a triangular process, furnished with a small spine. The slender squama reaches to about the third fifth of the second flagellar joint. Flagellum six-jointed. First joint very short. Second joint 4 times longer than the first. Third joint somewhat longer than the second, furnished with particular setae. Last three joints more slender than the preceding ones.

Labrum (Fig. 61c) with a broad parallel trapezoidal basal part which laterally is set with fine long hairs. The terminal part has a conspicuous triangular median projection in front, and its anterior margin is strongly excavated, very finely crenated and laterally set with some very tiny hairs.

Mandibles (Fig. 61d-g) strongly calcified. Processus molaris straight inwards directed, subcylindrical, with the distal end set with long hairs. Pars incisiva of either mandible and lacinia mobilis six-dentate. Spiniferous lobe of either mandible with one spiniform seta and five forked spines. First joint of the palp not fully 0.3 times as long as the second joint, furnished with a single seta. Second joint with a few distal setae, the proximal of which is longest, abruptly compressed in the distal half along which it is serrated along the concave margin and finely ciliated along the opposite margin; the other setae are one-sidedly finely ciliate along the distal part. Last joint about half as long as the second, with the distal half of the inner margin set

with setae, shaped as the short setae of the second joint; it has moreover a long bare terminal seta.

Labium (Fig. 61h) with the lateral margins of the basal part irregularly fine-serrated and set with extremely tiny hairs. Anterior margin with a short row of tiny hairs at some distance from the lobes. The latter are for the greater part margined with long hairs and at the end furnished with three forked spines.

Maxillula (Fig. 62a-d). The endites are set with hairs as shown in Fig. 62a. Outer endite with the end surmounted by one dwarfed and ten strong blunt spines. The palp is distally furnished with ten setae, the distal parts of which are finely serrated. Inner endite with five more or less ciliated terminal setae.

Maxilla (Fig. 62e-f). Caudal and rostral surfaces partly adorned with fine spinules. Setae of inner row bare, those of the outer row four in number and very finely plumose along the distal part. The fixed endite has one long spiniform caudal seta, and one broad caudal spine which is curved and strongly serrated in the distal part; the rostral surface bears a subterminal row of seven spines or spiniform setae; the distal end is set with one curved cylindrical seta and three strong forked spines, two of which are provided with some hairs in the proximal part of the outer side. Outer lobe of movable endite with eight setae, five outer of which are longest and one or two-sidedly ciliate; inner lobe with nine setae.

Maxilliped (Figs. 62g-h, and 63a). Coxa bare. Basis with a row of widely separated spinules on the innermost part of the caudal surface. The first joint of the palp bears one small outer seta and two caudal setae, one of which is very long, one very short and spiniform; second joint with three long setae near the outer distal end and with numerous inner setae, the seven proximal of which are spiniform and serrated along the distal half; third joint with four inner setae, and last joint with seven setae, the outermost of which is dwarfed. Each endite with a single coupler; inner caudal seta transformed into a somewhat leaf-like spine; free margin of median vertical surface with five plumose setae; distal margin with twelve chitinous formations, shaped as in Fig. 63a. Epignath (Fig. 62h) with a row of hairs along the proximal part of the distal margin and with two frontal lobes, one of which is for the greater part margined with long hairs; terminal spine sparsely set with tiny hairs in the distal part.

Cheliped (Fig. 63b-d) very slender. Basis somewhat shorter than carpus, about 3 times longer than



Fig. 63. *Leiopus wolffi* n.sp., ♀; a, endite of maxilliped, caudal view ($\times 385$); b, cheliped, caudal view ($\times 58$); c, exopodite of same ($\times 145$); d, distal end of propus, and dactylus of same, rostral view ($\times 205$); e, peraeopod II, caudal view ($\times 58$); f, exopodite of same ($\times 145$); g, dactylus of same ($\times 205$); h, peraeopod III, caudal view ($\times 58$); i, distal part of same, caudal view ($\times 103$).

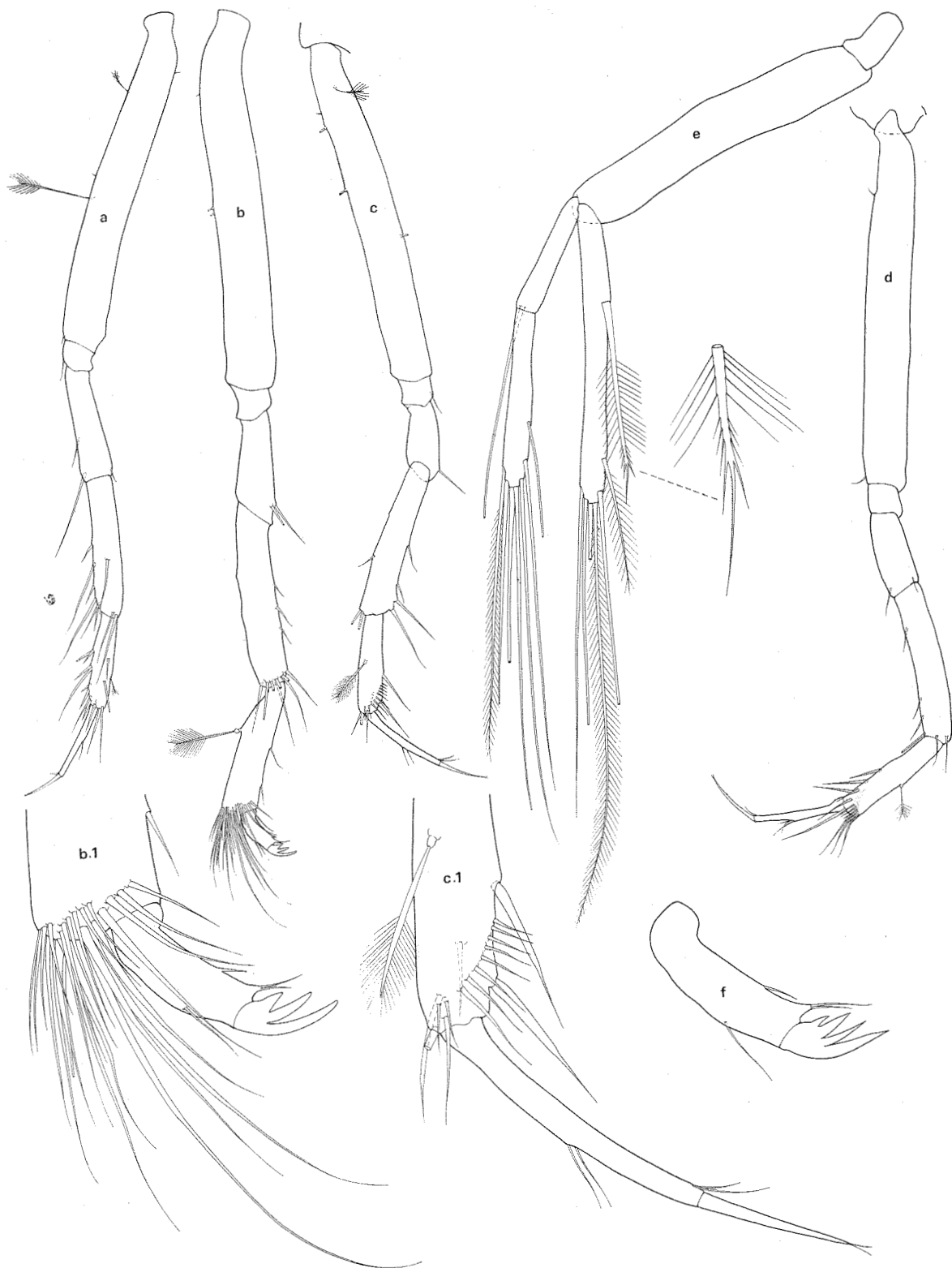


Fig. 64. *Leiopus wolffi* n. sp., ♀; a, peraeopod IV, caudal view ($\times 58$); b-d, peraeopods V-VII, rostral view ($\times 58$); b.1, distal end of propus, and dactylus of peraeopod V, rostral view ($\times 205$); c.1, distal end of propus, and dactylus of peraeopod VI, rostral view ($\times 205$); e, pleopod I, caudal view (all setae are plumose) ($\times 118$); f, dactylus with claw of right peraeopod V of the ♀ from St. 726 ($\times 205$).

the greatest width, narrowed at the base with a dentiform process near the distal sternal end and with two small setae in front of the process. Exopodite with three plumose setae. Merus with three juxtaposed sternal setae, the one of which is very short. Carpus much longer than propus, with four rostral setae, five sternal setae, and with one seta at the distal tergal end. Propus with three tergal and two sternal setae, and with one caudal seta just inside the gap between the finger and the dactylus; finger longer than the rest of the joint, armed as in Fig. 63d. Dactylus longer than the finger owing to the very long terminal claw; it bears three juxtaposed long rostral setae and four small sternal setae or spines.

Peraeopod II (Fig. 63e-g). Basis somewhat shorter than merus and carpus together, with a spiniform process at the distal sternal end. Exopodite with four plumose setae. Ischium short. Merus very long being somewhat longer than the two succeeding joints together, with one spine near the distal sternal corner. Carpus a little longer than propus, with two sternal spines. Propus with one tergal, one distal, and six sternal spines; caudal surface with three widely separated setulae near the sternal surface. Dactylus with claw about as long as propus; dactylus with two short tergal setae, with three sternal processes and with the distal sternal corner setiformly extended; claw almost half as long as dactylus, with three sternal processes.

Peraeopods III-IV (Figs. 63h-i, and 64a) very alike but with the following differences. Merus, carpus, and propus of peraeopod III are longer than the corresponding joints of peraeopod IV. Basis of peraeopod IV has at least two particular setae, and propus one tergal particular seta while peraeopod III is devoid of such setae. Propus of peraeopod III is as long as dactylus with claw, propus of peraeopod IV shorter than dactylus with claw. Propus of either peraeopod with one short, bare subterminal rostral spine. Claw about half as long as dactylus, bifid at the tip.

Peraeopod V (Fig. 64b-b.1). Basis and carpus are longer, merus shorter than in the two preceding peraeopods. Propus with a long tergal particular seta near the proximal third, and with numerous distal setae of different lengths. Dactylus much shorter and thicker than the one of the other peraeopods, with a sternal spiniform process near the distal third, with two setiform sternal prolongations at the tip, and with one tergal seta; claw broad with two sternal processes.

Peraeopods VI-VII (Fig. 64c-c.1, and d) very alike, but basis of peraeopod VI is somewhat longer, the one of peraeopod VII somewhat shorter than the four succeeding joints together. Propus shorter than dactylus with claw, furnished with a tergal particular seta near the middle. Dactylus with claw longer than propus; claw 0.6-0.7 times as long as dactylus, bifid at the tip.

Pleopods (Fig. 64e). Coxa short, bare. Basis about 5 times longer than coxa, bare. Exo- and endopodite slender with few plumose setae. Exopodite two-jointed; first joint remarkably long, being about 0.7 times as long as the second, and set with a long seta at the outer distal corner. Endopodite a little longer than exopodite; inner proximal seta trifid at the tip. All setae are plumose.

Uropod (Fig. 65) with slender peduncle, set with a few small setae. Exopodite five-jointed. Endopodite sixteen-jointed; joints 4, 7, 10, 13, and 16 with one or two particular setae.

Description of adult male:

Body (Pl. IVc) much more slender than in the female.

Carapace as in the female.

Peraeonites 1-6 with hyposphenians, the one of peraeonite 6 much shorter than the others. Peraeonite 7 with a strong, blunt genital cone (Fig. 66a).

Pleon (Fig. 66a-e). Pleonites with a small median ventral process (Fig. 66a). Pleotelson much more widened towards the end than in the female and very differently shaped (Fig. 66b-e).

Antennula (Fig. 67a-a.2) with the outer flagellum nineteen-jointed; all joints, except for the first one, provided with long, slender aesthetascs.

Mandibles (Fig. 67b-c) differing from those of the female in the following respects. Pars incisiva of right mandible five-dentate, that of left mandible four-dentate. Lacinia mobilis three-dentate. Spiniferous lobe of right mandible with six stiletto-shaped spines, that of left mandible with two.

Cheliped (Fig. 67d) somewhat more slender than that of the female.

Peraeopod V as in the female, but claw with two sternal processes (Fig. 67e).

Peraeopod VII (Fig. 67f) as in the female, but carpus furnished with some tergal setae.

Pleopods set with some more setae than in the female.

Uropods. Endopodite of right uropod thirteen-jointed, the one of left uropod seventeen-jointed, each of them with one particular seta on joints 4, 7,

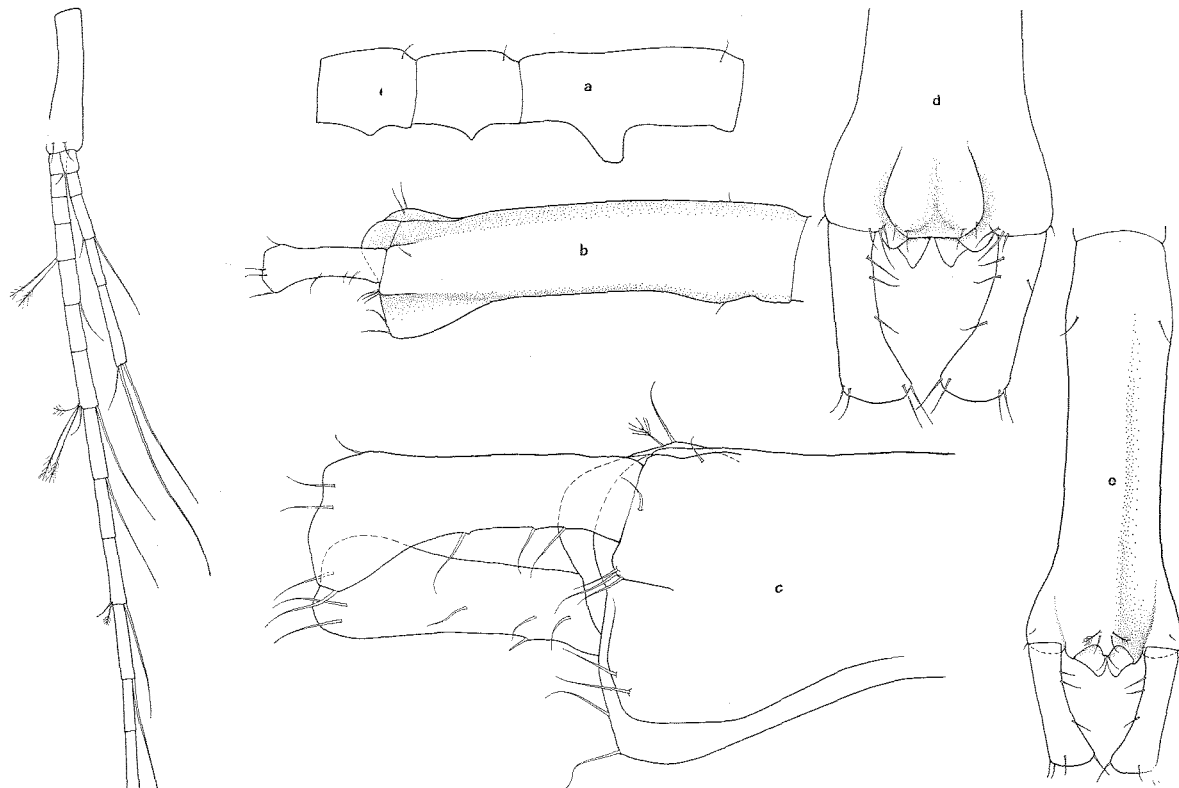


Fig. 66. *Leiopis wolffi* n.sp., adult ♂; a, last peraeonite and first two pleonites, lateral view ($\times 37$); b, pleotelson, lateral view ($\times 64$); c, posterior part of pleotelson, obliquely ventral view ($\times 164$); d, posterior part of same, ventral view ($\times 94$); e, pleotelson, dorsal view ($\times 64$).

Fig. 65. *Leiopis wolffi* n.sp.; uropod, ♀ ($\times 74$).

and 11, left endopodite moreover with one such seta on joint 14.

In other respects the male agrees with the female.

Description of subadult male:

This differs from the female only in the following respects.

Peraeonites 1-6 with long hyposphenians. Last peraeonite (Fig. 68a) with an acute genital cone which is less stout than in the adult male.

Pleon (Fig. 68a-b). Pleonites as in the adult male, pleotelson as in the female.

Antennula (Fig. 68c-c.1). Last peduncular joint very short. Outer flagellum with one more joint and with the aesthetasc attached to the antepenultimate joint owing to the fact that the joint corresponding to the last female joint has been divided. The proximal joints are broader.

Pleopods. Each ramus with only two terminal setae and one subterminal seta on either side.

Manca stage:

Seven specimens of one and the same manca stage have been found. All of them are as slender as the adult males, and they have hyposphenians on peraeonites 1-7. The sternal processes on the claw of peraeopod V (Fig. 68d) are more acute than in the female type and more like those of the female from St. 726 (cp. Figs. 68d and 64f). Peraeopod VII is six-jointed and it is devoid of setae (Fig. 68e). The pleopods are rudimentary and they have no setae (Fig. 68f).

Youth stage and two succeeding stages:

The youth stage differs from the manca stage mentioned inasmuch as the last pair of peraeopods

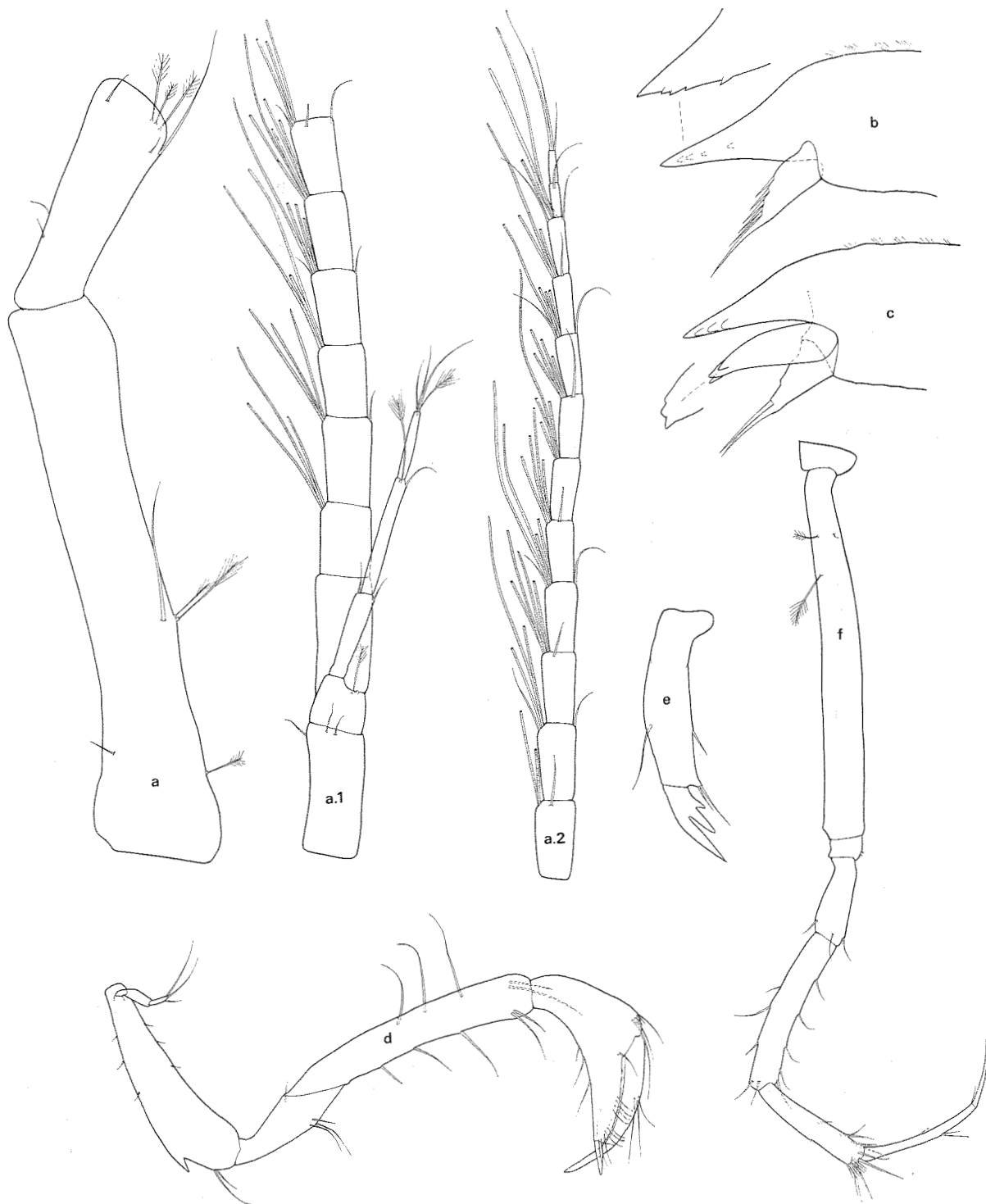
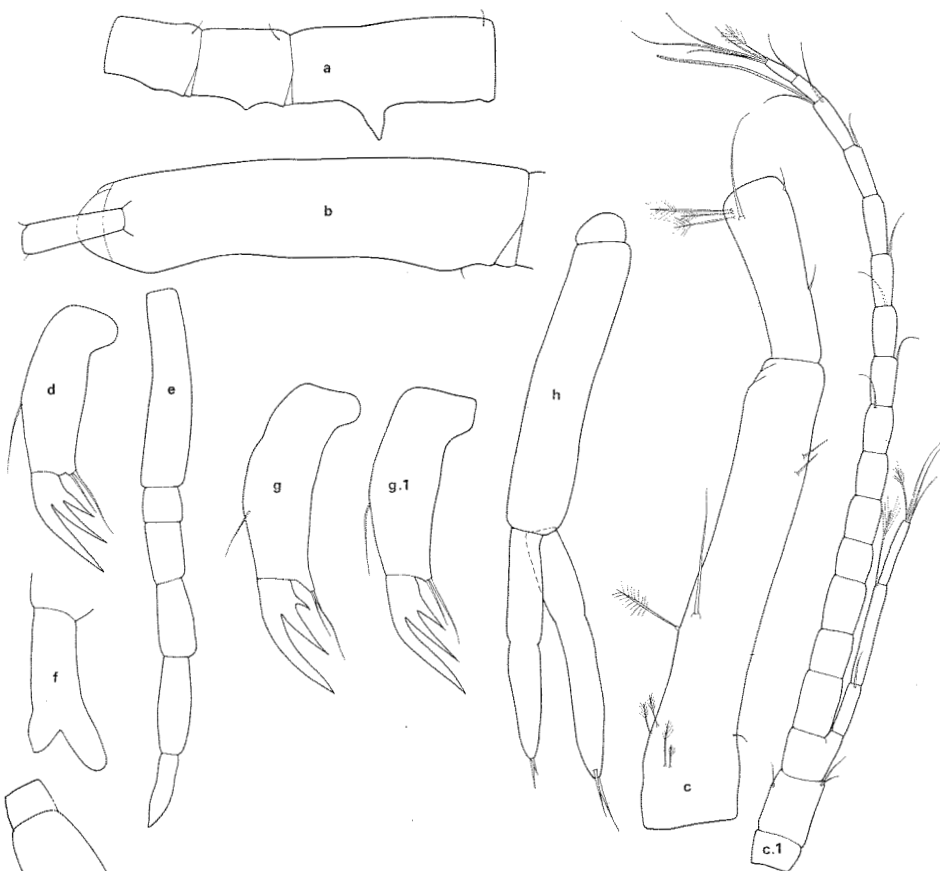


Fig. 67. *Leiopus wolffi* n. sp., adult ♂; a-a.2, antennula, ventral view ($\times 118$); b-c, distal part of right and left mandibles ($\times 320$); d, cheliped, caudal view ($\times 58$); e, dactylus with claw of peraeopod V ($\times 205$); f, peraeopod VII, rostral view ($\times 58$).

Fig. 68. *Leiopus wolffi* n.sp.; a-c, subadult ♂; a, last peraeonite and first two pleonites, lateral view ($\times 37$); b, pleotelson, lateral view ($\times 64$); c-c.1, antennula, ventral view ($\times 94$); d-f, manca; d, dactylus with claw of peraeopod V ($\times 256$); e, peraeopod VII ($\times 104$); f, pleopod I, caudal view ($\times 164$); g-h, youth stage; g-g.1, dactylus with claw of peraeopod V ($\times 256$); h, pleopod I, caudal view ($\times 164$).



is fully developed and the rami of the pleopods more developed and provided with two short terminal setae (Fig. 68h).

As has already been pointed out (p. 25), the youth stage is followed by at least two stages without any trace of oostegites. Except for the length (about 7.8 and 8.3 mm, respectively) these stages differ from one another mainly in the pleopods (Fig. 69a-b).

Variation:

In two of the females with rudimentary oostegites hyposphenians are present on all peraeonites, the first one included. These females are of the same length as the type specimen.

Besides the specimens described, three more females and two males have been dissected. Except for some differences in the number of setae on the antennulae, antennae, the palp of the maxillipeds, and on the various joints of the legs and the number of joints in the endopodite of the uropods, no other noticeable difference has been found than that in two of the females the outer antennular flagellum is fifteen-jointed with the aesthetasc issuing from the antepenultimate joint.

In the female from St. 726 the claw on peraeopod V has three sternal processes (Fig. 64f).

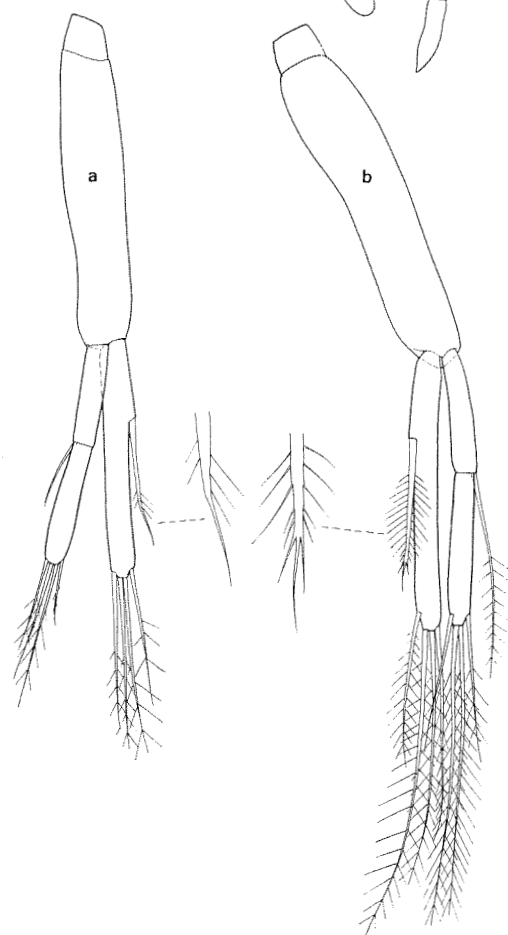


Fig. 69. *Leiopus wolffi* n.sp.; a-b, pleopods I, caudal view of two early post-youth stages with a length of about 7.8 and 8.3 mm, respectively ($\times 000$).

Remarks:

From the other females having pleopods and sternal processes on the claw of peraeopod V, *L. wolffi* differs materially in the shape of the rostrum and in the claw on peraeopod II. Except for *L. conspicuus*, the male differs from the other species in the claw on peraeopod V. From the male named, *L. wolffi* differs in the same characters as the females, and also in the basis of the chelipeds.

The species seems to be most closely related to *L. weberi*. It is named in honour of the distinguished carcinologist Dr. TORBEN WOLFF, Zoological Museum of the University, Copenhagen.

Apseudella n. gen.

Diagnosis:

Pleon with five pleonites. Ocular lobes well defined, without visual elements. Antennae with squama. Maxillulae without palp. Epignath of maxilliped falciform. Chelipeds and peraeopods II with exopodite. Peraeopod II fossorial; coxa extended as a spiniform process, directed obliquely forwards and downwards; carpus shorter than merus. Mandibles and pleotelson without such sexual dimorphism as in *Leiopus*. Uropods attached to a strong obliquely outwards- and backwards-directed lateral process in about the middle of pleotelson.

Remarks:

The genus, of which only the male of a single species is known, differs from all other genera of the family in the lack of maxillular palp and in the falciform epignath of the maxillipeds. In the maxillulae it agrees with the Neotanaidae, but it is no doubt most closely related to *Apseudes*.

Apseudella typica n. sp.

Material:

St. 243, off Kenya (4°09'S, 40°19'E), 665 m, 16 March 1951. Gear: Petersen-Grab 0.2 sq. m. Bottom: clay with a little sand. Bottom temp.: c. 8.8°C. – 2 adult males.

Description of male type:

Body (Pl. Va) about 6.5 times longer than broad. Length about 9 mm. Integument strongly calcified and somewhat fragile.

Carapace (Pl. Vb) a little shorter than its greatest width, somewhat narrower than peraeonite 2, in

front of the respiratory chambers almost straight; no lateral spiniform processes. Dorsal surface somewhat vaulted with a distinct transverse furrow near the front of the swollen respiratory chambers which are marked off by a distinct furrow. Ocular lobes not extended forwards, with a deep incision in the outer part. Rostrum strongly prominent, in dorsal view similar to the knob of a flagstaff. Epistome without spiniform projection.

Peraeonites (Fig. 70a; Pl. Va) decrease in width from 2 to 6, and they increase in length from 2 to 4 and 5 which are equally long while 6 is a little shorter than 5, and 7 a little shorter than 2. Coxae well defined. Peraeonites 3-7 with an outwards-directed spiniform projection at the anterior corners. Sternites of peraeonites 2-6 with a triangular process near the posterior end, directed straight backwards and set with a tiny seta on the tip. Genital cone short, at the tip obliquely truncated and set with a tiny seta.

Pleon (Fig. 70a-b; Pl. Va) about as long as the last three peraeonites together. Pleonites broader than long, with the epimera spiniformly extended and set with three plumose setae (pleonites 1-3) or with two plumose setae and one tiny bare seta (pleonites 4-5). Dorsally the pleonites are adorned with four very tiny hairs and two tiny setae (Fig. 70b) and ventrally they have a strong process directed somewhat backwards and set with a tiny seta or hair in the middle of the posterior surface. Pleotelson in dorsal view about as long as the last three pleonites together, terminating in a small rounded projection furnished with two tiny setae; laterally it bears one tiny seta near the anterior margin.

Antennula (Fig. 70c) longer than carapace. First peduncular joint about 2.3 times longer than the two succeeding joints together. Second joint about 3 times longer than the third. First two joints with particular setae. Inner flagellum five-jointed. Outer flagellum of right antennula ten-jointed, the one of left antennula eleven-jointed. Except for the last two joints, the joints are furnished with aesthetascs arranged as shown in the figure; last joint with particular seta.

Antenna (Fig. 70d) reaching to about the end of the first joint of the inner flagellum of the antennula. The first joint extends inward as a strong bulge which is tuberculated on the anterior surface and set with one tiny seta near the middle of the inner surface. The second joint is about 0.7 times as long as the first. The slender squama reaches to about