

## Deep-water Pycnogonida from the surroundings of New Caledonia

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### ABSTRACT

Forty-nine species of Pycnogonida (and six unidentifiable forms) are recorded from the continental slope (200-3740 m) in the Western Pacific off New Caledonia, the Loyalty and Chesterfield Islands, and in the Lau Basin; only six samples originate from the continental shelf (40-73 m). Of these 49 species, not less than 33 (67 %) are new to Science.

The new species belong to the genera *Ascorhynchus* (3 spp.), *Ammothella* (1 sp.), *Heterofragilia* (1 sp.), *Cilunculus* (4 spp.), *Proboehmia* gen. nov. (1 sp.), *Sericosura* (1 sp.),

*Rhopalorhynchus* (1 sp.), *Colossendeis* (1 sp.), *Hedgpethia* (1 sp.), *Austrodecus* (5 spp., of which 4 attributed to a new subgenus, *Tubidecus*), *Nymphon* (4 spp.), *Seguapallene* (1 sp.), *Parapallene* (1 sp.), *Pallenopsis* s. str. (1 sp.), *Pallenopsis* (*Bathypallenopsis*) (1 sp.), *Phoxichilidium* (2 spp.), *Anoplodactylus* (1 sp.), and *Pycnogonum* (3 spp.).

The richness in new species is explained by the fact that the bathyal zone around New Caledonia was unexplored so far for Pycnogonida.

### RÉSUMÉ

**Pycnogonida : Pycnogonides profonds des environs de la Nouvelle-Calédonie.**

Quarante-neuf espèces de Pycnogonides (et six formes non déterminables) sont signalées de la pente continentale (200-3740 m) au large de la Nouvelle-Calédonie et des îles Loyauté et Chesterfield, et dans le Bassin de Lau, tous dans le Pacifique occidental; six échantillons seulement sont originaires du plateau continental (40-73 m). Parmi ces espèces, pas moins de 33 (soit 67 %) sont nouvelles pour la Science.

Les espèces nouvelles appartiennent aux genres *Ascorhyn-*

*chus* (3 spp.), *Ammothella* (1 sp.), *Heterofragilia* (1 sp.), *Cilunculus* (4 spp.), *Proboehmia* gen. nov. (1 sp.), *Sericosura* (1 sp.), *Rhopalorhynchus* (1 sp.), *Colossendeis* (1 sp.), *Hedgpethia* (1 sp.), *Austrodecus* (5 spp., dont 4 attribuées à un sous-genre nouveau, *Tubidecus*), *Nymphon* (4 spp.), *Seguapallene* (1 sp.), *Parapallene* (1 sp.), *Pallenopsis* s. str. (1 sp.), *Pallenopsis* (*Bathypallenopsis*) (1 sp.), *Phoxichilidium* (2 spp.), *Anoplodactylus* (1 sp.), et *Pycnogonum* (3 spp.).

La richesse en espèces nouvelles s'explique par le fait que les Pycnogonides de la zone bathyale, autour de la Nouvelle-Calédonie, n'avaient jamais encore été étudiés.

## INTRODUCTION

Through the courtesy of Dr Alain CROSNIER (ORSTOM and Muséum national d'Histoire naturelle, Paris), Mr Michel SEGONZAC (Centre national de Tri d'Océanographie biologique, Plouzané), and Dr Françoise ARNAUD (Station marine d'Endoume, Marseille), we have received a large collection of Pycnogonida, brought together during various French campaigns around New Caledonia and some satellite islands, the Loyalty and Chesterfield groups :

- Dredgings (R.V. "Vauban", 1978).
- Campaign LAGON (R.V. "Vauban", 1985-1986).
- Campaign BIOCAL (R.V. "Jean Charcot", 1985).
- Campaign MUSORSTOM 4 (R.V. "Vauban", 1985).
- Campaign MUSORSTOM 5 (R.V. "Coriolis", 1986).
- Campaign CHALCAL 2 (R.V. "Coriolis", 1986).
- Campaign SMIB 2 (R.V. "Vauban", 1986).
- Campaign BIOGEOCAL (R.V. "Coriolis", 1987).
- Campaign BIOLAU (R.V. "Nadir", 1987).
- Campaign CORAIL 2 (R.V. "Coriolis" and R.V. "Alis", 1988).
- Campaign SMIB 4 (R.V. "Alis", 1989).
- Campaign AZTEQUE (R.V. "Alis", 1990).
- Campaign SMIB 6 (R.V. "Alis", 1990).

The station number of each campaign is preceded by two letters, indicating the gear used : CP = beam trawl ; DC = Charcot dredge ; DE = epibenthic sledge ; DS = Sanders' epibenthic sledge ; DW = Waren dredge ; KG = Usnel box-corer.

Only six samples were collected on the continental shelf ; all others came from the bathyal zone (200-3740 m). Although CHILD (1977) records 7 species from shallow waters of New Caledonia, the greater depths are, in the area under consideration, completely unexplored for Pycnogonida, such in contrast to adjacent areas, viz. the Malay, Australian and New Zealand regions. This explains no doubt why the collection contained such an unusually high number of new species (33 out of 49, or 67 %). At the same time, biogeographic conclusions are hard to draw from these collections, because many new species are known from the type-locality only, and most belong to genera widely distributed in the world's oceans. Only one new species has been found in New Caledonia and in the Philippines (the latter record is based on unpublished data originating from the MUSORSTOM 3 campaign).

Among the species already known, biogeographic data are rather confused : previously recorded from the Malay region (6 spp.), southern Africa (2 spp.), southern Australia (2 spp.), and circumglobal or pantropical (6 spp.).

All holotypes and most other specimens are preserved in the Muséum national d'Histoire naturelle, Paris (MNHN) ; an occasional duplicate has been retained for the Zoölogisch Museum, Amsterdam (ZMA).

Drawings of entire animals have been made from specimens in glycerine. Appendages have been dissected and mounted on slides in REYNE's modification of FAURE's medium, and illustrations have been made from these mountings.

Abbreviations used in the figures : *ant.* = anterior (side) ; *cem.* = cement gland (aperture) ; *c.3* = third coxa ; *hood* = cephalic hood ; *l.p.* = lateral process ; *oc.* = ocular tubercle ; *ov.* = oviger ; *pa.* = palp ; *post.* = posterior side.

## SYSTEMATIC ACCOUNT

The New Caledonian collection contains the following taxa :

Family Ammotheidae (19 + species of which 11 new)

*Ascorhynchus breviscapus* Stock, 1968

*A. cactoides* Stock, 1954

*A. fragilis* sp. nov.

*A. ornatus* (Helfer, 1938)

*A. pilipes* sp. nov.

*A. seticauda* sp. nov.

*Ammothella nimia* sp. nov.

*Heterofragilia brevicauda* sp. nov.

*Cilunculus achelioides* sp. nov.

*C. australiensis* Clark, 1963

*C. compactus* sp. nov.

*C. crinitus* sp. nov.

*C. frontosus* Loman, 1908

*C. pedatus* sp. nov.

*C. sp.*

*Bathyzetes setiger* (Loman, 1908)

*Proboehmia tubirostris* gen. nov., sp. nov.

*Sericosura bifurcata* sp. nov.

*Scipiolus plumosus* Loman, 1908

*Achelia nana* (Loman, 1908)

Family Colossendeidae (7 + species, of which 3 new)

*Rhopalorhynchus filipes* sp. nov.

*Rh. sp.*

*Colossendeis bicincta* Schimkewitsch, 1893

*C. colossea* Wilson, 1881

*C. macerrima* Wilson, 1881

*C. minor* Schimkewitsch, 1893

*Colossendeis pipetta* sp. nov.

*Hedgpethia tibialis* sp. nov.

Family Austrodecidae (5 species, all new)

*Austrodecus* (s.l.) *calvum* sp. nov.

*A. (Tubidecus* subgen. nov.) *excelsum* sp. nov.

*A. (T.) tuberculatum* sp. nov.

*A. (T.) bathyale* sp. nov.

*A. (T.) latum* sp. nov.

Family Nymphonidae (5 + species, of which 4 new)

*Nymphon adenopus* sp. nov.

*N. aequidigitatum*-group

*N. apicatum* sp. nov.

*N. novaecaledoniae* sp. nov.

*N. parum* sp. nov.

*N. sp.*

Family Callipallenidae (4 + species, of which 2 new)

*Seguapallene tricuspidata* sp. nov.

*S. sp.*

*Parapallene arnaudae* sp. nov.

*P. australiensis* (Hoek, 1881)

*Pigrogromitus timsanus* Calman, 1927

Family Phoxichilidiidae (7 + species, of which 5 new)

*Pallenopsis (Pallenopsis) angusta* sp. nov.

*P. (P.) virgata* Loman, 1908

*P. (P.) sp.*

*P. (Bathypallenopsis) longimana* sp. nov.

*P. (B.) scoparia* Fage, 1956

*Phoxichilidium tuberculatum* sp. nov.

*Ph. forfex* sp. nov.

*Anoplodactylus typhloides* sp. nov.

*Endeis* sp.

Family Pycnogonidae (3 species, all new)

*Pycnogonum* (s.l.) *crosnieri* sp. nov.

*P. (Nulloviger) lobipes* sp. nov.

*P. (N.) monoliferum* sp. nov.

## Family AMMOTHEIDAE

### Genus *ASCORHYNCHUS* Sars, 1877

*Ascorhynchus breviscapus* Stock, 1968

Fig. 1

*Ascorhynchus breviscapus* Stock, 1968 : 9-10, fig. 1.

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn CP 75, 22°18.65' S, 167°23.30' E, 825-860 m, 5 Sep. 1985 : 3 ♀ (MNHN Py 729).

REMARKS. — One of the females in the present collection closely resembles the holotype (and only specimen known) collected off False Bay,

South Africa, in 1361 m. The ocular tubercle in this specimen is a low swelling of the neck with two minute lateral tubercles (fig. 1b). In the other two specimens, the ocular tubercle is a slightly taller truncate cone (fig. 1a). No eyes are visible. The mid-dorsal trunk tubercles are slightly more robust in the present material, and the minute tubercles on the lateral processes are accompanied by two setules. In its remaining characters, the New Caledonian material agrees with the South African specimen.



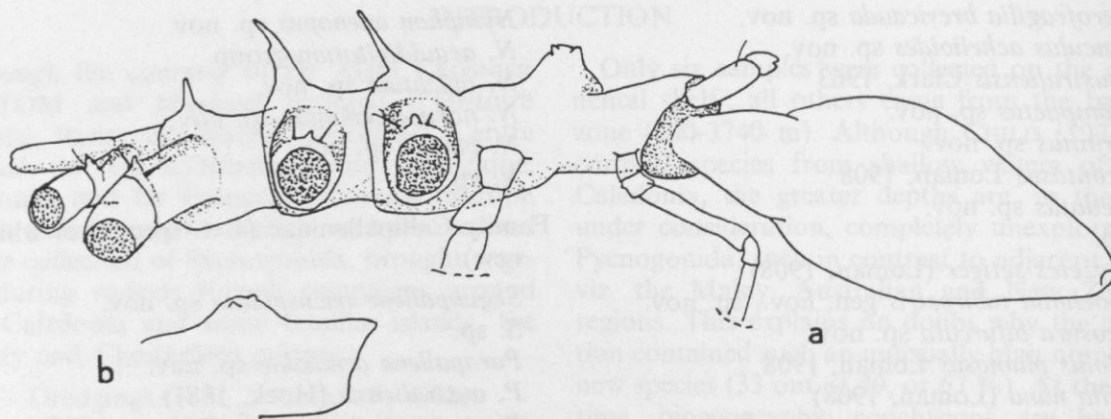


FIG. 1. — *Ascorhynchus breviscapus* Stock, 1968, ♀ : a, body, from the left ; b, ocular tubercle of another specimen, from the left.

*Ascorhynchus cactoides* Stock, 1954

Fig. 2 b-d

*Ascorhynchus cactoides* Stock, 1954 : 132-135, figs 63 d-f, 66.

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 66, 24°55.43' S, 168°21.67' E, 505-515 m, 3 Sep. 1985 : 12 specimens (10 MNHN Py 730 and 2 ZMA Pa 3329).

REMARKS. — This sample contains a considerable number of specimens, which exhibit a rather

large degree of variation. At least one of the specimens resembles the holotype in the development of the spiniform processes on the mid-dorsal line of the trunk and the lateral processes. In other specimens, these processes are more robust. The largest femoral spur can be as tall as in the holotype, in one specimen, however, the spur is vestigial. This long femoral spur may be accompanied by two auxiliary spurs of varying length. The tubercles on the dorsal surface of the first tibia are likewise variable in development.

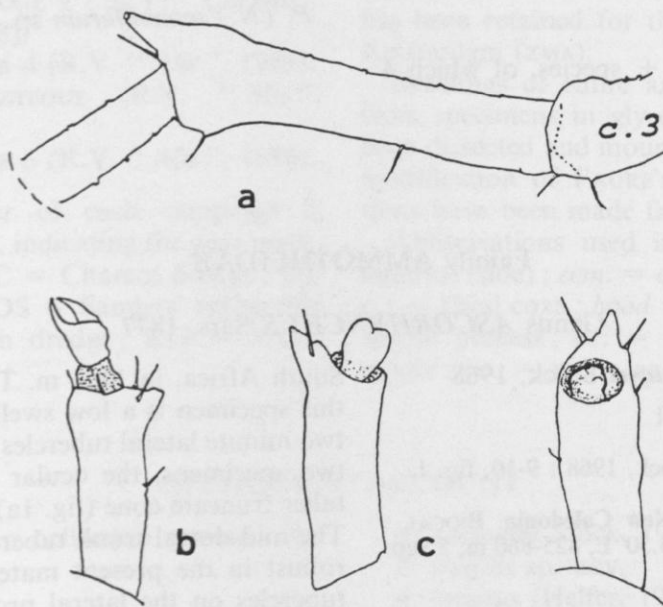


FIG. 2 a. — *Ascorhynchus ornatus* (Helfer, 1938), ♂ : femur, with cement gland tube.

FIG. 2 b-d. — *Ascorhynchus cactoides* Stock, 1954 : chelifores of juvenile (left), small adult (centre) and larger adult (right), all to same scale.



The chelifores of young specimens are still perfectly chelate, in older specimens the fingers are atrophied. The chela is attached to a membranous zone, by which it can be retracted into a distal excavation of the scape (figs 2 b-d).

The abdomen usually is straight, but in one specimen it is down-curved, as in the holotype.

In the light of this variability, we have attributed the present specimens to *A. cactoides*, previously known from the Kei Islands, Indonesia, from a depth of about 90 m. The BIOCAL record extends both the geographical and the bathymetrical range of the species.

*Ascorhynchus fragilis* sp. nov.

Figs 3-4

**MATERIAL EXAMINED.** — **New Caledonia.** BIOCAL : stn DS 14, 20°18.09' S, 167°17.70' E, 3680-3700 m, 13 Aug. 1985 : 1 ♂ holotype, 1 ♂ and 2 ♀♀ (all fragmentary) (MNHN Py 731). — Stn DS 59, 23°56.21' S, 166°41.10' E, 2650 m, 2 Sep. 1985 : 1 ♂ (MNHN Py 732). — Stn DS 98, 21°24.10' S, 166°29.76' E, 2365-2470 m, 7 Sep. 1985 : 1 immature (MNHN Py 733).

**DESCRIPTION.** — Body extremely slender (trunk segments 3 and 4 more than 4 times as long as wide), and consequently lateral processes widely separated (interval between lateral processes 2 and 3 ca. 4 times diameter of lateral process). Neck with 2 small, pointed tubercles ("horns") and rounded, unpaired swelling near anterior margin. No eyes. At level of anterior margin of first lateral process, there is a clearly functional articulation zone, separating neck from rest of trunk. Abdomen likewise with segmentation line at base; almost as long as trunk segment 4 (measured from anterior segmentation line to base of abdomen). Lateral processes short (twice as long as wide). Entire body, and appendages, covered with minute tubercles.

Proboscis tripartite, only slightly longer than neck.

Chelifore scape very slender, 2-segmented, with some short setae. Chela atrophied.

Palp 10-segmented; segment 3 slightly longer than segment 5; segments 6 to 10 short.

Oviger of ♂ : Segment 4 much longer than segment 5; two rows of compound spines on segments 7 to 10 (formula : 4 + 3 : 3 + 3 : 3 + 3 : 2 + 2); terminal claw pointed, strong, without ornamentation.

Oviger of (young ?) ♀ : segment 5 less slender than in ♂; compound spine formula 3 + 2 : 2 + 2 : 2 + 2 : 1 + 2.

Legs modestly armed with short setae; very thin and fragile, broken off partly or entirely in all available specimens. Coxa 2 enormously elongate (c. 75 % of length of femur). Femur of ♂ with ventroproximal cement gland duct; duct thump-shaped, length slightly less than femoral diameter. Femur and tibia 1 of equal length, tibia 2 only slightly more than 50 % of tibia 1. Small spinules on ventral margin of tibia 2, tarsus and propodus. Tarsus about 2/3 of length of propodus. Claw curved, more than half as long as propodus; inner margin with ca. 12 fine denticles. Anterior legs missing in all specimens, therefore no data available on eventual dimorphism between anterior and posterior legs.

*Measurements of ♂ holotype (mm).* - Length proboscis (ventral) 1.30; greatest diameter of proboscis 0.43; length neck (to anterior articulation) 1.03; length rest first trunk segment 0.23; length second trunk segment 0.77; length third trunk segment 0.82; length fourth trunk segment 0.68; width across second lateral processes 0.88.

Third leg : First coxa 0.21; second coxa 1.33; third coxa 0.23; femur 1.68; first tibia 1.77; second tibia 1.05; tarsus 0.36; propodus 0.48; claw 0.30.

**REMARKS.** — This extremely slender and brittle species bears superficial resemblance to *A. levisimus* Loman, 1908 (Flores Sea, Indonesia, 794 m), which is, however, several times larger than *A. fragilis*, and has very slender distal palp segments.

Much more closely related is *A. bucerus* Turpaeva, 1971 (Pacific Ocean, 45°18'S, 156°W, 5035-5210 m). *A. bucerus* agrees with *A. fragilis* in some essential characters : (1) absence of eyes and ocular tubercle; (2) presence of two horn-like projections near the frontal margin of the cephalon; (3) presence of a segmentation line between the neck and the rest of the trunk; (4) denticulated claw on the legs; and (5) distal palp segments shortish.

The following differences may serve in distinguishing *A. fragilis* from *A. bucerus* : (1) trunk segments 2 and 3 less long (and consequently lateral processes less widely spaced) in *buceros*; (2) coxa 2 very elongate (much longer than tibia 2) in *fragilis* (not very elongate, < tibia 2, in *buceros*).

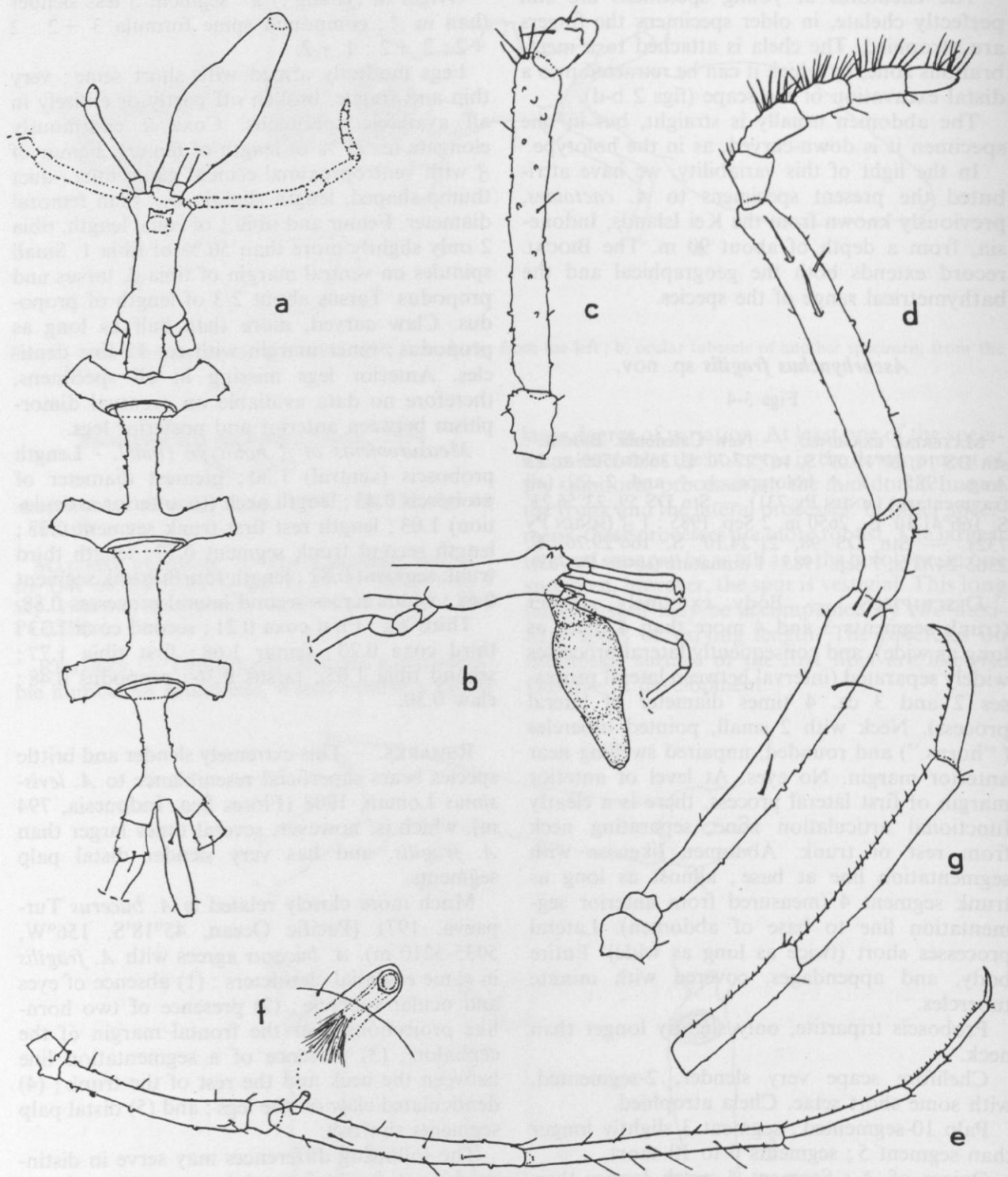


FIG. 3. — *Ascorhynchus fragilis* sp. nov. : a, body, ♂, dorsal ; b, cephalic segment, ♀, from the right ; c, chelifere, ♂ ; d, palp, ♂ ; e, leg 4, ♂ ; f, cement gland, ♂, more strongly enlarged ; g, distal segments of leg 4, ♂.

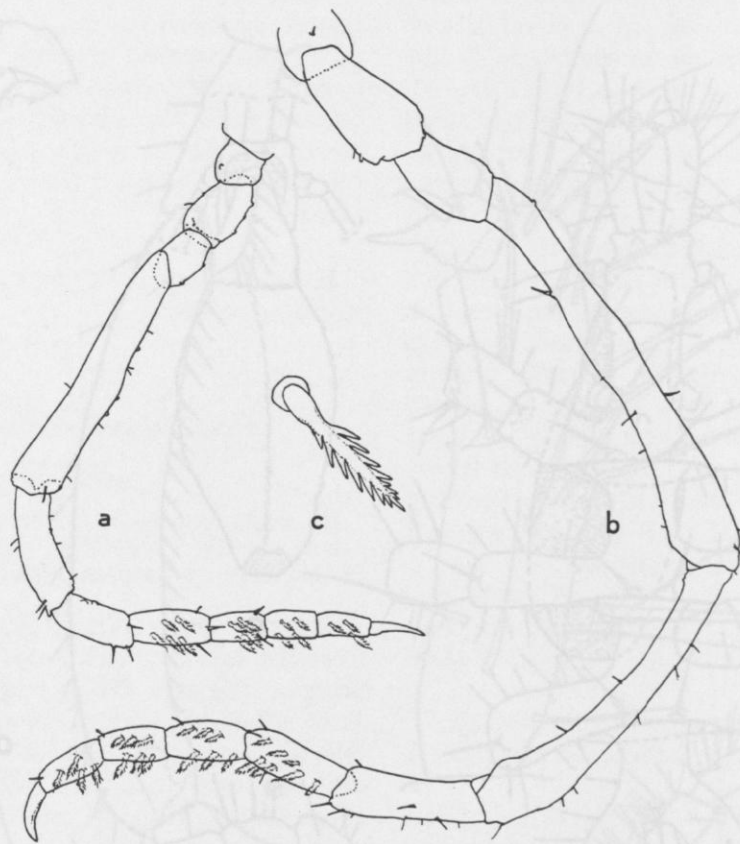


FIG. 4. — *Ascorhynchus fragilis* sp. nov. : a, oviger, ♀ ; b, oviger, ♂ ; c, distalmost compound spine of oviger segment 7, ♂.

ETYMOLOGY. — The specific name, *fragilis*, refers to the extremely thin body and legs, the latter often broken off in our material.

*Ascorhynchus ornatus* (Helfer, 1938)

Fig. 2a

*Ainigma ornatum* Helfer, 1938 : 181-183, fig. 10.

*Ascorhynchus ornatum* - STOCK, 1953 : 41-44, fig. 6. — ARNAUD & CHILD, 1988 : 127-128. — MUELLER, 1989 : 280-281, figs 8-14.

MATERIAL EXAMINED. — **New Caledonia.** BIOCAL : stn CP 57, 23°43.26' S, 166°58.06' E, 1490-1620 m, 1 Sep. 1985 : 1 ♂, 2 ♀♀ (MNHN Py 734).

REMARKS. — Up to now, this species was only recorded from shallower waters around South Africa (Cape of Good Hope, East London area, Agulhas Bank, 90-708 m).

The New Caledonian specimens agree with

HELPER's type-material, but for the dorsal tubercles in the mid-dorsal line and on the lateral processes, which are slightly more robust, and the somewhat longer chelifore scape.

Female sexual pores are on the ventral surface of coxa 2 of all legs. Cement gland (fig. 2a) opening through a short tube on the dorsodistal end of the femur of legs 2 to 4 (not on leg 1). It should be noted that ARNAUD & CHILD (1988 : 128) give a quite different description of the cement glands. MUELLER (1989) supposes for this reason that the material of ARNAUD & CHILD might belong to another species.

*Ascorhynchus pilipes* sp. nov.

Figs 5-6

MATERIAL EXAMINED. — **Between New Caledonia and the Loyalty Islands.** BIOGEOCAL : stn DW 313, 20°58.95' S, 166°59.04' E, 1640-1600 m, 2 May 1987 : 1 ♀ holotype (MNHN Py 781).



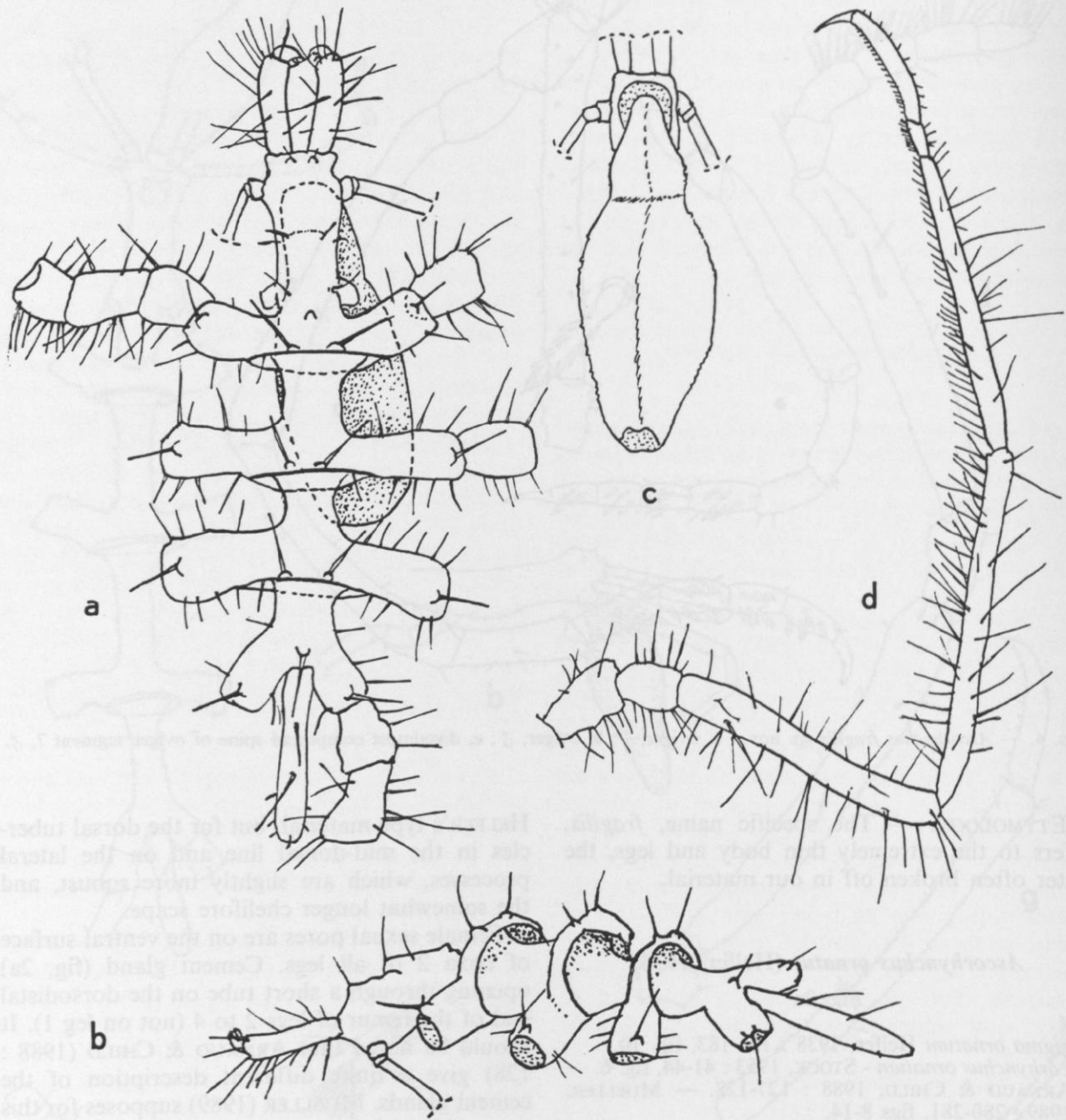


FIG. 5. — *Ascorhynchus pilipes* sp. nov., ♀ holotype : a, trunk, dorsal ; b, trunk, from the left ; c, proboscis, ventral ; d, first leg (same scale as a).

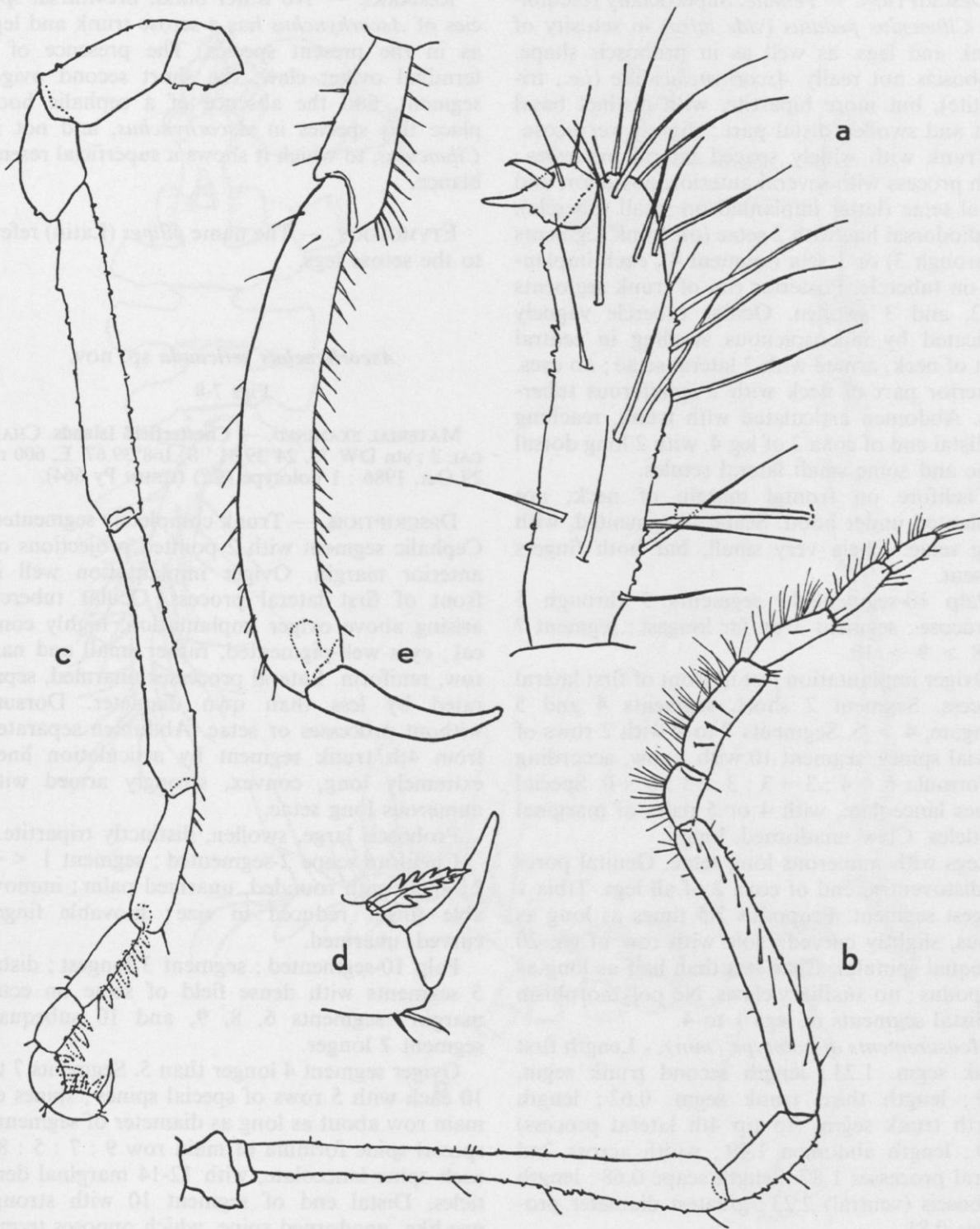


FIG. 6. — *Ascorhynchus pilipes* sp. nov., ♀ holotype : a, chelifore ; b, palp ; c, oviger ; d, distal part of oviger ; e, distal part of first leg.

DESCRIPTION. — *Female*. Superficially resembling *Cilunculus pedatus* (*vide infra*) in setosity of trunk and legs, as well as in proboscis shape. Proboscis not really *Ascorhynchus*-like (*i.e.*, tripartite), but more bipartite, with distinct basal part and swollen distal part; slightly verrucose.

Trunk with widely spaced lateral processes; each process with several anterior, posterior, and distal setae (latter implanted on small tubercle). Mediodorsal line with 2 setae (on trunk segments 1 through 3) or 1 seta (segment 4), each implanted on tubercle. Posterior rim of trunk segments 1, 2, and 3 swollen. Ocular tubercle vaguely indicated by inconspicuous swelling in central part of neck, armed with 2 lateral setae; no eyes. Anterior part of neck with 2 spiniferous tubercles. Abdomen articulated with trunk, reaching to distal end of coxa 2 of leg 4, with 2 long dorsal setae and some small lateral setules.

Chelifore on frontal margin of neck, not implanted under hood. Scape 1-segmented, with long setae. Chela very small, but both fingers present.

Palp 10-segmented; segments 3 through 5 verrucose; segment 3 by far longest; segment 7 > 8 > 9 > 10.

Oviger implantation just in front of first lateral process. Segment 2 short, segments 4 and 5 elongate, 4 > 5. Segments 7 to 9 with 2 rows of special spines, segment 10 with 1 row, according to formula 6 + 4 : 3 + 3 : 3 + 3 : 3 + 0. Special spines lanceolate, with 4 or 5 pairs of marginal denticles. Claw unadorned, long.

Legs with numerous long setae. Genital pores on distoventral end of coxa 2 of all legs. Tibia 1 longest segment. Propodus 3.5 times as long as tarsus, slightly curved; sole with row of ca. 20 subequal spinules. Claw less than half as long as propodus; no auxiliary claws. No polymorphism in distal segments of legs 1 to 4.

*Measurements of holotype (mm)*. — Length first trunk segm. 1.23; length second trunk segm. 0.72; length third trunk segm. 0.62; length fourth trunk segm. (to tip 4th lateral process) 0.90; length abdomen 1.09; width across 2nd lateral processes 1.87; length scape 0.68; length proboscis (ventral) 2.23; greatest diameter proboscis 0.81.

First leg: first coxa 0.37; second coxa 0.47; third coxa 0.30; femur 1.81; first tibia 2.22; second tibia 1.91; tarsus 0.23; propodus 0.81; claw 0.31.

REMARKS. — No other blind, brevitarsal species of *Ascorhynchus* has a setose trunk and legs as in the present species. The presence of a terminal oviger claw, the short second oviger segment, and the absence of a cephalic hood place this species in *Ascorhynchus*, and not in *Cilunculus*, to which it shows a superficial resemblance.

ETYMOLOGY. — The name *pilipes* (Latin) refers to the setose legs.

*Ascorhynchus seticauda* sp. nov.

Figs 7-8

MATERIAL EXAMINED. — **Chesterfield Islands**. CHALCAL 2: stn DW 75, 24°39.31' S, 168°39.67' E, 600 m, 29 Oct. 1986: 1 holotype (♀?) (MNHN Py 664).

DESCRIPTION. — Trunk completely segmented. Cephalic segment with 2 pointed projections on anterior margin. Oviger implantation well in front of first lateral process. Ocular tubercle arising above oviger implantation, highly conical; eyes well-pigmented, rather small and narrow, reniform. Lateral processes unarmed, separated by less than own diameter. Dorsum without processes or setae. Abdomen separated from 4th trunk segment by articulation line; extremely long, convex, strongly armed with numerous long setae.

Proboscis large, swollen, distinctly tripartite.

Chelifore scape 2-segmented; segment 1 < < 2; chela with rounded, unarmed palm; immovable finger reduced in size; movable finger curved, unarmed.

Palp 10-segmented; segment 3 longest; distal 5 segments with dense field of setae on ectal margin; segments 6, 8, 9, and 10 subequal, segment 7 longer.

Oviger segment 4 longer than 5. Segments 7 to 10 each with 5 rows of special spines; spines of main row about as long as diameter of segment; special spine formula of main row 9 : 7 : 5 : 8; each spine lanceolate, with 12-14 marginal denticles. Distal end of segment 10 with strong, peg-like, unadorned spine, which opposes terminal claw to form a pseudo-chela. Claw robust, short, unadorned.

All legs of similar morphology. Very long setae on dorsodistal end of femur, and proximal half



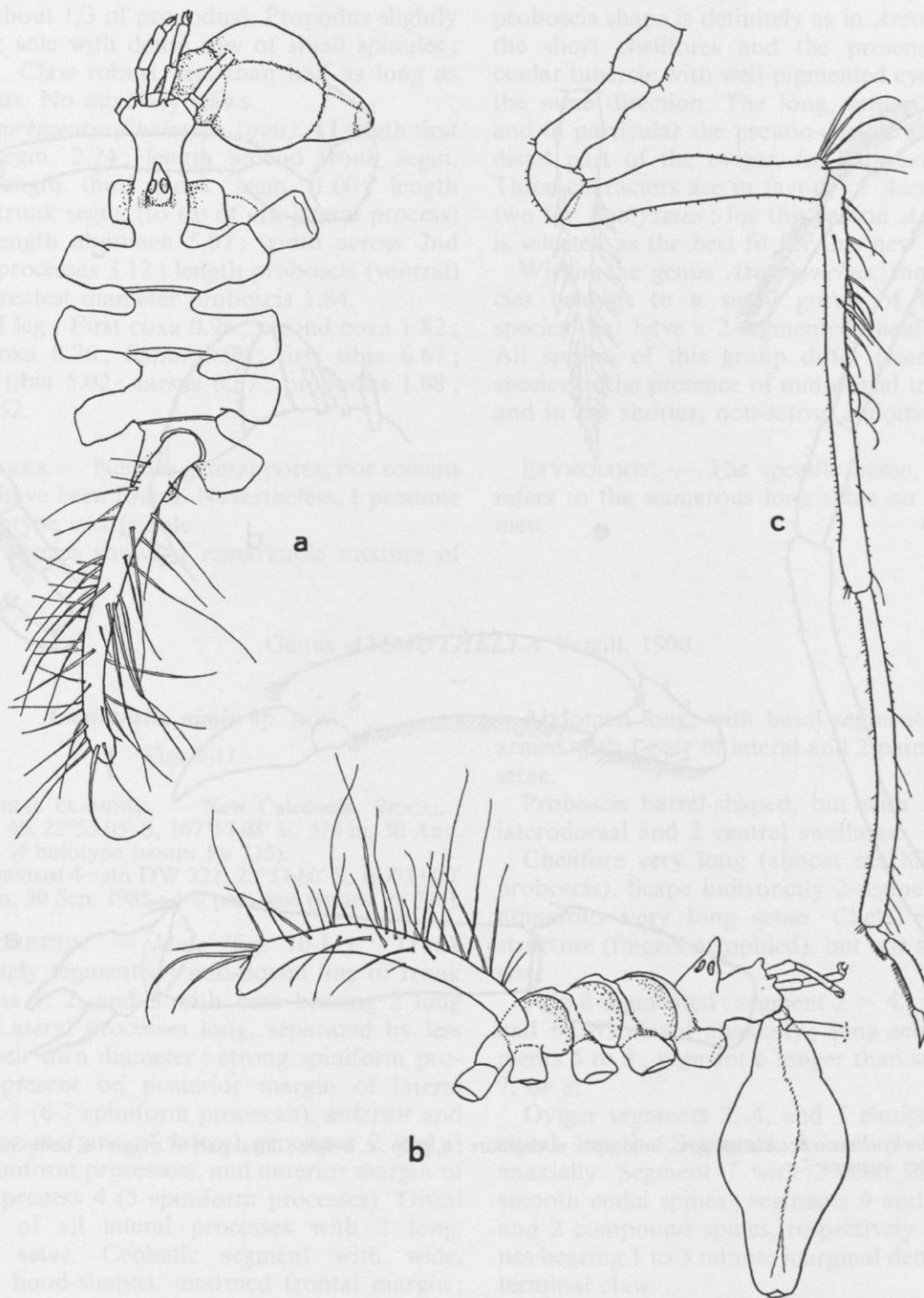


FIG. 7. — *Ascorhynchus seticauda* sp. nov., holotype : a, trunk, dorsal ; b, trunk, from the right ; c, third leg (same scale as a and b).

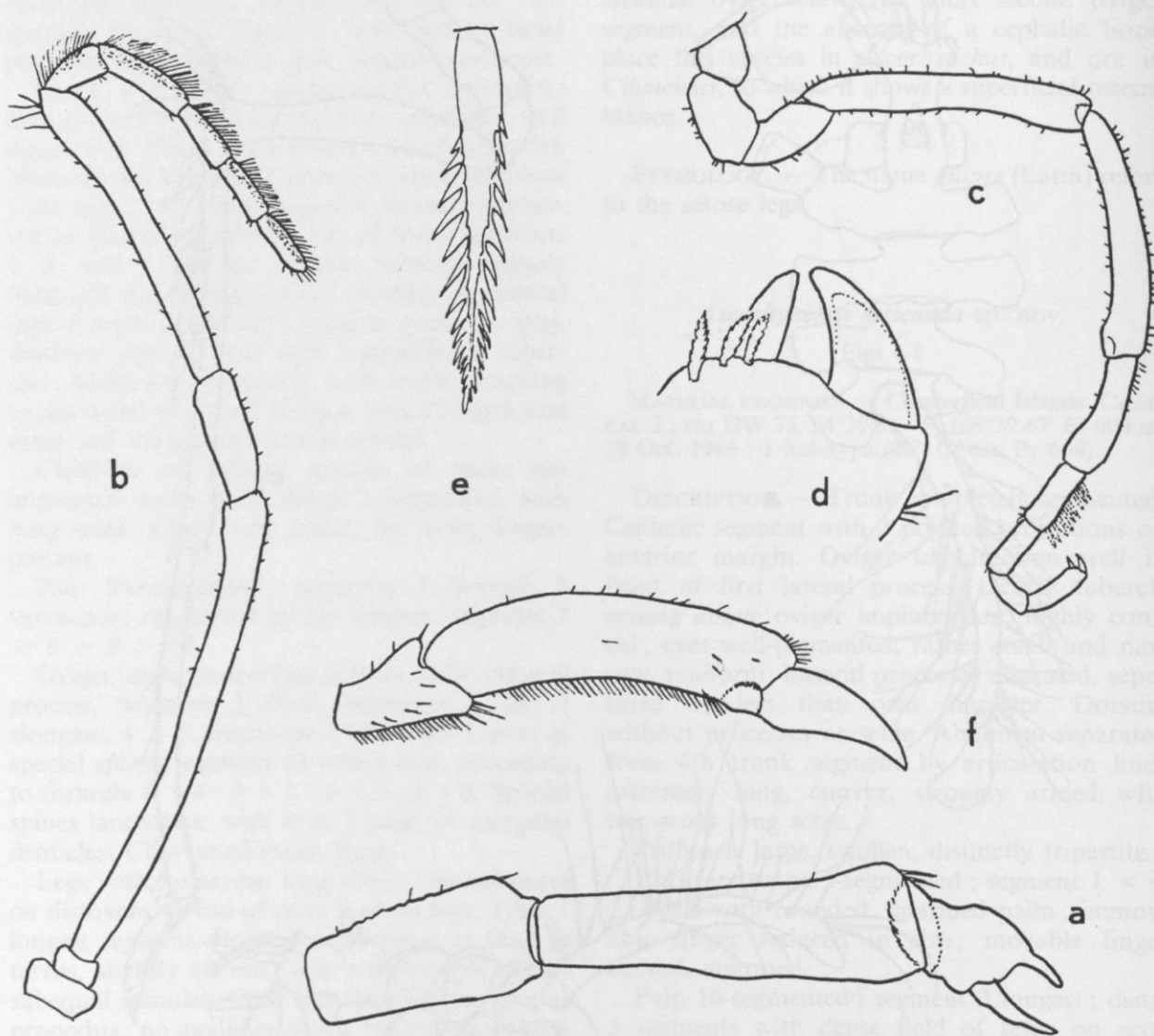


FIG. 8. — *Ascorhynchus seticauda* sp. nov., holotype : a, chelifore ; b, palp ; c, oviger ; d, distal part of oviger ; e, compound spine of oviger segment 7.

of tibia 1. Tibia 1 > tibia 2 > femur. Tarsus short (about 1/3 of propodus). Propodus slightly curved; sole with dense row of small spinules; no heel. Claw robust, less than half as long as propodus. No auxiliary claws.

*Measurements of holotype (mm).* - Length first trunk segm. 2.74; length second trunk segm. 1.09; length third trunk segm. 1.00; length fourth trunk segm. (to tip of 4th lateral process) 0.89; length abdomen 5.07; width across 2nd lateral processes 3.12; length proboscis (ventral) 4.15; greatest diameter proboscis 1.84.

Third leg: First coxa 0.96; second coxa 1.82; third coxa 0.76; femur 3.99; first tibia 6.67; second tibia 5.02; tarsus 0.37; propodus 1.08; claw 0.52.

REMARKS. — Neither genital pores, nor cement glands have been found. Nevertheless, I presume the holotype is a female.

This species shows a remarkable mixture of

characters of *Ascorhynchus* and *Bathyzetes*. The proboscis shape is definitely as in *Ascorhynchus*; the short chelifores and the presences of an ocular tubercle with well-pigmented eyes point in the same direction. The long, setose abdomen, and in particular the pseudo-chelate state of the distal part of the oviger, fit *Bathyzetes* better. Three characters are in favour of *Ascorhynchus*, two for *Bathyzetes*; for this reason *Ascorhynchus* is selected as the best fit for this new species.

Within the genus *Ascorhynchus*, the new species belongs to a small group of brevitarsal species that have a 2-segmented chelifore scape. All species of this group differ from the new species in the presence of mid-dorsal trunk spurs and in the shorter, non-setose abdomen.

ETYMOLOGY. — The specific name, *seticauda*, refers to the numerous long setae on the abdomen.

### Genus *AMMOTHELLA* Verrill, 1900

#### *Ammothella nimia* sp. nov.

Figs 9-11

MATERIAL EXAMINED. — New Caledonia. BIOCAL: stn DW 46, 22°53.05' S, 167°17.08' E, 570 m, 30 Aug. 1985: 1 ♂ holotype (MNHN Py 735).

MUSORSTOM 4: stn DW 222, 22°57.60' S, 167°33.00' E, 440 m, 30 Sep. 1985: 1 ♀ paratype (MNHN Py 736).

DESCRIPTION. — *Male* (figs 10-11): Trunk completely segmented; mid-dorsal line of trunk segments 1, 2, and 3 with boss bearing 2 long setae. Lateral processes long, separated by less than their own diameter; strong spiniform processes present on posterior margin of lateral process 1 (6-7 spiniform processes), anterior and posterior margins of lateral processes 2 and 3 (6-8 spiniform processes), and anterior margin of lateral process 4 (5 spiniform processes). Distal margin of all lateral processes with 2 long, curved setae. Cephalic segment with wide, slightly hood-shaped, unarmed frontal margin; chelifore implantation just under the hood; palp insertion on frontolateral margin; oviger implantation in contact with first lateral process. Ocular tubercle very tall and thin, distally bifid and with small medioterminal tubercle; no eyes.

Abdomen long, with basal segmentation line, armed with 1 pair of lateral and 2 pairs of dorsal setae.

Proboscis barrel-shaped, but with 2 pairs of laterodorsal and 2 ventral swellings.

Chelifore very long (almost reaching end of proboscis). Scape indistinctly 2-segmented, with numerous very long setae. Chela reduced in structure (fingers atrophied), but not so much in size.

Palp 8-segmented; segment 2 > 4; segments 5 and 6 articulated anaxially; long setae on segments 4 to 8; segment 6 longer than segments 5, 7, or 8.

Oviger segments 2, 4, and 5 elongate and of equal length. Segments 8 and 9 articulated anaxially. Segment 7 with 2 ectal setae and 2 smooth endal spines; segments 9 and 10 with 1 and 2 compound spines, respectively (these spines bearing 1 to 3 minute marginal denticles). No terminal claw.

Legs: Coxa 1 with 3 or 4 spiniform processes on anterior and posterior margins, and with 2 long, curved setae on distodorsal margin. Coxa 2 with 2 setiform elements on anterior and posterior margins, and 2 setiform elements on disto-



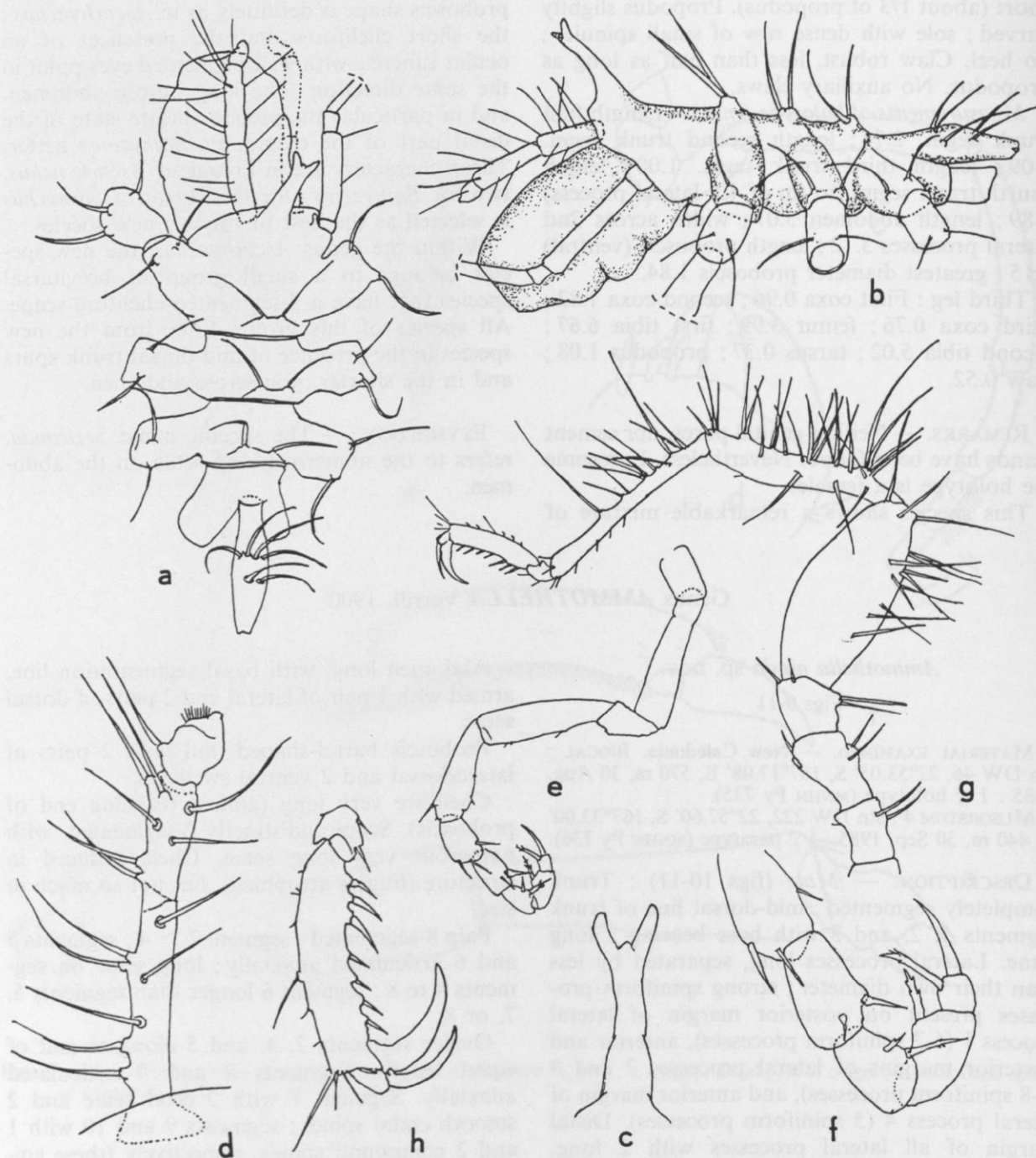


FIG. 9. — *Ammothella nimia* sp. nov., ♀ paratype : a, body, dorsal ; b, body, from the left ; c, ocular tubercle, posterodorsal ; d, chelifore ; e, oviger ; f, distal oviger segments ; g, third leg (to same scale as fig. 5a) ; h, distal segments of third leg.

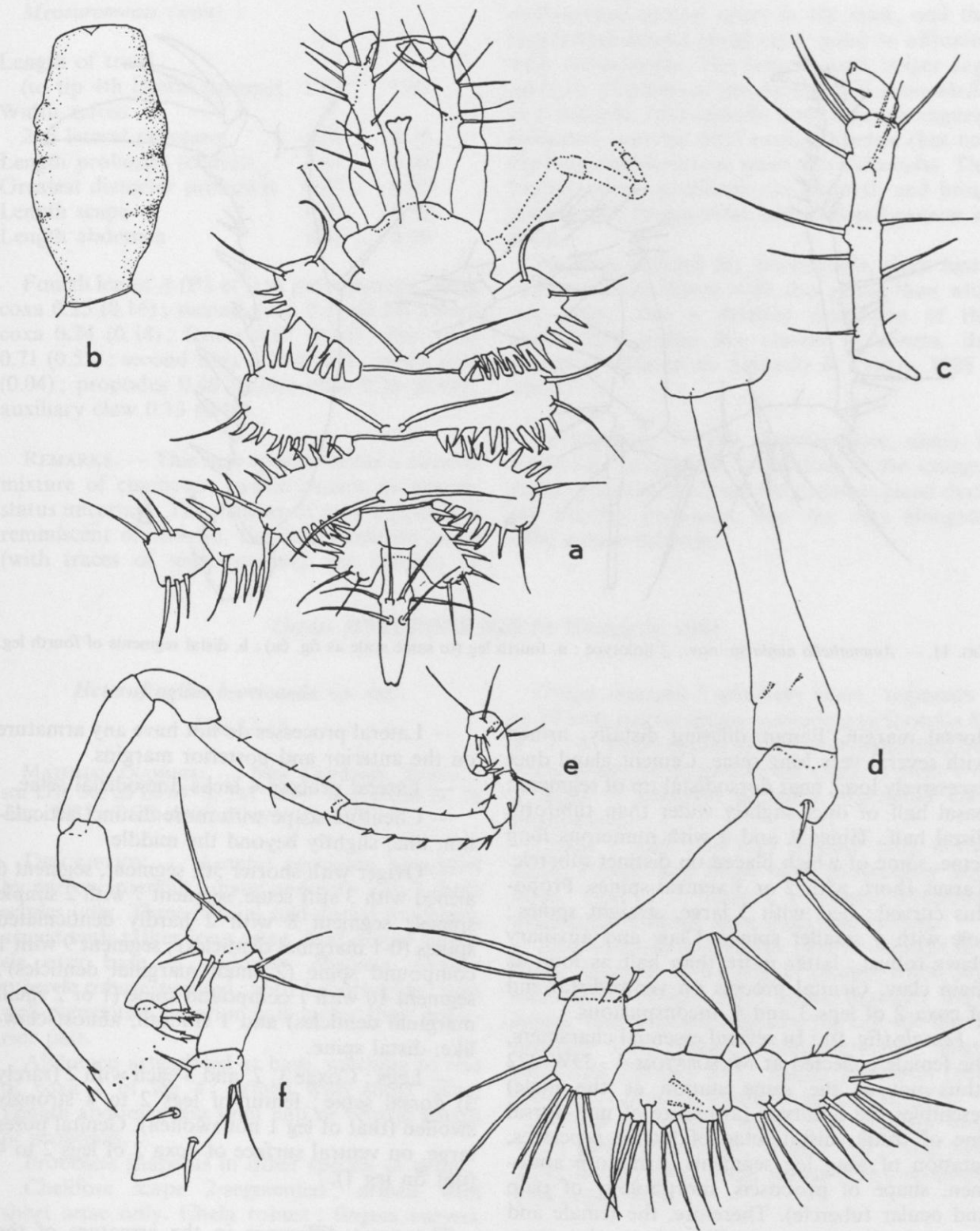


FIG. 10. — *Ammothella nimia* sp. nov., ♂ holotype : a, body, dorsal ; b, proboscis, ventral ; c, chelifore ; d, palp ; e, oviger ; f, distal segments of oviger.



FIG. 11. — *Ammothella nimia* sp. nov., ♂ holotype : a, fourth leg (to same scale as fig. 6a) ; b, distal segments of fourth leg.

dorsal margin. Femur dilating distally, armed with several very long setae. Cement gland duct excessively long, near dorsodistal tip of segment ; basal half of duct slightly wider than tubiform distal half. Tibiae 1 and 2 with numerous long setae, some of which placed on distinct tubercle. Tarsus short, with 2 or 3 ventral spines. Propodus curved ; heel with 3 large, straight spines ; sole with 4 smaller spines. Claw and auxiliary claws robust ; latter more than half as long as main claw. Genital process on ventrodorsal end of coxa 2 of legs 3 and 4, inconspicuous.

*Female* (fig. 9) : In several essential characters, the female collected at MUSORSTOM 4 - DW 222 (thus not at the same station as the male) resembles the holotype (armature of mid-dorsal line of trunk, distal setae of lateral processes, setation of long leg segments, armature abdomen, shape of proboscis, morphology of palp and ocular tubercle). Therefore, the female and the male have been attributed to the same species, notwithstanding (strong) sexual dimorphism in certain other characters :

— Lateral processes do not have any armature on the anterior and posterior margins.

— Lateral process 4 lacks dorsodistal setae.

— Chelifore scape with more distinct articulation line, slightly beyond the middle.

— Oviger with shorter 5th segment, segment 6 armed with 3 stiff setae, segment 7 with 2 simple spines ; segment 8 with 2 hardly denticulated spines (0-1 marginal denticles) ; segment 9 with 1 compound spine (2 small marginal denticles) ; segment 10 with 1 compound spine (1 or 2 small marginal denticles) and 1 smooth, almost claw-like, distal spine.

— Legs : Coxae 1, 2, and 3 each with 2 (rarely 3) dorsal setae ; femur of legs 2 to 4 strongly swollen (that of leg 1 not swollen). Genital pores large, on ventral surface of coxa 2 of legs 2 to 4 (not on leg 1).

The great difference in the armature of the lateral processes is exceptional, whereas most other differences are more usual in pycnogonids.



*Measurements (mm) :*

	♂	♀
Length of trunk		
(to tip 4th lateral process)	1.23	1.09
Width across		
2nd lateral processes	0.86	0.70
Length proboscis (dorsal)	0.67	0.60
Greatest diameter proboscis	0.37	0.37
Length scape	0.41	0.39
Length abdomen	0.41	0.39

Fourth leg of ♂ (P3 of ♀ in parentheses) : First coxa 0.25 (0.16); second coxa 0.37 (0.24); third coxa 0.24 (0.18); femur 0.67 (0.53); first tibia 0.71 (0.53); second tibia 0.79 (0.57); tarsus 0.04 (0.04); propodus 0.40 (0.26); claw 0.18 (0.14); auxiliary claw 0.13 (0.10).

REMARKS. — This new species shows a curious mixture of characters, which makes its generic status uncertain. The number of palp segments is reminiscent of *Achelia*, the long chelifore scape (with traces of segmentation), the absence of

well-marked genital spurs in the male, and the articulated cement gland tube, point to affinities with *Ammothella*. The long second oviger segment (♀, ♂) points in the direction of *Ammothella* or *Cilunculus*; the cephalic hood, though vaguely indicated, and the bifid ocular tubercle (but not the long chelifores) are more like *Cilunculus*. The humps on the proboscis are unusual, and bring genera like *Hedgpethius* and *Dromedopycnon* in mind.

We have decided for *Ammothella*, since more characters are shared with this genus than with any other. For a detailed discussion of the distinctions within this cluster of genera, the reader is referred to ARNAUD & CHILD, 1988 : 126-127.

ETYMOLOGY. — The specific name, *nimia*, is Latin for "over-done", alluding to the exaggerated spinosity, the extra long cement gland duct, the knobby proboscis, and the very elongate, bifid ocular tubercle.

Genus *HETEROFRAGILIA* Hedgpeth, 1943*Heterofragilia brevicauda* sp. nov.

Figs 12-13

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 36, 23°08.64' S, 167°10.99' E, 650-680 m, 29 Aug. 1985 : 1 ♀ holotype (MNHN Py 709).

DESCRIPTION. — Lateral processes separated by narrow intervals; distal end with 1 to 3 short setules only. Three conical mid-dorsal processes, armed with rather long setae. Mid-dorsal tubercle over base of abdomen obsolete. Ocular tubercle robust, pointed; with 4 short setae; eyes well-pigmented, anterior pair larger than posterior pair.

Abdomen articulated at base, reaching to end of coxa 2 of leg 4; armed with short setae. Length abdomen less than half of ventral length of proboscis.

Proboscis shape as in other species of genus.

Chelifore scape 2-segmented; armed with short setae only. Chela robust; fingers curved, unarmed, gaping.

Palp 10-segmented; segment 7 >> 6; segments 8 to 10 roundish, slightly longer than wide.

Oviger segment 5 relatively short; segments 7 to 10 with special spines, according to formula 8 : 5 : 7 : 6. Most special spines unornamented, but some spines, in particular on segm. 7, with 1 or 2 pairs of obsolete denticles. Terminal claw unadorned.

Coxae 1 and 2 of legs without long dorsal setae. Femur and tibiae with moderately long setae. Tibia 2 > tibia 1 > femur. Propodus moderately curved, claw short and robust.

*Measurements of holotype (mm).* - Length first trunk segment 2.16; length second trunk segment 0.78; length third trunk segment 0.83; length fourth trunk segment (to tip 4th lateral process) 1.16; length abdomen 2.09; length proboscis (dorsal) 3.41; length proboscis (ventral) 4.43; greatest diameter proboscis 1.83.

Second leg : First coxa 0.78; second coxa 1.12; third coxa 0.85; femur 5.09; first tibia 5.29; second tibia 5.48; tarsus 0.36; propodus 1.54; claw 0.38.

REMARKS. — The New Caledonian species differs in several respects from the three previously described species (*H. fimbriata* Hedgpeth,

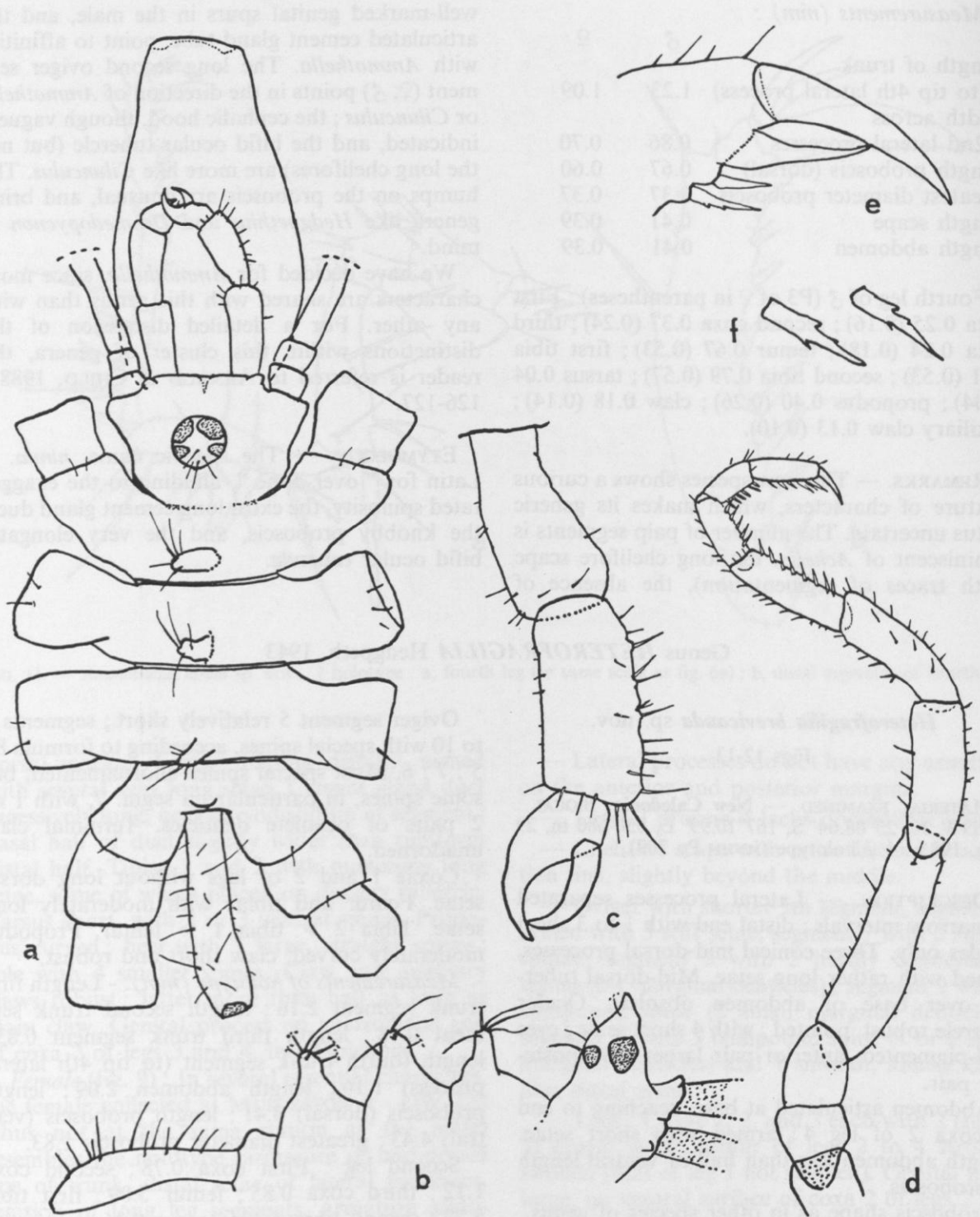


FIG. 12. — *Heterofragilia brevicauda* sp. nov., ♀ holotype: a, trunk, dorsal; b, contour of dorsum, from the right; c, chelifore; d, oviger; e, distal part of oviger; f, special spines of oviger segment 7.

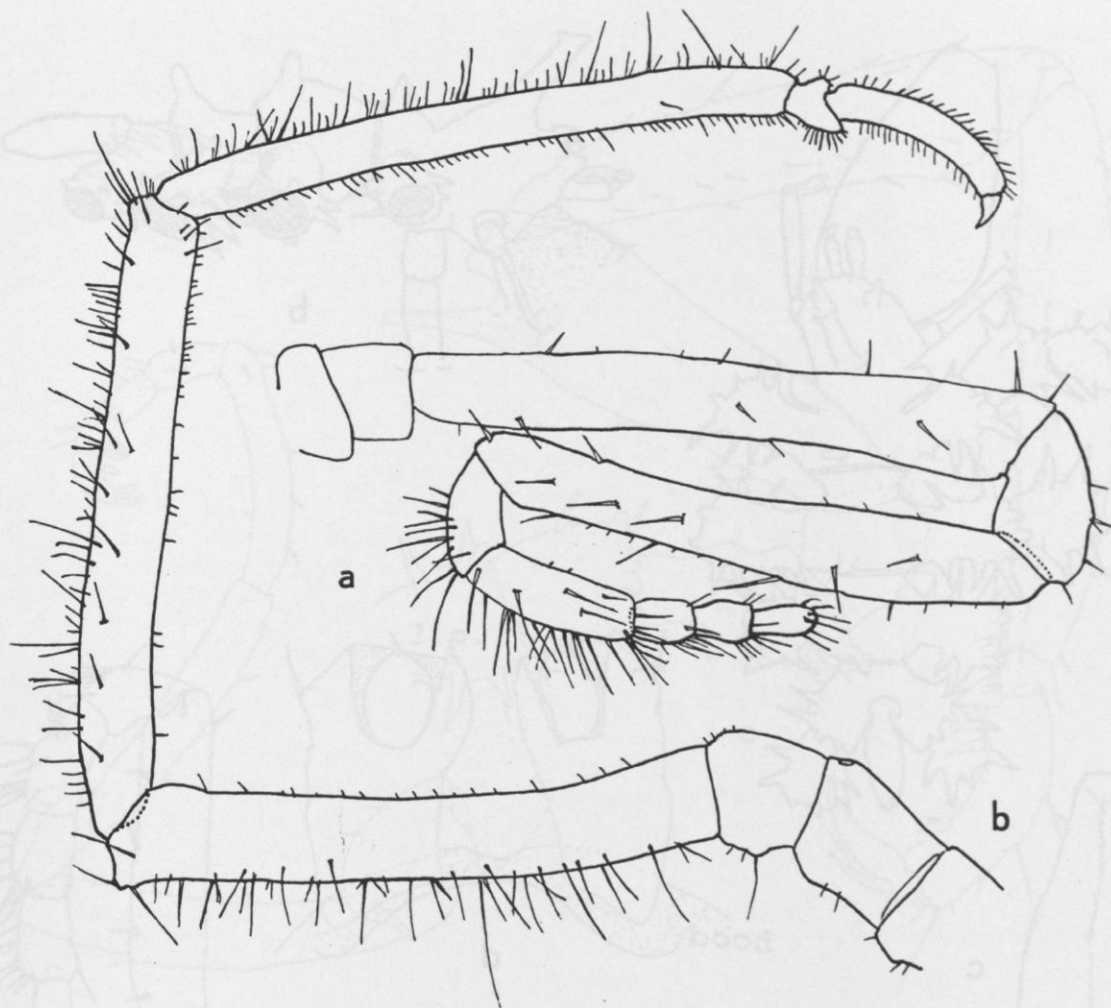


FIG. 13. — *Heterofragilia brevicauda* sp. nov., ♀ holotype : a, palp ; b, second leg.

1943, from Martinique ; *H. amica* Stock, 1954, from Kyushu, Japan ; *H. major* Stock, 1986, from St. Vincent, West Indies). These differences are : (1) abdomen short (less than half the ventral length of the proboscis, versus at least 2/3 of this length) ; (2) lateral processes and coxae 1 and 2 with short setae (versus long setae) ; (3) tibia 2 >

tibia 1 > femur (versus femur > tibia 1 > tibia 2) ; (4) less slender chelae ; (5) eyes pigmented (versus unpigmented or absent).

ETYMOLOGY. — The specific name, *brevicauda*, alludes to the short abdomen.

#### Genus *CILUNCULUS* Loman, 1908

##### *Cilunculus achelioides* sp. nov.

Figs 14-15

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 66, 24°55.43' S, 168°21.67' E, 505-515 m, 3 Sep. 1985 : 1 ♂ holotype, 1 ♂ paratype (MNHN Py 737).

DESCRIPTION. — Cephalic hood covering base of chelifores only. Mid-dorsal line with low spur on segments 1, 2, and 3. Abdomen very clearly articulated at base, short (not reaching end of coxa 1 of leg 4), clavate, practically unarmed. Proboscis ovoid, with constricted proximal part.



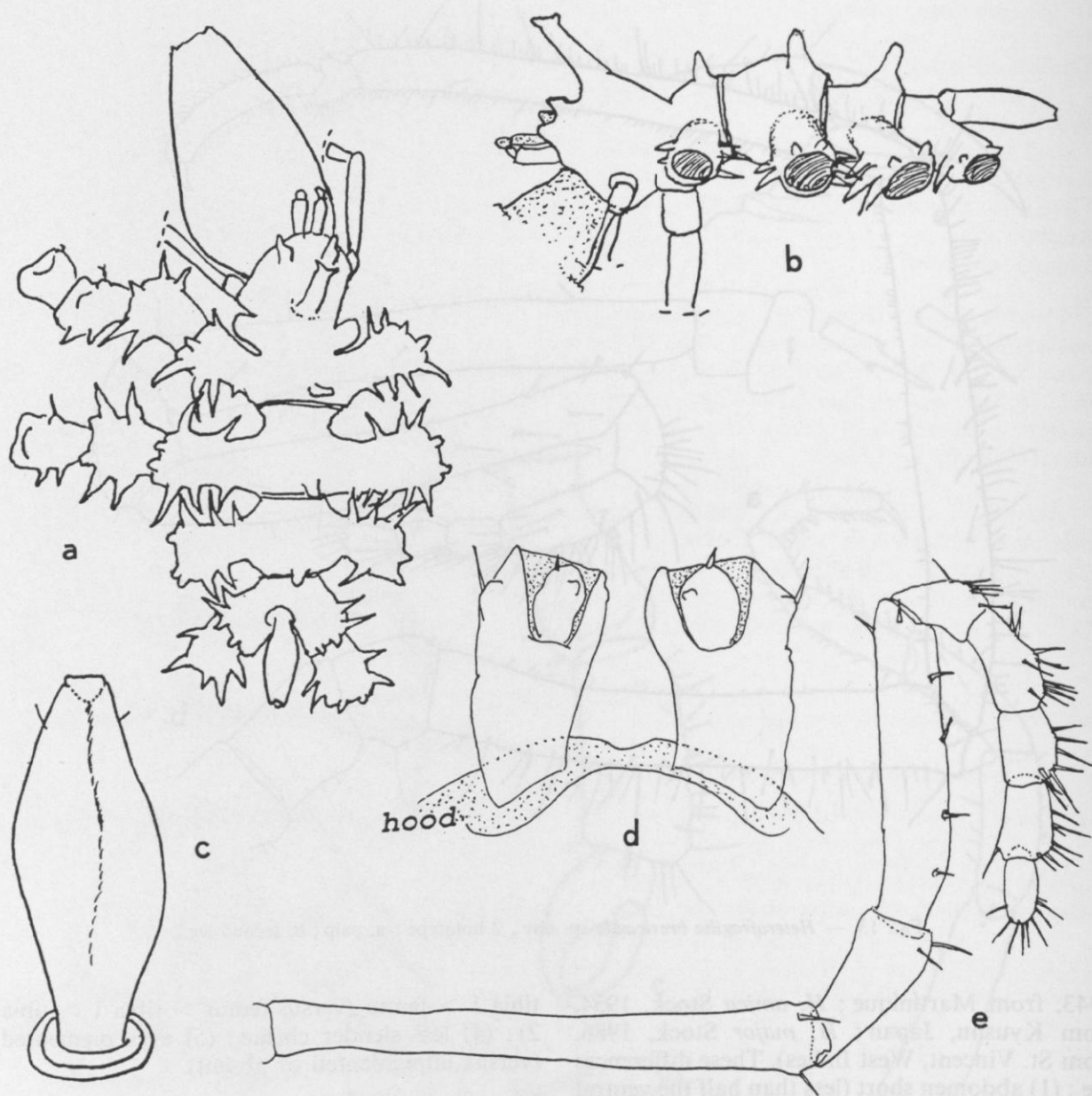


FIG. 14. — *Cilunculus achelioides* sp. nov., ♂ : **a**, body, dorsal ; **b**, body, from the right ; **c**, proboscis, ventral ; **d**, chelifore and hood, ventral ; **e**, p

Frontal margin of cephalic segment with 2 low spurs. Ocular tubercle tall, truncate at tip. Lateral processes separated by less than own diameter ; armed on anterior margin with 1 or 2 (lat. proc. 1), 2 or 3 (lat. proc. 2 and 4) or 3 (lat. proc. 3) strong spiniform processes ; armed on posterior margin with 3 to 4 (lat. proc. 1 and 2), 1 or 2 (lat. proc. 3) or no (lat. proc. 4) spiniform

processes. Dorsodistal margin of all lateral processes with 2 tubercles.

Chelifore with very short scape, armed with 1 spine ; chela ovoid, retractable in distal excavation of scape.

Palp 9-segmented ; segment 2 by far the longest.

Oviger 10-segmented ; segment 2 very long ;

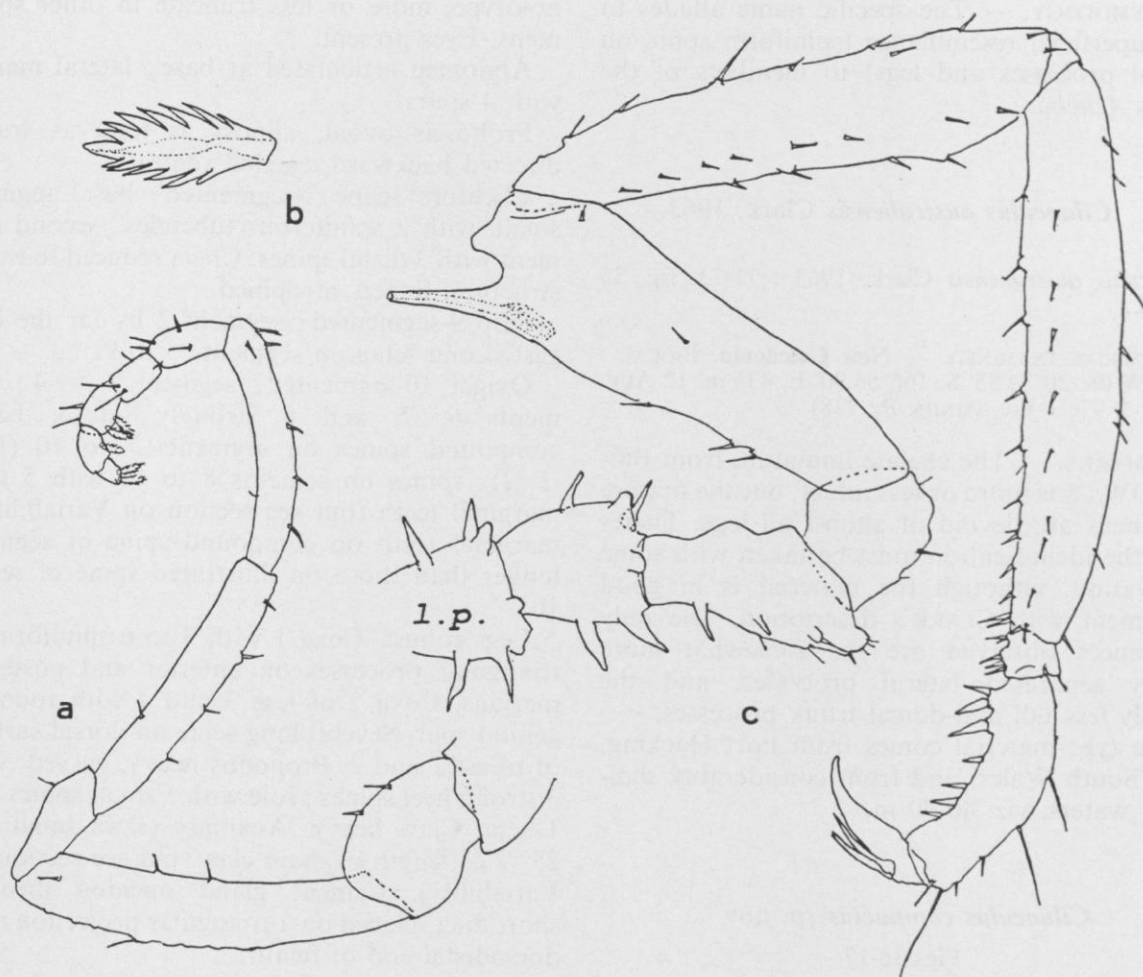


FIG. 15. — *Cilunculus achelioides* sp. nov., ♂ : a, oviger ; b, compound spine of oviger segment 9 ; c, third leg.

compound spines on segments 7 to 10, according to formula 1(?) :2 :1 :2 ; compound spines leaf-shaped, with 6 to 7 marginal teeth.

Legs not very slender. Coxa 1 with 2 spiniform processes on anterior and posterior margins, and 2 distal tubercles. Coxa 2 with 3 low spurs. Genital spur on coxa 2 of leg 3 short (leg 4 lacking in both specimens). Femoral cement gland tube tapering, chimney-shaped, near dorso-distal end of segment. Femur and tibiae armed with few, short spinules only. Tibia 2 > tibia 1. Propodus moderately curved ; 3 heel spines ; 4 sole spines. Claw robust ; auxiliary claws longer than half length of main claw.

*Measurements (mm)*. - Holotype : Length trunk (frontal margin cephalic hood to tip 4th lateral process) 1.33 ; width across 2nd lateral

processes 0.88 ; length proboscis 0.83 ; greatest diameter proboscis 0.46.

Paratype : Length abdomen 0.31. Third leg : first coxa 0.22 ; second coxa 0.30 ; third coxa 0.19 ; femur 0.71 ; first tibia 0.75 ; second tibia 0.89 ; tarsus 0.07 ; propodus 0.34 ; claw 0.21 ; auxiliary claws 0.13.

**REMARKS.** — This new species is remarkably similar to *C. alcicornis* Stock, 1978, from deeper waters of the English Channel. However, *C. alcicornis* is devoid of an ocular tubercle, whereas in *C. achelioides* a long ocular tubercle is present. The abdomen of *C. achelioides* is much shorter than that of *C. alcicornis*, whereas the spiniform processes on the lateral processes of the trunk are more numerous.

ETYMOLOGY. — The specific name alludes to the superficial resemblance (spiniform spurs on lateral processes and legs) to members of the genus *Achelia*.

*Cilunculus australiensis* Clark, 1963

*Cilunculus australiensis* Clark, 1963 : 71-73, fig. 35 A-K.

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 08, 20°34.35' S, 166°53.90' E, 435 m, 12 Aug. 1985 : 2 ♀♀, 1 juv. (MNHN Py 738).

REMARKS. — The chelate immature from BIOCAL DW 08 is more or less intact, but the mature specimens are devoid of almost all legs. Therefore, the identification must be taken with some reservation, although the material is in good agreement with CLARK's description. The only differences observed are the somewhat more widely separated lateral processes, and the slightly less tall mid-dorsal trunk processes.

The type-material comes from Port Hacking, New South Wales, and from considerably shallower waters, viz. 40-70 m.

*Cilunculus compactus* sp. nov.

Figs 16-17

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 46, 22°53.05' S, 167°17.08' E, 570-610 m, 30 Aug. 1985 : 1 ♂ holotype (MNHN Py 739).

SMIB 4 : DW 51, 23°41.3' S, 168°00.6' E, 260 m, 9 Mar. 1989 : 1 ♀ (MNHN Py 725).

Philippines. MUSORSTOM 3 : stn DR 117, 12°31.2' N, 120°46.4' E, 92-97 m, 3 June 1985 : 1 ♂, 1 ♀, 1 immature (MNHN Py 740).

DESCRIPTION. — *Male (holotype)* : Body compact, lateral processes separated by very narrow intervals ; completely segmented. Posterior margin of all trunk segments (including segment 4) with conical mid-dorsal raised hump. Lateral processes 2 and 3 with strong triangular to spiniform projections on anterior and posterior margins. Similar projections on posterior margin of lateral process 1. Distal margin of lateral processes with tubercle. Cephalic hood strongly developed, tuberculate and with some minute spinules ; covering chelifores almost completely. Ocular tubercle lowly conical in

holotype, more or less truncate in other specimens. Eyes present.

Abdomen articulated at base ; lateral margin with 4 spurs.

Proboscis ovoid, almost as long as trunk, directed backward, carried ventrally.

Chelifore scape 2-segmented ; basal segment small, with 2 spiniferous tubercles ; second segment with 3 distal spines. Chela reduced to ovoid structure, fingers atrophied.

Palp 9-segmented ; segment 2 by far the longest. Long setae on segments 5 to 9.

Oviger 10-segmented ; segment 2 > 4 ; segments 6, 7, and 8 strongly setose. Large compound spines on segments 7 to 10 (1 :2 :1 :2) ; spines on segments 8 to 10 with 5 to 6 marginal teeth (but see section on Variability) ; marginal teeth on compound spine of segm. 9 longer than those on illustrated spine of segm. 10.

Legs robust. Coxa 1 with 3 to 6 spiniform to triangular processes on anterior and posterior margins. Coxa 2 of legs 3 and 4 with rounded genital spur. Several long setae on dorsal surface of tibiae 1 and 2. Propodus heavy, curved, with 3 strong heel spines ; sole with 3 small spines and 1 seta. Claw heavy. Auxiliary claws small (ca. 25 % of length of main claw, but see section on Variability). Cement gland opening through short duct, placed on a triangular projection near dorsodistal end of femur.

*Measurements of holotype (mm).* - Length trunk (frontal margin cephalic hood to tip 4th lateral process) 2.82 ; width across 2nd lateral processes 1.60 ; length proboscis (ventral) 2.41.

Third leg : First coxa 0.35 ; second coxa 0.49 ; third coxa 0.37 ; femur 1.07 ; first tibia 1.19 ; second tibia 1.21 ; tarsus 0.11 ; propodus 0.69 ; claw 0.34 ; auxiliary claws 0.09.

*Variability.* - The number and structure of the compound oviger spines appear to be variable. In the holotype, I found only 1 spine on segment 7. In a male from the Philippines, segment 7 bears 2 spines with reduced denticulation, in another specimen, the two spines on segment 7 are normally denticulated. The specimens from MUSORSTOM 6 and SMIB 4 are somewhat smaller than the holotype, have a slightly stronger tuberculation, more strongly setose dorsal and distal margin of the propodus, a slightly stronger male genital spur, and longer auxiliary claws (up to almost 40 % of main claw).



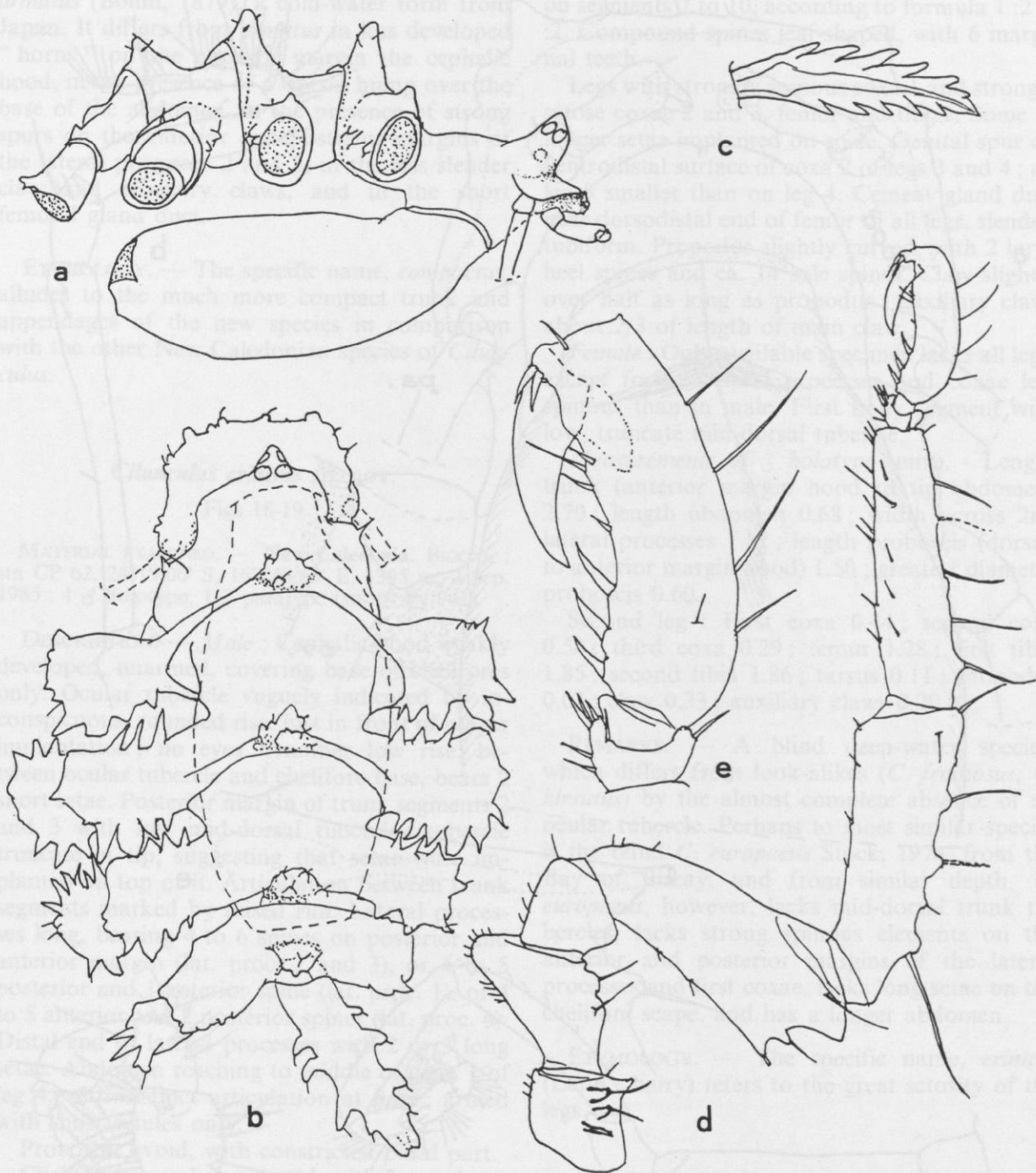


FIG. 16. — *Cilunculus compactus* sp. nov., ♂ : a, body, from the right ; b, body, dorsal ; c, distalmost compound spine of oviger segment 10 ; d, third leg ; e, distal segments of third leg.

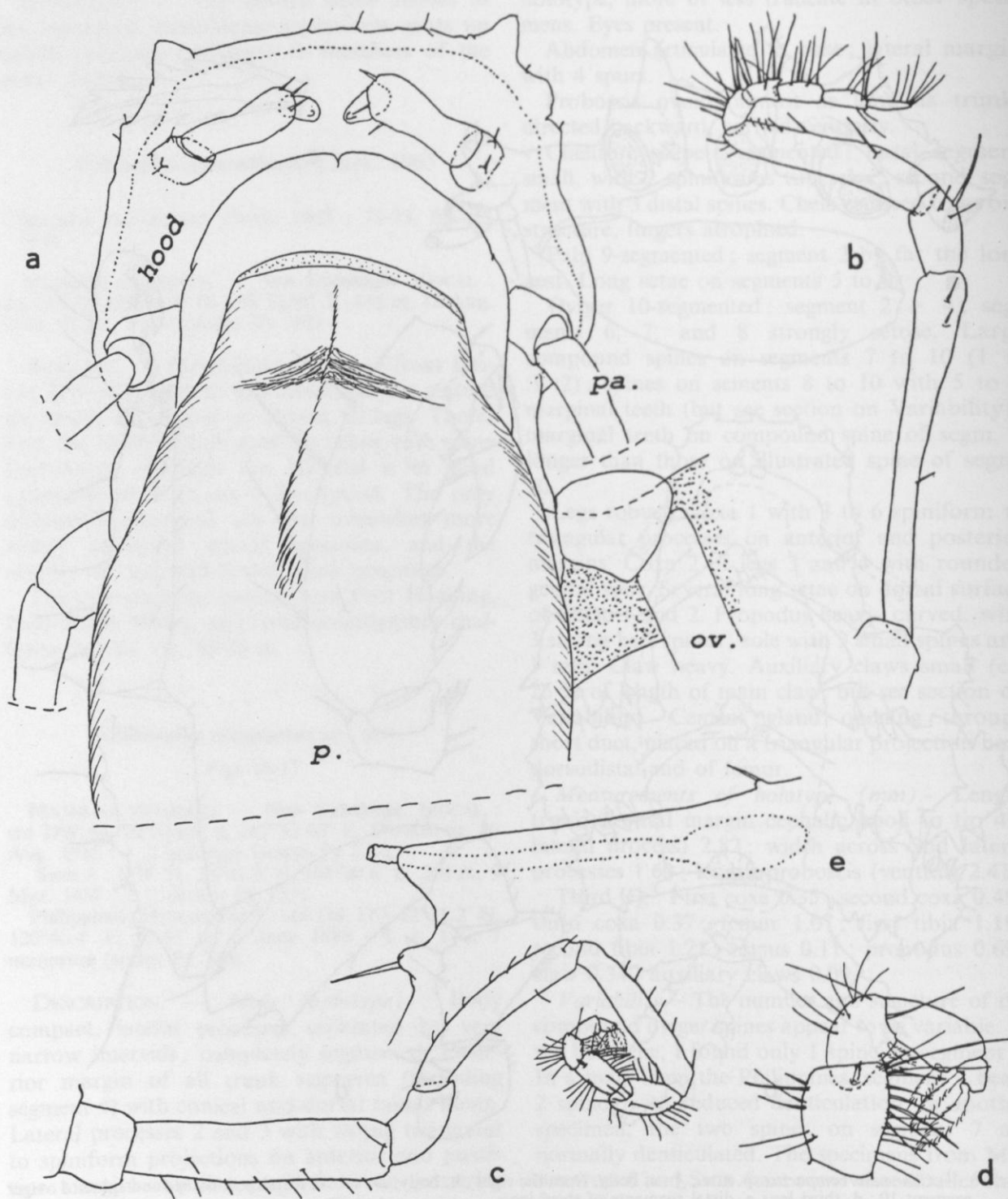


FIG. 17. — *Cilunculus compactus* sp. nov., ♂ : a, anterior part of body, ventral ; b, palp ; c, oviger ; d, distal oviger segments ; e, cement gland of third leg.

REMARKS. — The species is reminiscent of *C. armatus* (Böhm, 1879), a cold-water form from Japan. It differs from *armatus* in less developed "horns" on the anterior margin the cephalic hood, in the presence of a dorsal hump over the base of the abdomen, in the presence of strong spurs on the anterior and posterior margins of the lateral processes 2 and 3, in the less slender claw and auxiliary claws, and in the short femoral gland duct.

ETYMOLOGY. — The specific name, *compactus*, alludes to the much more compact trunk and appendages of the new species in comparison with the other New Caledonian species of *Cilunculus*.

*Cilunculus crinitus* sp. nov.

Figs 18-19

MATERIAL EXAMINED. — **New Caledonia.** BIOCAL : stn CP 62, 24°19.06' S, 167°48.65' E, 1395 m, 2 Sep. 1985 : 1 ♂ holotype, 1 ♀ paratype (MNHN Py 741).

DESCRIPTION. — *Male* : Cephalic hood weakly developed, unarmed, covering base of chelifores only. Ocular tubercle vaguely indicated by inconspicuous, rounded rise, just in front of oviger implantation; no eyes. Another low rise, between ocular tubercle and chelifore base, bears 2 short setae. Posterior margin of trunk segments 2 and 3 with low mid-dorsal tubercle; tubercle truncate at tip, suggesting that setae were implanted on top of it. Articulation between trunk segments marked by raised rim. Lateral processes long, bearing 4 to 6 spines on posterior and anterior margin (lat. proc. 2 and 3), or 4 to 5 posterior and 1 anterior spine (lat. proc. 1), or 4 to 5 anterior and 2 posterior spines (lat. proc. 4). Distal end of lateral processes with 2 or 3 long setae. Abdomen reaching to middle of coxa 1 of leg 4, with distinct articulation at base; armed with short setules only.

Proboscis ovoid, with constricted basal part.

Chelifore scape 1-segmented, with 3 very long, and several shorter setae. Chela partly retracted in excavated distal end of scape, globular.

Palp 9-segmented, segments 2 and 4 elongate.

Oviger implantation separated by narrow interval from first lateral process. Segment 2 very long; segments 4 and 5 with row of spinules;

reversed spines on segment 6; compound spines on segments 7 to 10, according to formula 1 : 2 : 2 : 2. Compound spines leaf-shaped, with 6 marginal teeth.

Legs with strongly spinous coxa 1 and strongly setose coxae 2 and 3, femur and tibiae. Some of longer setae implanted on socle. Genital spur on ventrodorsal surface of coxa 2 of legs 3 and 4; on leg 3 smaller than on leg 4. Cement gland duct near dorsodistal end of femur of all legs, slender, tubiform. Propodus slightly curved, with 2 large heel spines and ca. 14 sole spines. Claw slightly over half as long as propodus; auxiliary claws about 2/3 of length of main claw.

*Female* : Only available specimen lacks all legs, except fourth. Lateral processes and coxae less spinous than in male. First body segment with low, truncate mid-dorsal tubercle.

*Measurements of ♂ holotype* (mm). - Length trunk (anterior margin hood to tip abdomen) 2.70; length abdomen 0.68; width across 2nd lateral processes 1.52; length proboscis (dorsal, to anterior margin hood) 1.50; greatest diameter proboscis 0.60.

Second leg : First coxa 0.44; second coxa 0.58; third coxa 0.29; femur 1.28; first tibia 1.85; second tibia 1.86; tarsus 0.11; propodus 0.62; claw 0.33; auxiliary claws 0.20.

REMARKS. — A blind deep-water species, which differs from look-alikes (*C. frontosus*, *C. hirsutus*) by the almost complete absence of an ocular tubercle. Perhaps to most similar species is the blind *C. europaeus* Stock, 1978, from the Bay of Biscay, and from similar depth. *C. europaeus*, however, lacks mid-dorsal trunk tubercles, lacks strong spinous elements on the anterior and posterior margins of the lateral processes and first coxae, lacks long setae on the chelifore scape, and has a longer abdomen.

ETYMOLOGY. — The specific name, *crinitus* (Latin : hairy) refers to the great setosity of the legs.

*Cilunculus frontosus* Loman, 1908

*Cilunculus frontosus* Loman, 1908 : 54-55, pl. 7 figs 83-95. — STOCK, 1955 : 256; 1978 : 197 (key).

MATERIAL EXAMINED. — **New Caledonia.** BIOCAL : stn DW 66, 24°55.43' S, 168°21.67' E, 515 m, 3 Sep. 1985 : 1 ♂ (MNHN Py 742).



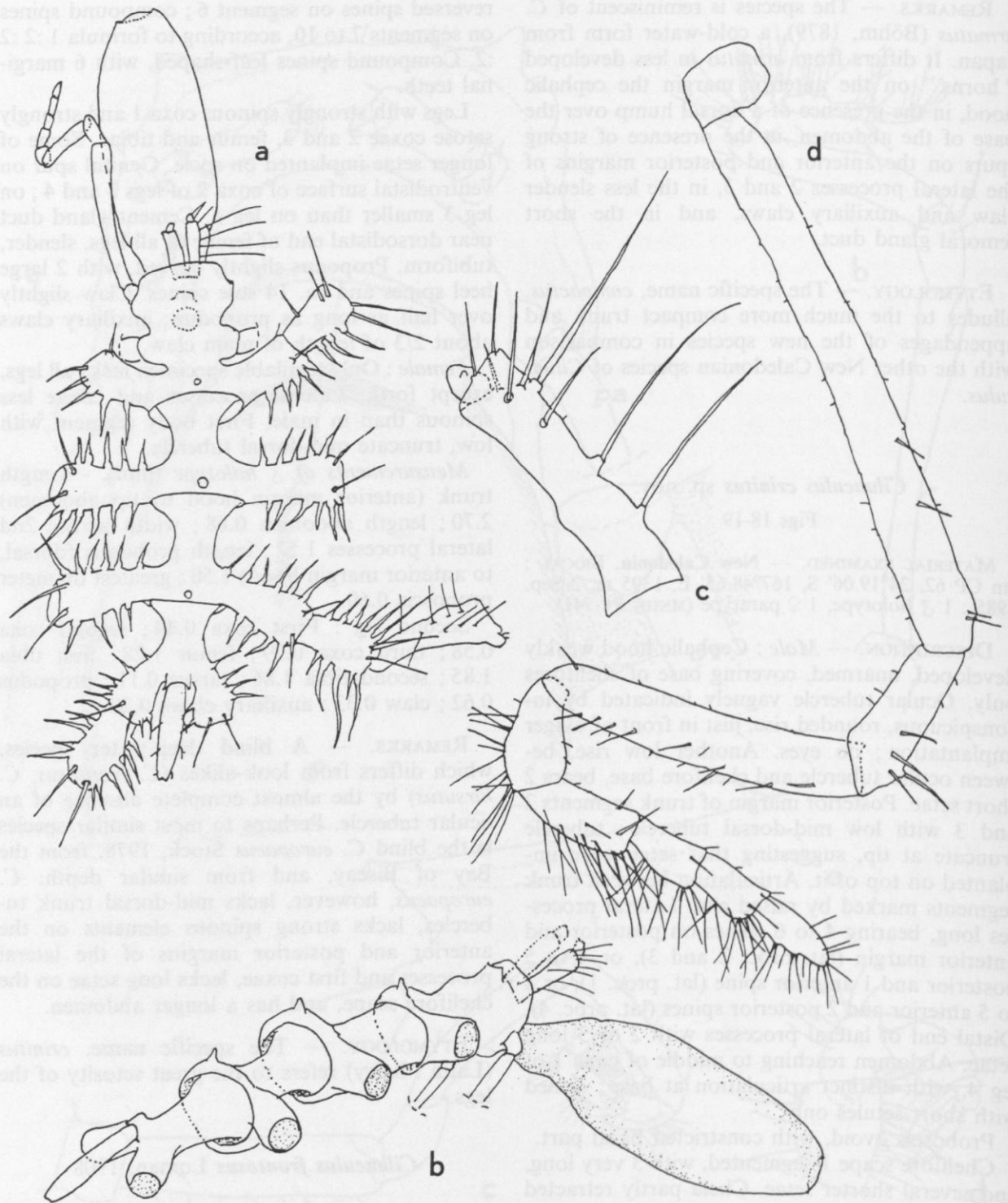


FIG. 18. — *Cihunculus crinitus* sp. nov. : a, body, ♂, dorsal ; b, body, ♀, from the right ; c, chelifore, ♂ ; d, palp, ♂.

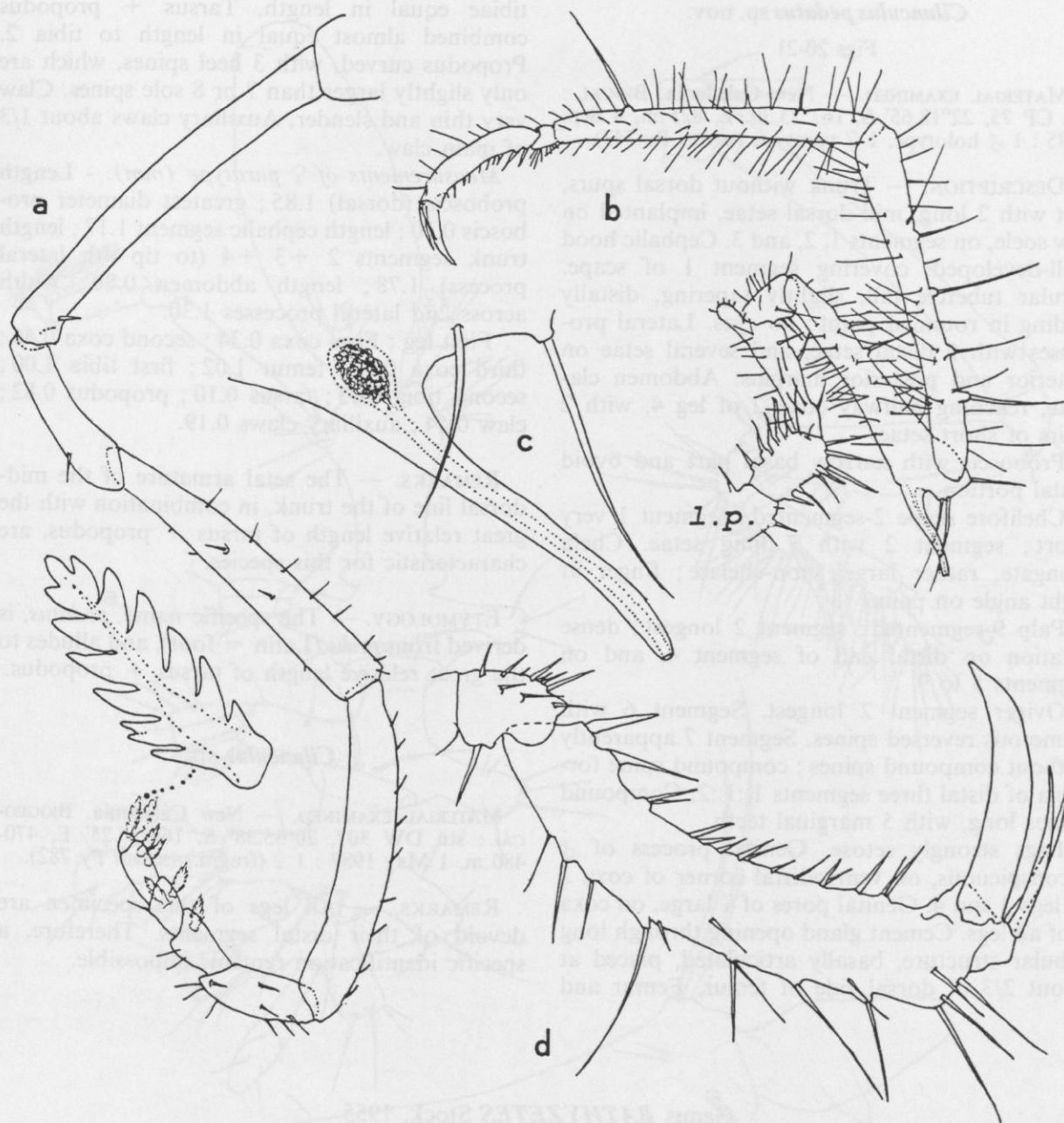


FIG. 19. — *Cilunculus crinitus* sp. nov., ♂ holotype. : a, oviger ; b, second leg ; c, cement gland of second leg ; d, distal segments of second leg.

REMARKS. — I have compared this male with LOMAN's holotype (from " *Siboga* " Stn 122, near Menado, 1260-1165 m). The holotype has a long seta in the mid-dorsal line of the trunk segments 1, 2, and 3. As usual in several species of *Cilunculus*, this seta is placed on a robust socle (almost a tubercle). The presence of these setae is not shown in LOMAN's fig.

83, nor is it mentioned in his description. In the BIOCAL male, the setae are broken off, but the socle remains. The ocular tubercle too, is damaged in the BIOCAL male. Otherwise, this specimen agrees well with the holotype.

The present specimen came from much shallower waters than the holotype.

*Cilunculus pedatus* sp. nov.

Figs 20-21

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL : stn CP 75, 22°18.65' S, 167°23.30' E, 825 m, 4 Sep. 1985 : 1 ♂ holotype, 1 ♀ paratype (MNHN Py 743).

DESCRIPTION. — Trunk without dorsal spurs, but with 2 long, mid-dorsal setae, implanted on low socle, on segments 1, 2, and 3. Cephalic hood well-developed, covering segment 1 of scape. Ocular tubercle tall, slightly tapering, distally ending in rounded point; no eyes. Lateral processes with 2 distal setae, and several setae on anterior and posterior margins. Abdomen clavate, reaching halfway coxa 2 of leg 4, with 2 pairs of short setae.

Proboscis with narrow basal part and ovoid distal portion.

Chelifore scape 2-segmented; segment 1 very short; segment 2 with 7 long setae. Chela elongate, rather large; non-chelate; finger at right angle on palm.

Palp 9-segmented; segment 2 longest; dense setation on distal end of segment 4, and on segments 5 to 9.

Oviger segment 2 longest. Segment 6 with numerous reversed spines. Segment 7 apparently without compound spines; compound spine formula of distal three segments 1 : 1 : 2. Compound spines long, with 5 marginal teeth.

Legs strongly setose. Genital process of ♂ inconspicuous, on ventrodorsal corner of coxa 2 of legs 3 and 4. Genital pores of ♀ large, on coxa 2 of all legs. Cement gland opening through long tubular structure, basally articulated, placed at about 2/3 of dorsal side of femur. Femur and

tibiae equal in length. Tarsus + propodus combined almost equal in length to tibia 2. Propodus curved, with 3 heel spines, which are only slightly larger than 7 or 8 sole spines. Claw very thin and slender. Auxiliary claws about 1/3 of main claw.

Measurements of ♀ paratype (mm). - Length proboscis (dorsal) 1.85; greatest diameter proboscis 0.70; length cephalic segment 1.17; length trunk segments 2 + 3 + 4 (to tip 4th lateral process) 1.78; length abdomen 0.80; width across 2nd lateral processes 1.30.

First leg : First coxa 0.34; second coxa 0.46; third coxa 0.30; femur 1.02; first tibia 1.00; second tibia 1.03; tarsus 0.10; propodus 0.82; claw 0.54; auxiliary claws 0.19.

REMARKS. — The setal armature of the mid-dorsal line of the trunk, in combination with the great relative length of tarsus + propodus, are characteristic for this species.

ETYMOLOGY. — The specific name, *pedatus*, is derived from *pedis* (Latin = foot), and alludes to the great relative length of tarsus + propodus.

*Cilunculus* sp.

MATERIAL EXAMINED. — **New Caledonia**. BIOGEOCAL : stn DW 307, 20°35.38' S, 166°55.25' E, 470-480 m, 1 May 1987 : 1 ♀ (fragm.) (MNHN Py 782).

REMARKS. — All legs of this specimen are devoid of their distal segments. Therefore, a specific identification remains impossible.

Genus *BATHYZETES* Stock, 1955*Bathyzetes setiger* (Loman, 1908)

*Eurycyde setigera* Loman, 1908 : 29-30, pl. 5 figs 52-58.

*Bathyzetes setiger* - STOCK, 1955 : 261, fig. 24 a-c. — NAKAMURA & CHILD, 1990a : 305-307.

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL : stn DW 51, 23°05.27' S, 167°44.95' E, 700-680 m, 31 Aug. 1985 : 1 ♀, 2 juv., 1 fragm. (MNHN Py 744).

REMARKS. — As far as I know, this is the third published record for this species. LOMAN's material came from "Siboga" Stn 122, near Menado (Indonesia), 1260-1165 m; an additional specimen (NAKAMURA & CHILD, 1990a) was taken in the Flores Sea, 550-593 m.



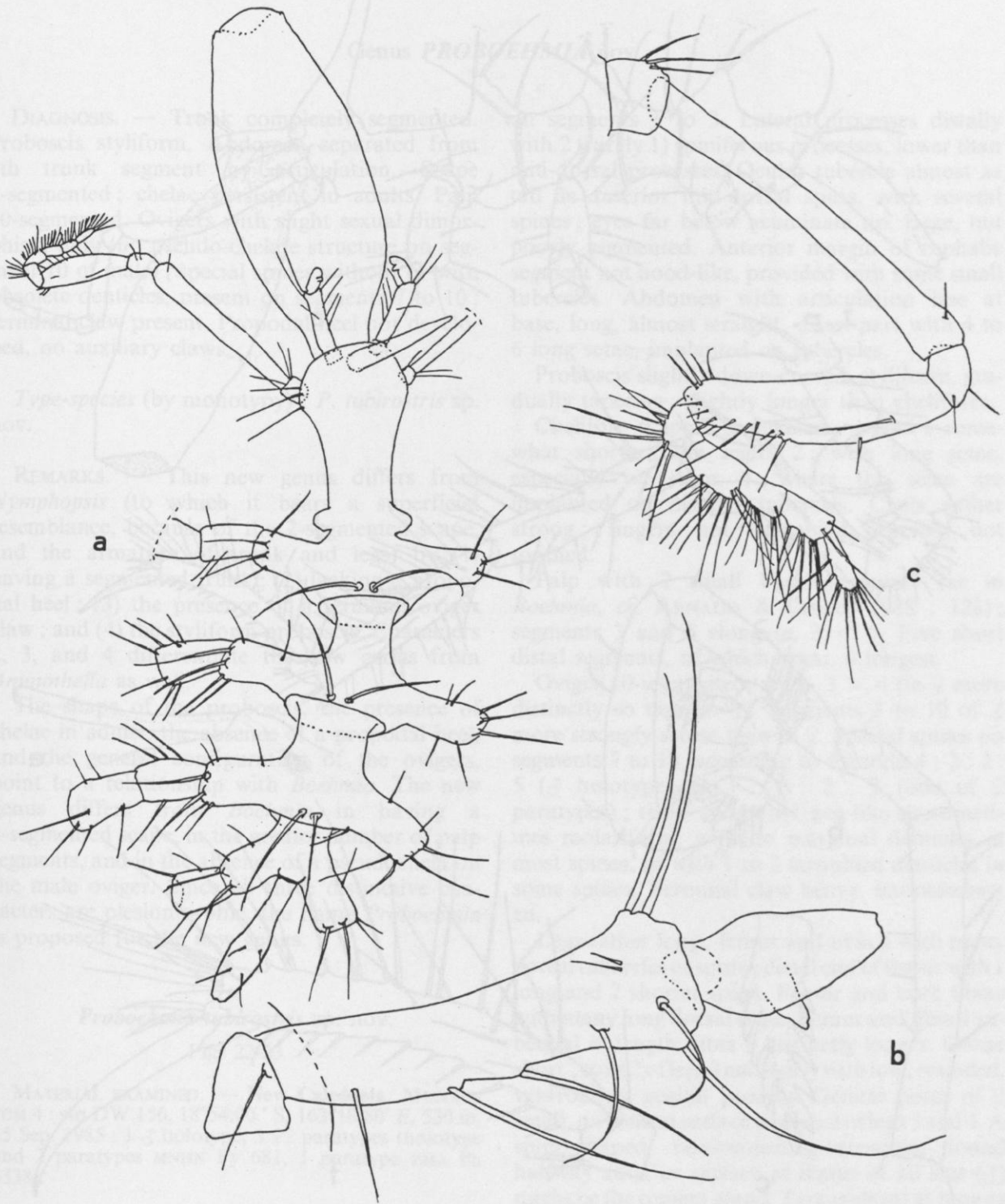


FIG. 20. — *Cilunculus pedatus* sp. nov. : a, body, ♀, dorsal ; b, chelifore, ♂ ; c, palp, ♂.

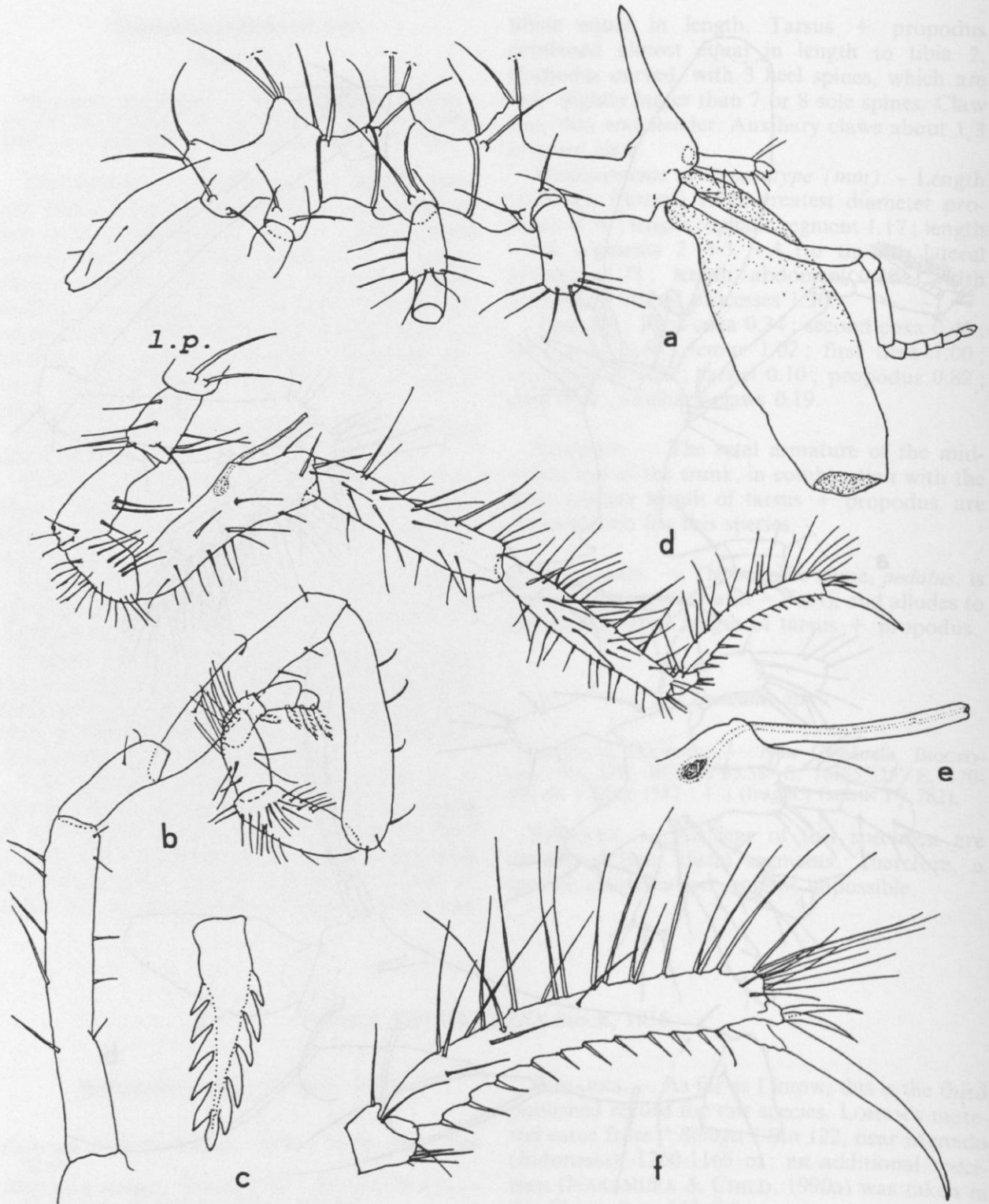


FIG. 21. — *Cilunculus pedatus* sp. nov., ♂ : a, body, from the right ; b, oviger ; c, distalmost compound spine of oviger segment 10 ; d, third leg ; e, cement gland of third leg ; f, distal segments of third leg.

Genus *PROBOEHMIA* nov.

**DIAGNOSIS.** — Trunk completely segmented. Proboscis styliform. Abdomen separated from 4th trunk segment by articulation. Scape 2-segmented; chelae persistent in adults. Palp 10-segmented. Ovigera with slight sexual dimorphism only (no pseudo-chelate structure on segment 10 of male); special spines without or with obsolete denticles, present on segments 7 to 10; terminal claw present. Propodal heel not developed, no auxiliary claws.

*Type-species* (by monotypy) : *P. tubirostris* sp. nov.

**REMARKS.** — This new genus differs from *Nymphopsis* (to which it bears a superficial resemblance, because of the 2-segmented scape, and the armature of trunk and legs) by (1) having a segmented trunk; (2) lacking a propodal heel; (3) the presence of a terminal ovigera claw; and (4) the styliform proboscis. Characters 2, 3, and 4 differentiate the new genus from *Ammothella* as well.

The shape of the proboscis, the presence of chelae in adults, the absence of a propodal heel, and the general configuration of the ovigera, point to a relationship with *Boehmia*. The new genus differs from *Boehmia* in having a 2-segmented scape, in the greater number of palp segments, and in the absence of a pseudochela on the male ovigera. Since all three distinctive characters are plesiomorphic, the name *Proboehmia* is proposed for the new genus.

*Proboehmia tubirostris* sp. nov.

Figs 22-23

**MATERIAL EXAMINED.** — New Caledonia. MUSORSTOM 4 : stn DW 156, 18°54.00' S, 163°18.80' E, 530 m, 15 Sep. 1985 : 1 ♂ holotype, 3 ♀♀ paratypes (holotype and 2 paratypes MNHN Py 681, 1 paratype ZMA Pa 3338).

**DESCRIPTION.** — Trunk compact, completely segmented; lateral processes (almost) touching. Each trunk segment with tall, spiniferous, mid-dorsal spur, that on segment 4 lower than those

on segments 1 to 3. Lateral processes distally with 2 (rarely 1) spiniferous processes, lower than mid-dorsal processes. Ocular tubercle almost as tall as anterior mid-dorsal spurs, with several spines; eyes far below acuminate tip, large, but poorly pigmented. Anterior margin of cephalic segment not hood-like, provided with some small tubercles. Abdomen with articulation line at base, long, almost straight, distal part with 4 to 6 long setae, implanted on tubercles.

Proboscis slightly down-curved, styliform, gradually tapering; slightly longer than chelifores.

Chelifore scape 2-segmented; segm. 1 somewhat shorter than segm. 2; with long setae, especially on segm. 1, where the setae are implanted on distinct tubercles. Chela rather strong; fingers not atrophied, curved, not toothed.

Palp with 2 small basal segments (as in *Boehmia*, cf. ARNAUD & CHILD, 1988 : 128); segments 3 and 5 elongate, 3 < 5. Five short distal segments, of which segm. 6 longest.

Ovigera 10-segmented, segm. 3 > 4 (in ♀ more distinctly so than in ♂). Segments 3 to 10 of ♂ more strongly setose than in ♀. Special spines on segments 7 to 10, according to formula 4 : 2 : 2 : 5 (♂ holotype) or 3 : 1 : 2 : 3 (one of ♀ paratypes); these spines are peg-like or sometimes molariform, with no marginal denticles in most spines, or with 1 to 2 atrophied denticles in some spines. Terminal claw heavy, unornamented.

Legs rather long; femur and tibia 1 with many dorsal tubercles or spurs; distal end of femur with 1 long and 2 shorter spurs. Femur and both tibiae with many long dorsal setae. Femur and tibia 1 subequal in length, tibia 2 distinctly longer. Coxae short; coxa 2 of legs 3 and 4 of ♂ with low, rounded, ventrodorsal genital process. Genital pores of ♀ small, on ventral surface of coxa 2 of legs 3 and 4. A spiral-shaped, non-projecting structure found halfway anterior surface of femur of all legs (♂) might be the cement gland. Tarsus about as long as wide. Propodus slightly curved, without heel or heel spines; sole with row of minute spinules. Claw short, no auxiliary claws. Propodus of all legs of similar morphology.



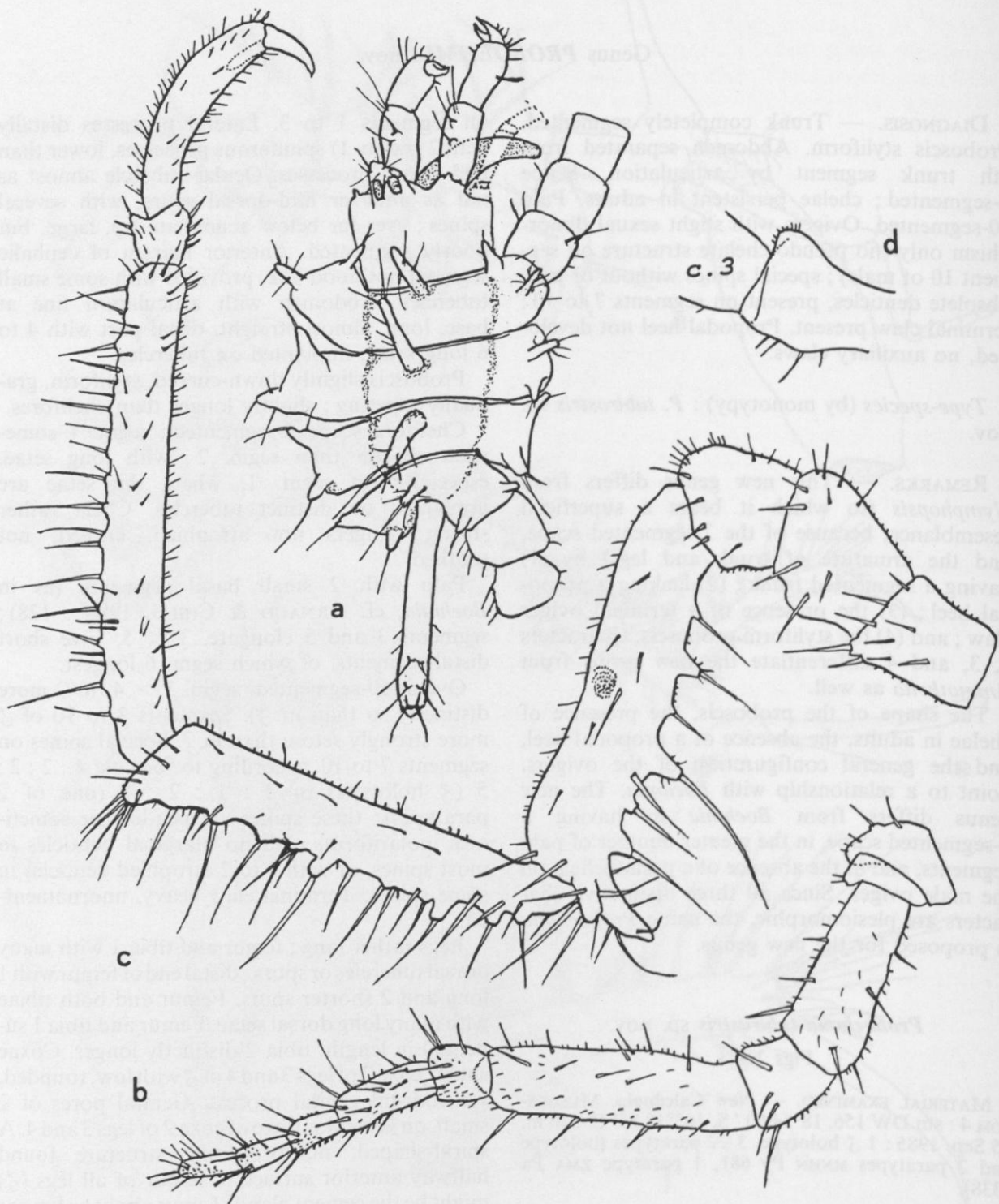


FIG. 22. — *Proboehmia tubirostris* gen. nov., sp. nov.: a, trunk, ♀, dorsal; b, palp, ♂; c, first leg, ♂; d, coxa 2 of leg 3, ♂.

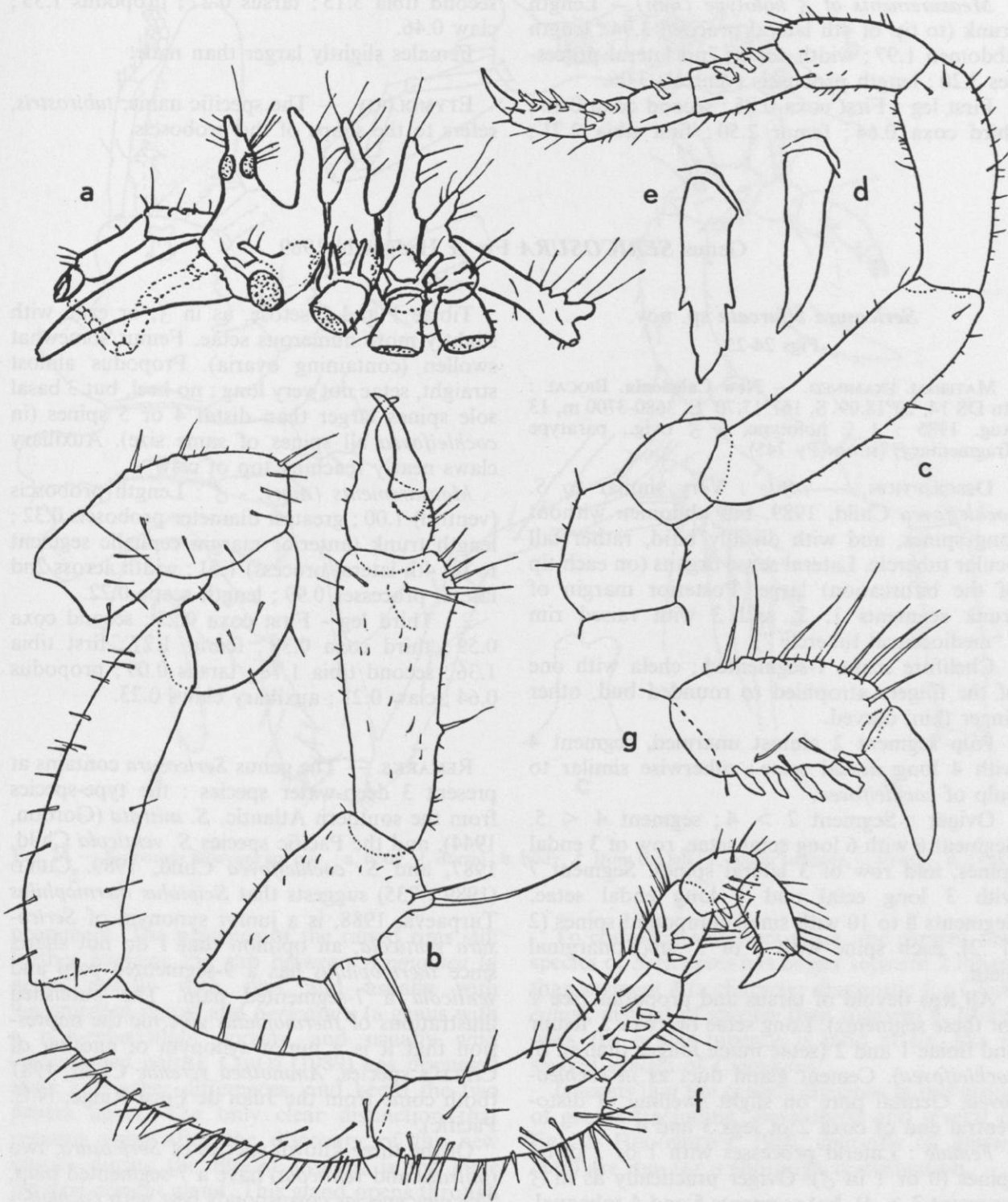


FIG. 23. — *Proboehmia tubirostris* gen. nov., sp. nov. : a, trunk, ♂, from the left ; b, chelifore, ♂ ; c, oviger, ♀ ; d, special spine n° 2 of oviger segment 10, ♀ ; e, special spine n° 3 of same segment ; f, oviger, ♂ ; g, distal part of oviger, ♂.

*Measurements of ♂ holotype (mm).* - Length trunk (to tip of 4th lateral process) 3.94; length abdomen 1.97; width across 2nd lateral processes 3.20; length proboscis (ventral) 3.06.

First leg : First coxa 0.85; second coxa 0.86; third coxa 0.64; femur 2.50; first tibia 2.71;

second tibia 3.15; tarsus 0.27; propodus 1.35; claw 0.46.

Females slightly larger than male.

ETYMOLOGY. — The specific name, *tubirostris*, refers to the shape of the proboscis.

### Genus *SERICOSURA* Fry & Hedgpeth, 1969

#### *Sericosura bifurcata* sp. nov.

Figs 24-25

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DS 14, 20°18.09' S, 167°17.70' E, 3680-3700 m, 13 Aug. 1985 : 1 ♀ holotype, 1 ♂ ovig., paratype (fragmentary) (MNHN Py 745).

DESCRIPTION. — *Male* : Very similar to *S. cochleifovea* Child, 1989, but abdomen without long spines, and with distally bifid, rather tall ocular tubercle. Lateral sense organs (on each tip of the bifurcation) large. Posterior margin of trunk segments 1, 2, and 3 with raised rim ("mediodorsal tubercle").

Chelifore scape 1-segmented; chela with one of the fingers atrophied to rounded bud, other finger thin, curved.

Palp segment 2 almost unarmed, segment 4 with 4 long dorsal setae; otherwise similar to palp of *cochleifovea*.

Oviger : Segment 2 > 4; segment 4 < 5. Segment 6 with 6 long ectal setae, row of 3 endal spines, and row of 3 lateral spines. Segment 7 with 3 long ectal and 1 long endal setae. Segments 8 to 10 with small compound spines (2 : 1 : 2), each spine with 2 or 3 small marginal teeth.

All legs devoid of tarsus and propodus (see ♀ for these segments). Long setae on coxa 2, femur and tibiae 1 and 2 (setae much longer than in *S. cochleifovea*). Cement gland duct as in *cochleifovea*. Genital pore on slight swelling of disto-ventral end of coxa 2 of legs 3 and 4.

*Female* : Lateral processes with 1 or 2 distal spines (0 or 1 in ♂). Oviger practically as in ♂ (segment 2 > 4), but segments 5 and 4 subequal. One compound spine present on segment 7 (such spine, as far I can see, absent in ♂); segments 8 to 10 with same number of compound spines as in ♂.

Tibiae 1 and 2 setose, as in ♂, or even with slightly more numerous setae. Femur somewhat swollen (containing ovaria). Propodus almost straight, setae not very long; no heel, but 3 basal sole spines larger than distal 4 or 5 spines (in *cochleifovea* all spines of same size). Auxiliary claws nearly reaching top of claw.

*Measurements (mm).* - ♂ : Length proboscis (ventral) 1.00; greatest diameter proboscis 0.32; length trunk (anterior margin cephalic segment to tip 4th lateral process) 1.51; width across 2nd lateral processes 0.99; length scape 0.22.

♀ : Third leg - First coxa 0.23; second coxa 0.59; third coxa 0.38; femur 1.27; first tibia 1.36; second tibia 1.18; tarsus 0.09; propodus 0.64; claw 0.27; auxiliary claws 0.23.

REMARKS. — The genus *Sericosura* contains at present 3 deep-water species : the type-species from the southern Atlantic, *S. mitrata* (Gordon, 1944), and the Pacific species *S. venticola* Child, 1987, and *S. cochleifovea* Child, 1989. CHILD (1989 : 735) suggests that *Scipiolus thermophilus* Turpaeva, 1988, is a junior synonym of *Sericosura venticola*, an opinion that I do not share, since *thermophilus* has a 9-segmented palp and *venticola* a 7-segmented palp. The published illustrations of *thermophilus* give me the impression that it is a junior synonym of another of CHILD's species, *Ammonothea verenae* Child, 1987 (both come from the Juan de Fuca Ridge, N.E. Pacific).

Of the three known species of *Sericosura*, two (*mitrata* and *venticola*) have a 7-segmented palp. The new species corresponds best with *cochleifovea* in having a 9-segmented palp. None of the three described species has a raised rim ("tubercles") on the mid-dorsal line of trunk segments 1, 2, and 3, but in the new species such rims are



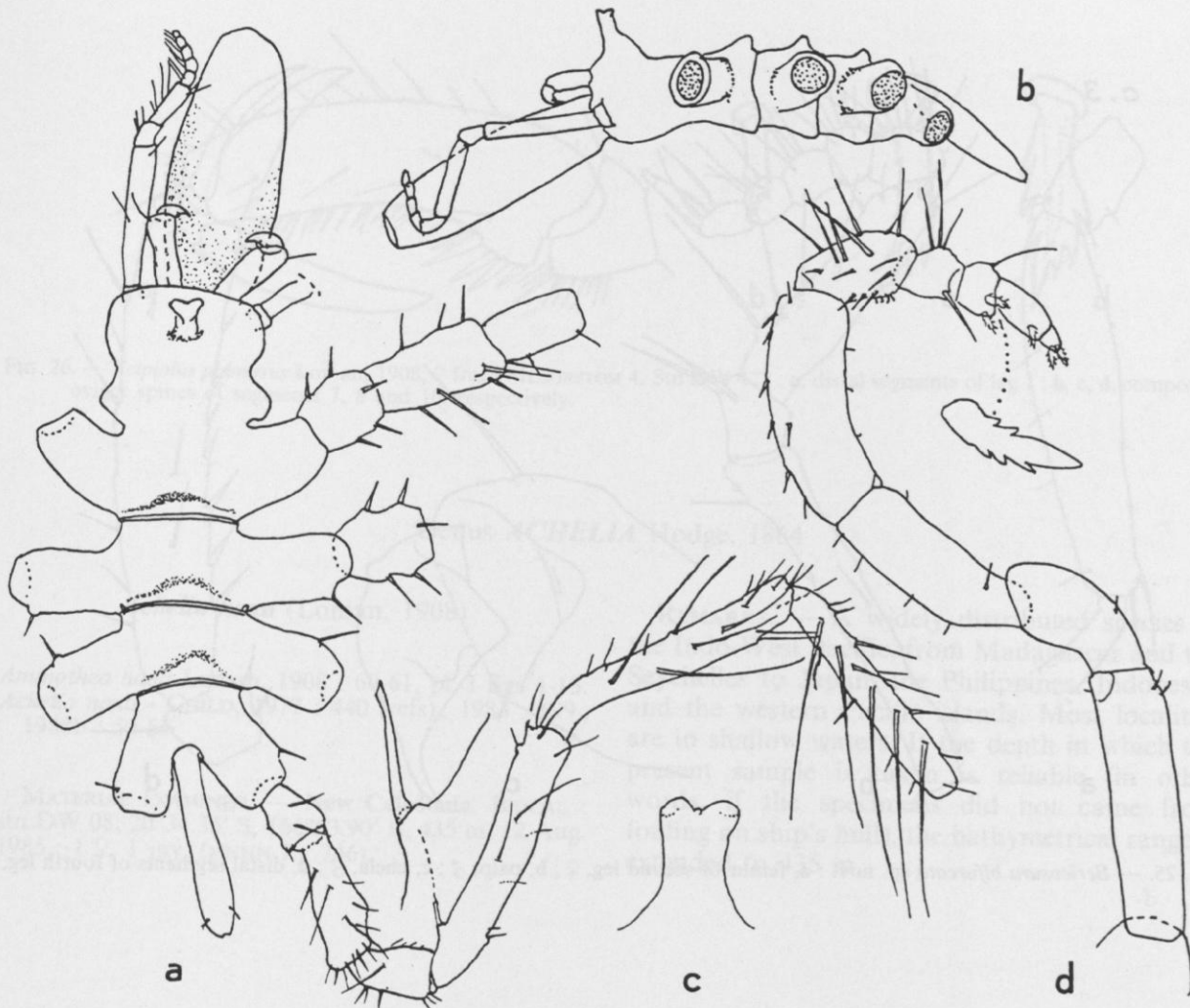


FIG. 24. — *Sericosura bifurcata* sp. nov.: a, body, ♂, dorsal; b, body, ♂, from the left; c, ocular tubercle, ♀, frontal; d, oviger, ♂.

prominent. The presence of the raised rims still further narrows the gap between *Ammothella* (a genus usually with rims and usually with 9-segmented palps) and *Sericosura* (a genus with a non-tuberculate dorsum and usually with 7-segmented palps). CHILD (1989) has discussed these and other differences, and keeps the two genera apart. The only clear distinction that remains valid after the discovery of the new species during the BIOCAL cruises, is the male femoral cement gland. This gland opens through a long duct on the dorsoproximal end of the femur in *Sericosura*, through a pore on an inconspicuous swelling near the distal end of the femur in *Ammothella*.

To complicate matters more, the present new species of *Sericosura* has oviger segment 2 longer than segment 4 (a character diagnostic for *Cilunculus*), instead of shorter than segment 4. Moreover, the ocular tubercle is bifid at tip, like in several species of *Cilunculus*.

It seems that the generic divisions in this group of genera (including *Ammothella* and several of FRY & HEDGPETH's, 1969, split-offs of *Ammothella*) are due for a thorough re-evaluation.

ETYMOLOGY. — The specific name, *bifurcata*, refers to the bifid distal end of the ocular tubercle.

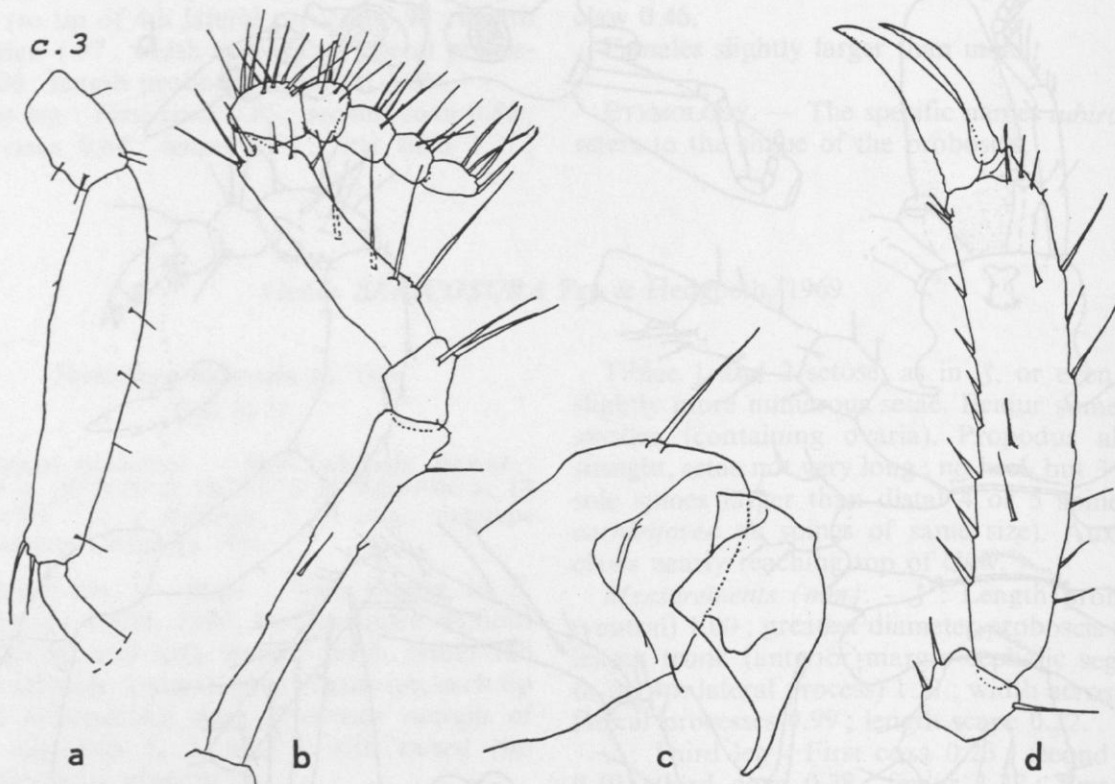


FIG. 25. — *Sericosura bifurcata* sp. nov. : a, femur of second leg, ♀; b, palp, ♂; c, chela, ♂; d, distal segments of fourth leg, ♂.

### Genus *SCIPIOLUS* Loman, 1908

#### *Scipiolus plumosus* Loman, 1908

Fig. 26

*Scipiolus plumosus* Loman, 1908 : 58-59, pl. 15 figs 204-212. — STOCK, 1957 : 91, figs 10 a, c, 11.

MATERIAL EXAMINED. — **Loyalty Islands.** MUSORS-TOM 6 : stn DW 472, 21°08.60' S, 167°54.70' E, 300 m, 22 Feb. 1989 : 1 ♀ (MNHN Py 783).

**New Caledonia.** CHALCAL 2 : stn DW 83, 23°20.30' S, 168°05.50' E, 200 m, 31 Oct. 1986 : 1 ♀ (MNHN Py 833).

REMARKS. — This species was only known

from the holotype, likewise a female, from "Siboga" Stn 260 (Kei Islands, 90 m). LOMAN states in the original description that auxiliary claws are absent. Re-examination of the holotype showed this statement to be erroneous : minute auxiliaries are present both in the holotype and in the present specimen (fig. 26a). The ovigers of both New Caledonian specimens bear special spines on segments 6(!), 7, 8, 9, and 10 (formula 1 : 2 : 2 : 1 : 2). The special spines on the proximal segments are spiniform to lanceolate, with 1 to 4 pairs of marginal denticles ; distal spines leaf-like, with 3 to 4 pairs of denticles.

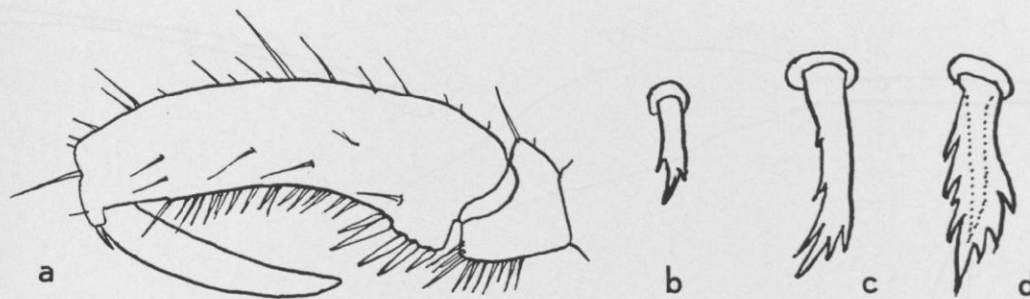


FIG. 26. — *Scipiolus plumosus* Loman, 1908, ♀ from MUSORSTOM 4, Stn DW 472 : a, distal segments of leg I ; b, c, d, compound oviger spines of segments 7, 8 and 10, respectively.

### Genus *ACHELIA* Hodge, 1864

#### *Achelia nana* (Loman, 1908)

*Ammothea nana* Loman, 1908 : 60-61, pl. I figs 1-13.  
*Achelia nana* - CHILD, 1977 : 440 (refs); 1983 : 699;  
 1988b : 50-51.

MATERIAL EXAMINED. — **New Caledonia**. BIICAL :  
 stn DW 08, 20°34.35' S, 166°53.90' E, 435 m, 12 Aug.  
 1985 : 1 ♀, 1 juv. (MNHN Py 746).

REMARKS. — A widely distributed species in the Indo-West Pacific, from Madagascar and the Seychelles to Japan, the Philippines, Indonesia, and the western Pacific islands. Most localities are in shallow waters. If the depth in which the present sample is taken is reliable (in other words, if the specimens did not come from fouling on ship's hull), the bathymetrical range is extended to 435 m.

### Family COLOSSENDEIDAE

#### Genus *RHOPALORHYNCHUS* Wood-Mason, 1883

#### *Rhopalorhynchus filipes* sp. nov.

Fig. 27

MATERIAL EXAMINED. — **Chesterfield Islands**. MUSORSTOM 5 : stn CP 254, 25°10.07' S, 159°53.07' E, 280-290 m, 7 Oct. 1986 : 2 ♂♂ (MNHN Py 697). — Stn CP 259, 25°31.64' S, 159°44.47' E, 285 m, 8 Oct. 1986 : 1 ♂ (MNHN Py 695). — Stn DW 262, 25°24.89' S, 159°30.80' E, 300 m, 8 Oct. 1986 : 1 ♂ (MNHN Py 692). — Stn CP 267, 25°23.60' S, 159°47.20' E, 285 m, 8 Oct. 1986 : 2 ♂♂, 1 ♀ (MNHN Py 696). — Stn CP 268, 24°44.70' S, 159°39.20' E, 280 m, 9 Oct. 1986 : 1 ♀ holotype (MNHN Py 726), 7 ♂♂, 9 ♀♀ (MNHN Py 691 and 693). — Stn CP 269, 24°47.00' S, 159°37.30' E, 270-250 m, 9 Oct. 1986 : 7 ♂♂, 9 ♀♀ (12 MNHN Py 689, 4 ZMA Pa 3332). — Stn CP 275, 24°46.60' S, 159°40.30' E, 285 m, 9 Oct. 1986 : 6 ♂♂, 8 ♀♀ (MNHN Py 694). —

Stn CP 279, 24°08.72' S, 159°37.76' E, 260-270 m, 10 Oct. 1986 : 1 ♀ (?) paratype (MNHN Py 728), 2 ♂♂, 3 ♀♀ (MNHN Py 698). — Stn CP 293, 23°09.35' S, 159°30.80' E, 280 m, 10 Oct. 1986 : 4 ♂♂, 8 ♀♀ (MNHN Py 699). — Stn CP 310, 22°14' S 159°24' E, 320 m, 12 Oct. 1986 : 1 ♀, 1 ♀ (?), paratypes (MNHN Py 727).

**Between Loyalty Islands and New Caledonia**. MUSORSTOM 6 : stn DW 462, 21°05.10' S, 167°26.85' E, 200 m, 21 Feb. 1989 : 1 ♀ paratype (ZMA Pa 3324).

DESCRIPTION. — Body extremely slender, lateral processes 1 and 2, and 2 and 3 separated by distance at least 6 times as wide as diameter lateral process. Each lateral process (except 4th) very short. Ocular tubercle strongly pointed above eyes, point bent slightly forward.



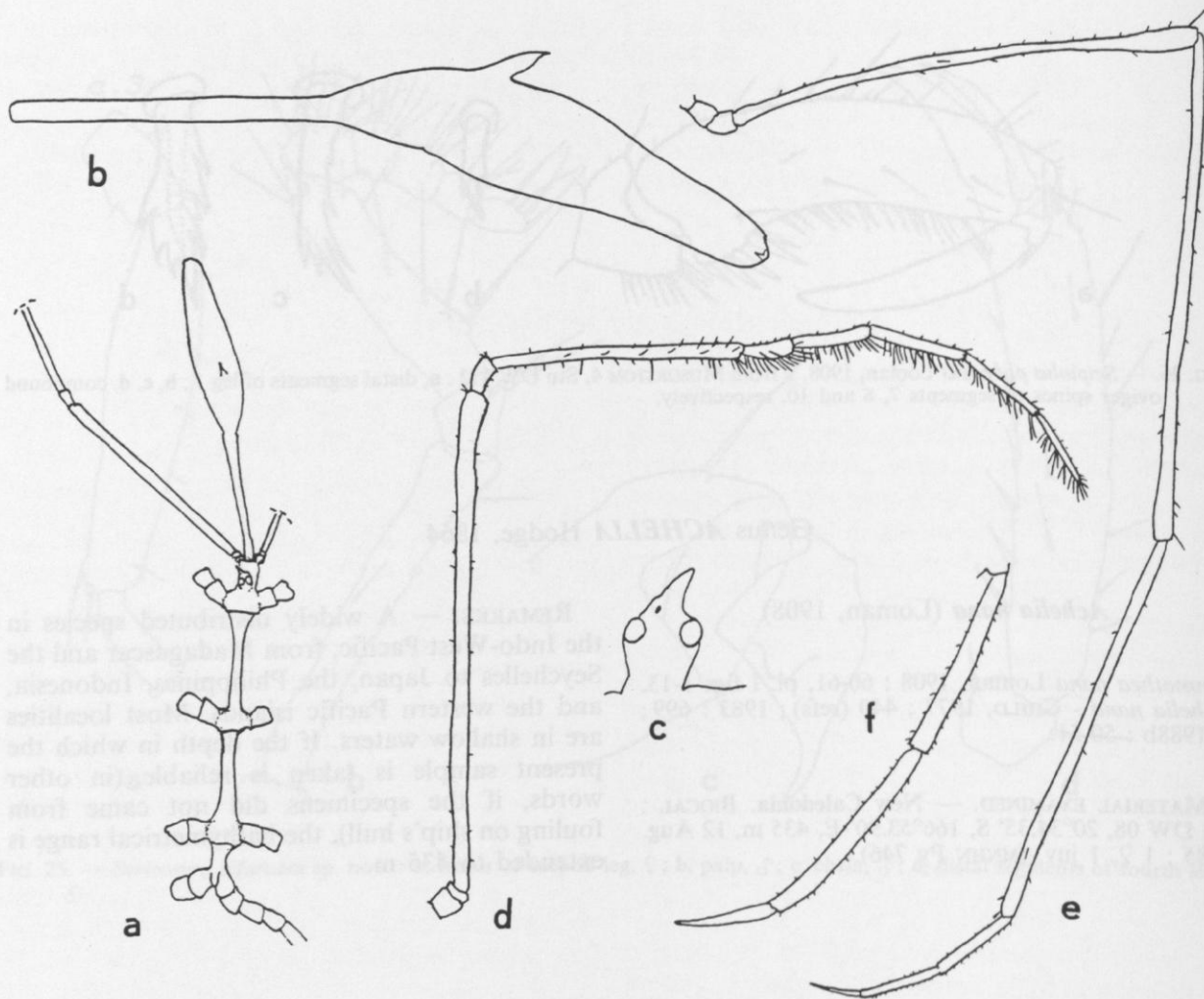


FIG. 27. — *Rhopalorhynchus filipes* sp. nov., ♀ holotype : a, body, dorsal ; b, proboscis, from the right ; c, ocular tubercle, from the right ; d, leg ; e, distal leg segments.

Proboscis narrow, not very pointed ; basal stalk long, dorsal tooth strong, situated at ca. 35 % of length of inflated part.

Palp segment 6 between 55 and 60 % of length of segment 7. Distal palp segments, in particular segments 8 and 9, very thin and slender, almost filiform.

Legs brevitarsal (tarsus + propodus + claw ca. 46 % of length of tibia 2). Tarsus subequal to propodus. Propodal sole with 0-8 spinules. Claw about half as long as propodus.

*Measurements of ♀ holotype (mm).*— Length trunk (frontal margin cephalic segment to tip 4th lateral process) 7 ; width across 2nd lateral processes 0.7 ; total length proboscis 6.3 ; remaining dimensions of proboscis :  $\alpha$  4.24,  $\beta$  2.68,  $\gamma$

3.85,  $\delta$  2.58, ( $\epsilon$ ) 0.88, ( $\zeta$ ) 0.41. Leg : first to third coxae 1.5 ; femur 9.5 ; first tibia 9.7 ; second tibia 9.0 ; tarsus 1.4 ; propodus 1.8 ; claw 0.9.

**REMARKS.** — The new species belongs to the brevitarsal group of the genus *Rhopalorhynchus* (vide STOCK, 1958 : 117), of which 4 species are known : *Rh. pedunculatus* Stock, 1957, *Rh. clavipes* Carpenter, 1893, *Rh. gracillimus* Carpenter, 1907, and *Rh. mortenseni* Stock, 1958.

In the general slender shape of the trunk and the proboscis, it resembles *pedunculatus*, but it differs from this Red Sea species in that the stalk of the proboscis is shorter than the inflated part, in the very thin, narrow and slender (almost filiform) distal four palp segments, in the poorly

armed propodal sole, and in a more slender claw on the legs.

With *clavipes* (Torres Strait) it agrees in the scantily armed propodal sole, but it differs in the more prominent dorsal tooth of the proboscis, more widely spaced lateral processes, a shorter 6th palp segment, and much more slender palp segments 7 to 10.

From *gracillimus* (Indian Ocean, Indonesia), the palp of the new species differs in the same way as for *clavipes*. Moreover, the tarsus and propodus of *clavipes* are densely spinulose.

*Rh. mortenseni* (Philippines) differs likewise in a densely spinulose tarsus and propodus, and a smaller dorsal tooth on the proboscis.

*Variability*.— The proboscis of the males is invariably more slender (less inflated distal part, slightly longer basal stalk) than that of the

females. The size of the dorsal tooth on the proboscis is sometimes somewhat smaller than in the type series (e.g., in some specimens from MUSORSTOM 5 : CP 293), but otherwise these specimens are very similar to the types.

ETYMOLOGY. — The specific name, *filipes*, alludes to the thin and slender legs.

### *Rhopalorhynchus* sp.

MATERIAL EXAMINED. — **New Caledonia**. MUSORSTOM 5, stn CP 287 : 24°05.40' S, 159°36.30' E, 270 m, 10 Oct. 1986, 1 fragm. (MNHN Py 845).

REMARKS. — Three legs only, no trunk, are present in this sample.

## Genus *COLOSSENDEIS* Jarzynsky, 1870

### *Colossendeis bicincta* Schimkewitsch, 1893

*Colossendeis bicincta* Schimkewitsch, 1893 : 27-29, pl. 1 figs 1-3. — STOCK, 1978 : 409-411, figs 1 a-f, 3 ; 1984a : 745-746.

MATERIAL EXAMINED. — **Valufa Ridge, Lau Basin**. BIOLAU : stn 07 : 22°32' S, 176°43' E, 1900 m, 19 May 1989 : 1 spm. (ZMA Pa 3336).

REMARKS. — Although not from the New Caledonian zone of the Pacific, this specimen from the Lau Basin is included here, mainly because it is new for the western Pacific. Previously recorded from deep waters in the eastern Pacific and eastern Atlantic.

### *Colossendeis colossea* Wilson, 1881

*Colossendeis colossea* - STOCK, 1988 : 508 (refs).

MATERIAL EXAMINED. — **New Caledonia**. BIICAL : stn CP 72, 22°09.02' S, 167°33.18' E, 2100-2110 m, 4 Sep. 1985 : 1 spm. (MNHN Py 784).

**Between New Caledonia and the Chesterfield Islands**. BIOGEOCAL : stn CP 205, 22°40.61' S, 166°28.01' E, 1350-1380 m, 8 Apr. 1987 : 1 fragmentary specimen (MNHN Py 785).

REMARKS. — A circumglobal deep-water species.

### *Colossendeis macerrima* Wilson, 1881

*Colossendeis macerrima* - STOCK, 1988 : 508 (refs).

MATERIAL EXAMINED. — **Chesterfield Islands**. MUSORSTOM 5 : stn CP 323, 21°18.52' S, 157°57.62' E, 970 m, 14 Oct. 1986 : 4 spms (MNHN Py 686). — Stn CP 324, 21°15.01' S, 157°51.33' E, 970 m, 14 Oct. 1986 : 8 spms (MNHN Py 687 & 703).

REMARKS. — A circumglobal deep-water species.

### *Colossendeis minor* Schimkewitsch, 1893

*Colossendeis minor* - STOCK, 1984b : 702-704, figs 1-6. — 1986 : 417, fig. 5d.

MATERIAL EXAMINED. — **New Caledonia**. BIICAL : stn CP 72, 22°09.02' S, 167°33.18' E, 2100-2110 m, 4 Sep. 1985 : 4 spms (MNHN Py 704). — Stn CP 74, 22°14.06' S, 167°29.01' E, 1300-1475 m, 4 Sep. 1985 : 1 spm. (MNHN Py 710).

REMARKS. — Widely distributed in the Indo-Pacific Ocean.

*Colossendeis pipetta* sp. nov.

Fig. 28

MATERIAL EXAMINED. — **New Caledonia.** "Vauban" Dredgings : stn 15, 22°49' S, 167°12' E, dredge, 390 m, 10 Apr. 1978 : 2 spms (ZMA Pa. 3331).

**BIOCAL** : stn DW 38, 22°59.74' S, 167°15.31' E, 360 m, 30 Aug. 1985 : 1 spm. (MNHN Py 707). — Stn CP 74, 22°14.06' S, 167°29.01' E, 1300-1475 m, 4 Sep. 1985 : 1 spm. (MNHN Py 786).

**MUSORSTOM 4** : stn CP 155, 18°52.80' S, 163°19.50' E, 570 m, 15 Sep. 1985 : 1 spm. (MNHN Py 787). — Stn CP 194, 18°52.80' S, 163°21.70' E, 550 m, 19 Sep. 1985 : 1 spm. (MNHN Py 820). — Stn DW 197, 18°51.30' S, 163°21.00' E, 560 m, 20 Sep. 1985 : 1 spm. (MNHN Py 670). — Stn CP 215, 22°55.70' S, 167°17.00' E, 520 m, 28 Sep. 1985 : 3 spms (MNHN Py 667). — Stn CP 216, 22°59.50' S, 167°22.00' E, 515 m, 29 Sep. 1985 : 1 spm. (MNHN Py 678). — Stn DW 221, 22°58.60' S, 167°36.80' E, 560 m, 29 Sep. 1985 : 1 spm. (MNHN Py 788). — Stn DW 226, 22°47.20' S, 167°21.60' E, 395 m, 30 Sep. 1985 : 1 spm. (MNHN Py 676). — Stn DW 229, 22°51.60' S, 167°13.50' E, 460 m, 30 Sep. 1985 : 1 spm. (MNHN Py 671). — Stn DW 230, 22°52.50' S, 167°11.80' E, 420 m, 30 Sep. 1985 : 1 spm. (MNHN Py 789). — Stn DW 234, 22°15.5' S, 167°08.30' E, 365 m, 2 Oct. 1985 : 1 spm. (MNHN Py 673).

**CHALCAL 2** : stn CP 27, 23°15.29' S, 168°04.55' E, 289 m, 31 Oct. 1986 : 1 spm. (MNHN Py 661). — Stn DW 76, 23°40.50' S, 167°45.20' E, 470 m, 30 Oct. 1986 : 1 spm. (MNHN Py 663).

**SMIB 4** : stn DW 53, 23°40.1' S, 167°59.9' E, 270 m, 9 Mar. 1989 : 1 spm. holotype (MNHN Py 747).

**SMIB 6** : stn DW 115, 19°00.1' S, 163°27.5' E, 280 m, 2 Mar. 1990 : 1 spm.

**Chesterfield Islands.** **MUSORSTOM 5** : stn DW 337, 19°53.80' S, 158°38.00' E, 412-430 m, 15 Oct. 1986 : 1 spm. (MNHN Py 688). — Stn DW 338, 19°51.60' S, 158°40.40' E, 540-580 m, 15 Oct. 1986 : 1 spm. (MNHN Py 822). — Stn DC 372, 19°52.96' S, 158°36.63' E, 400 m, 20 Oct. 1986 : 1 spm. (MNHN Py 700).

**Loyalty Islands.** **MUSORSTOM 6** : stn DW 478, 21°08.96' S, 167°54.28' E, 400 m, 22 Feb. 1989 : 1 spm. paratype (MNHN Py 748).

DESCRIPTION. — Trunk unsegmented. Lateral processes separated by about twice own diameter. Ocular tubercle low, slightly pointed above well-pigmented eyes. Abdomen overreaching coxa 1 of leg 4, almost horizontal.

Proboscis of characteristic shape : constricted at base, then slightly inflated from about 20 % to about 50 % of its length, then tapering into tubiform, slightly down-curved distal part. Proboscis somewhat longer than trunk.

Palp 10-segmented. Segment 3 as long as segment 5. Segments 6 and 7 of equal length, segment 8 much shorter, segment 9 slightly longer than 8, segment 10 distinctly longer than 8. Distal four palp segments together more than 20 % of total palp length.

Oviger 10-segmented. Segments 3 and 5 extremely slender. Compound spines of spatulate type, placed in 3 more or less distinct rows on oviger segments 7 to 10 ; major spine row according to formula 8 : 12 : 10 : 11. Claw short, straightish, unarmed.

Legs brevitarsal, very thin and elongate. Femur < tibia 1 < tibia 2. Tarsus almost twice as long as propodus. Ventral margin of tarsus and propodus with some more conspicuous spines (6-10 in number), interspaced by minute spinules. Claw short, between 25 and 30 % of length of propodus.

*Measurements of holotype (mm).* - Length trunk (frontal margin cephalic segment to tip 4th lateral process) 6 ; width across 2nd lateral processes 2 ; length proboscis 7.5. Third leg : femur 14.5 ; first tibia 16.3 ; second tibia 21.0 ; tarsus 3.3 ; propodus 1.7.

REMARKS. — The new species has a narrow, tubiform distal part of the proboscis and resembles in this respect *C. macerrima* Wilson, 1881, *C. leptorhynchus* Hoek, 1881, *C. gardineri* Carpenter, 1907, *C. minuta* Hoek, 1881 [= *japonica* Hoek, 1898, *vide* STOCK, 1963], *C. minor* Schimkewitsch, 1893, *C. nasuta* Hedgpeth, 1949, *C. mica* Pushkin, 1970, *C. spei* Pushkin, 1970, *C. pennata* Pushkin, 1970.

From the *C. macerrima*-complex (incl. *C. minor*), the new species differs in the palp : segments 2 and 4 are subequal, segments 8 + 9 + 10 are much longer than segment 7. *C. gardineri* differs in having an upcurved proboscis, which is not bulbous in the middle, and a longer 7th palp segment, but is otherwise not unlike the new species.

In the palp, *C. nasuta* corresponds rather well with the new species, but tarsus and propodus in *nasuta* are of equal length, the claw of the legs is 2/3 of the propodus, tibia 2 is much shorter than tibia 1, and the proboscis is longer.

The basal palp segments and the claw of the legs of *C. minuta* agree rather well with those of *C. pipetta*. However, the tarsus of *minuta* is



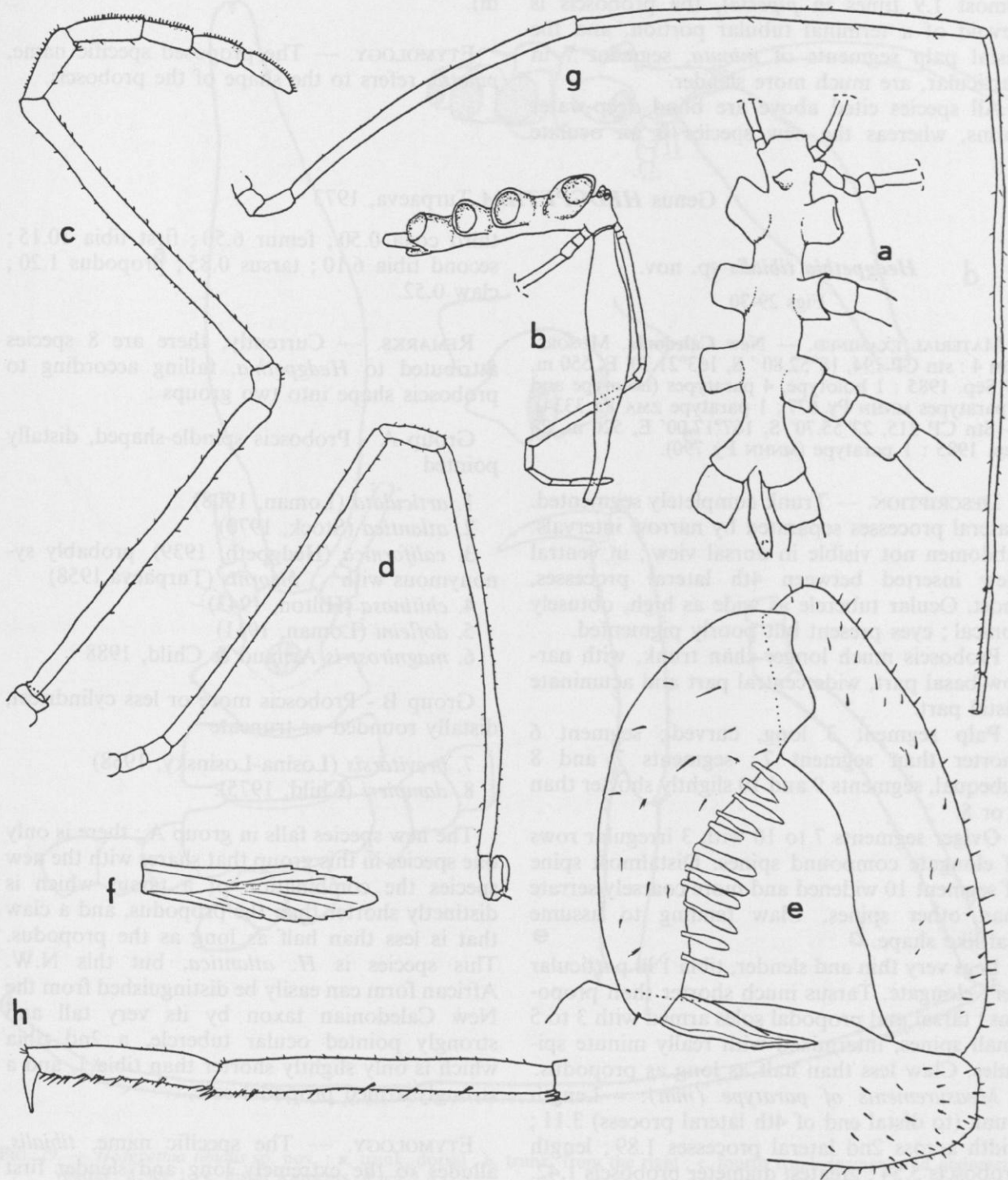


FIG. 28. — *Colossendeis pipetta* sp. nov., holotype : a, trunk, dorsal ; b, body, from the right ; c, palp ; d, oviger ; e, distal oviger segments (auxiliary rows of compound spines on segment 10 omitted, as well as all compound spines of segments 8 and 9) ; f, compound spine of main row of segment 10 ; g, fourth leg ; h, distal segments of fourth leg.

shorter (1.5 times as long as the propodus, versus almost 1.9 times in *pipetta*), the proboscis is devoid of a terminal tubular portion, and the distal palp segments of *minuta*, segment 7 in particular, are much more slender.

All species cited above are blind deep-water forms, whereas the new species is an oculate

form from relatively shallow waters (270-1475 m).

ETYMOLOGY. — The proposed specific name, *pipetta*, refers to the shape of the proboscis.

### Genus *HEDGPETHIA* Turpaeva, 1973

#### *Hedgpethia tibialis* sp. nov.

Figs 29-30

MATERIAL EXAMINED. — New Caledonia. MUSORSTOM 4 : stn CP 194, 18°52.80' S, 163°21.70' E, 550 m, 19 Sep. 1985 : 1 holotype, 4 paratypes (holotype and 3 paratypes MNHN Py 677 ; 1 paratype ZMA Pa 3334). — Stn CP 215, 22°55.70' S, 167°17.00' E, 520 m, 28 Sep. 1985 : 1 paratype (MNHN Py 790).

DESCRIPTION. — Trunk completely segmented. Lateral processes separated by narrow intervals. Abdomen not visible in dorsal view ; in ventral view inserted between 4th lateral processes, short. Ocular tubercle as wide as high, obtusely conical ; eyes present but poorly pigmented.

Proboscis much longer than trunk, with narrow basal part, wide central part and acuminate distal part.

Palp segment 3 long, curved ; segment 6 shorter than segment 7 ; segments 7 and 8 subequal, segments 9 and 10 slightly shorter than 7 or 8.

Oviger segments 7 to 10 with 3 irregular rows of elongate compound spines. Distalmost spine of segment 10 widened and more coarsely serrate than other spines. Claw tending to assume leaf-like shape.

Legs very thin and slender, tibia 1 in particular very elongate. Tarsus much shorter than propodus ; tarsal and propodal soles armed with 3 to 5 small spines, intermixed with really minute spinules. Claw less than half as long as propodus.

Measurements of paratype (mm). - Length trunk (to distal end of 4th lateral process) 3.11 ; width across 2nd lateral processes 1.89 ; length proboscis 5.54 ; greatest diameter proboscis 1.42.

First leg : First coxa 0.73 ; second coxa 0.77 ;

third coxa 0.50 ; femur 6.50 ; first tibia 10.15 ; second tibia 6.10 ; tarsus 0.85 ; propodus 1.20 ; claw 0.52.

REMARKS. — Currently, there are 8 species attributed to *Hedgpethia*, falling according to proboscis shape into two groups :

Group A - Proboscis spindle-shaped, distally pointed

1. *articulata* (Loman, 1908)
2. *atlantica* (Stock, 1970)
3. *californica* (Hedgpeth, 1939), probably synonymous with *bicornis* (Turpaeva, 1958)
4. *chitinsa* (Hilton, 1943)
5. *dofleini* (Loman, 1911)
6. *magnirostris* Arnaud & Child, 1988

Group B - Proboscis more or less cylindrical, distally rounded or truncate

7. *brevitarsis* (Losina-Losinsky, 1958)
8. *dampieri* (Child, 1975).

The new species falls in group A ; there is only one species in this group that shares with the new species the combination of a tarsus which is distinctly shorter than the propodus, and a claw that is less than half as long as the propodus. This species is *H. atlantica*, but this N.W. African form can easily be distinguished from the New Caledonian taxon by its very tall and strongly pointed ocular tubercle, a 2nd tibia which is only slightly shorter than tibia 1, and a strongly armed propodal sole.

ETYMOLOGY. — The specific name, *tibialis*, alludes to the extremely long and slender first tibia.

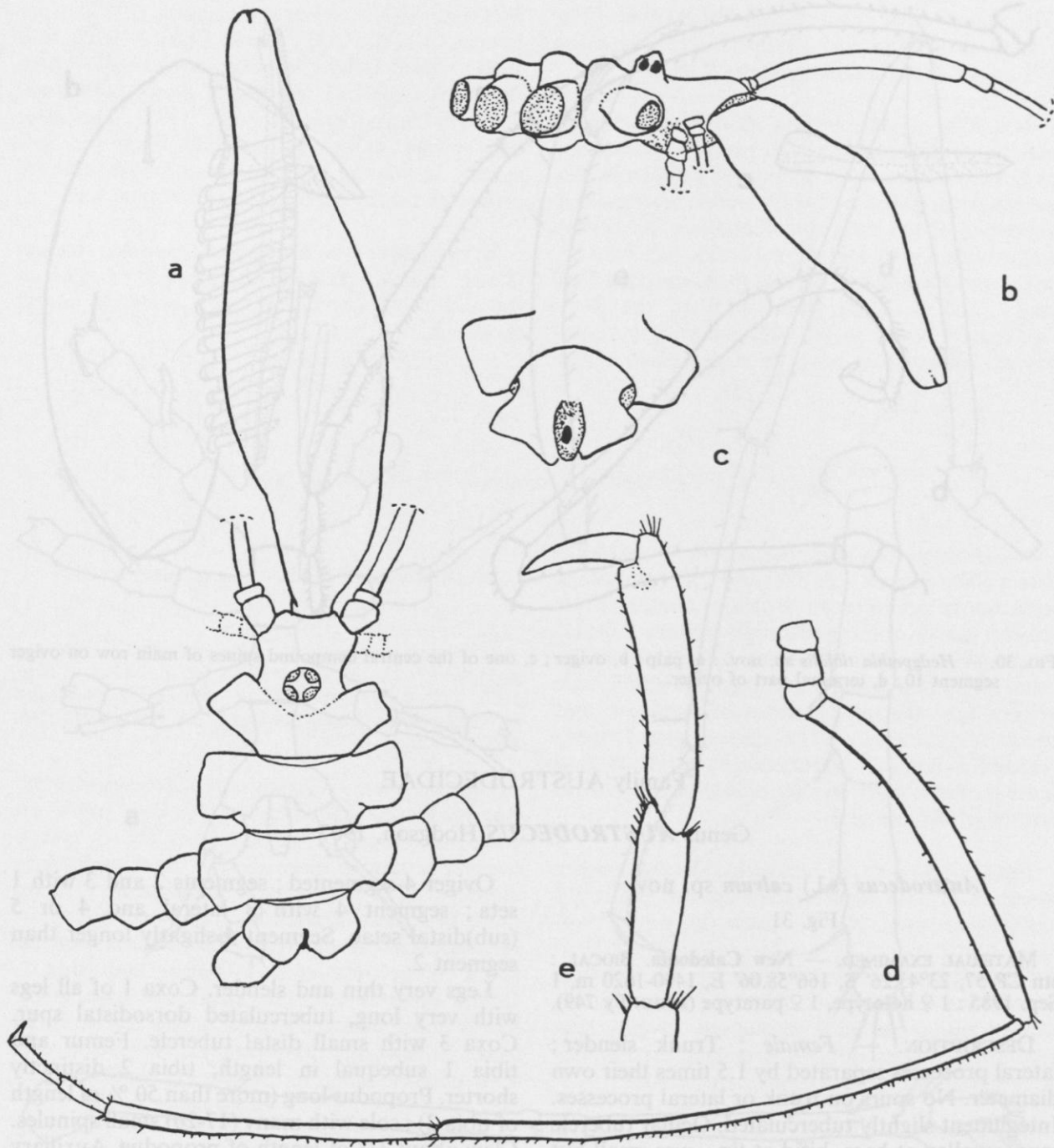


FIG. 29. — *Hedgpethia tibialis* sp. nov. : a, trunk, dorsal ; b, trunk, from the right ; c, fourth trunk segment and abdomen, ventral ; d, leg 1 ; e, distal segments of leg 2.



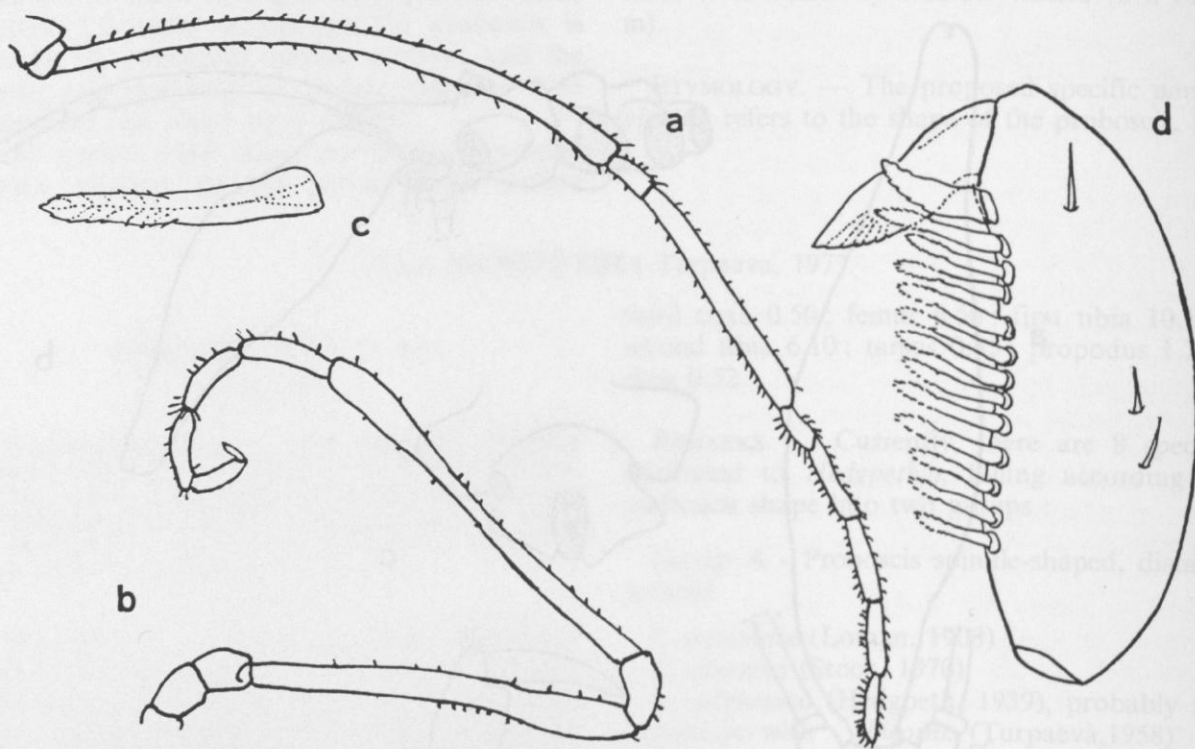


FIG. 30. — *Hedgpethia tibialis* sp. nov. : a, palp; b, oviger; c, one of the central compound spines of main row on oviger segment 10; d, terminal part of oviger.

### Family AUSTRODECIDAE

#### Genus *AUSTRODECUS* Hodgson, 1907

##### *Austrodecus* (s.l.) *calvum* sp. nov.

Fig. 31

**MATERIAL EXAMINED.** — New Caledonia. BICAL : stn CP 57, 23°43.26' S, 166°58.06' E, 1490-1620 m, 1 Sep. 1985 : 1 ♀ holotype, 1 ♀ paratype (MNHN Py 749).

**DESCRIPTION.** — *Female* : Trunk slender; lateral processes separated by 1.5 times their own diameter. No spurs on trunk or lateral processes. Integument slightly tuberculated. Ocular tubercle long, swollen at base, bifid at tip; eyes small but distinct. Abdomen short, not reaching distal end of coxa 1 of leg 4.

Proboscis slightly longer than trunk.

Palp 6-segmented; segment 2 longest. Segment 4 with strong, distal hook-shaped spine. Segments 5 and 6 articulated anaxially; segment 5 strongly lobate. Segment 6 of elongate shape.

Oviger 4-segmented; segments 2 and 3 with 1 seta; segment 4 with 3 lateral and 4 or 5 (sub)distal setae. Segment 4 slightly longer than segment 2.

Legs very thin and slender. Coxa 1 of all legs with very long, tuberculated dorsodistal spur. Coxa 3 with small distal tubercle. Femur and tibia 1 subequal in length, tibia 2 distinctly shorter. Propodus long (more than 50 % of length of tibia 2); sole with many (17-20) small spinules. Claw about 1/3 of length of propodus. Auxiliary claws slightly less than half of main claw.

*Measurements of ♀ (mm).* - Length first trunk segment 0.23; length second trunk segment 0.34; length third trunk segment 0.29; length fourth trunk segment (to base of abdomen) 0.29; length abdomen 0.28; length proboscis 1.66; greatest diameter proboscis 0.13.

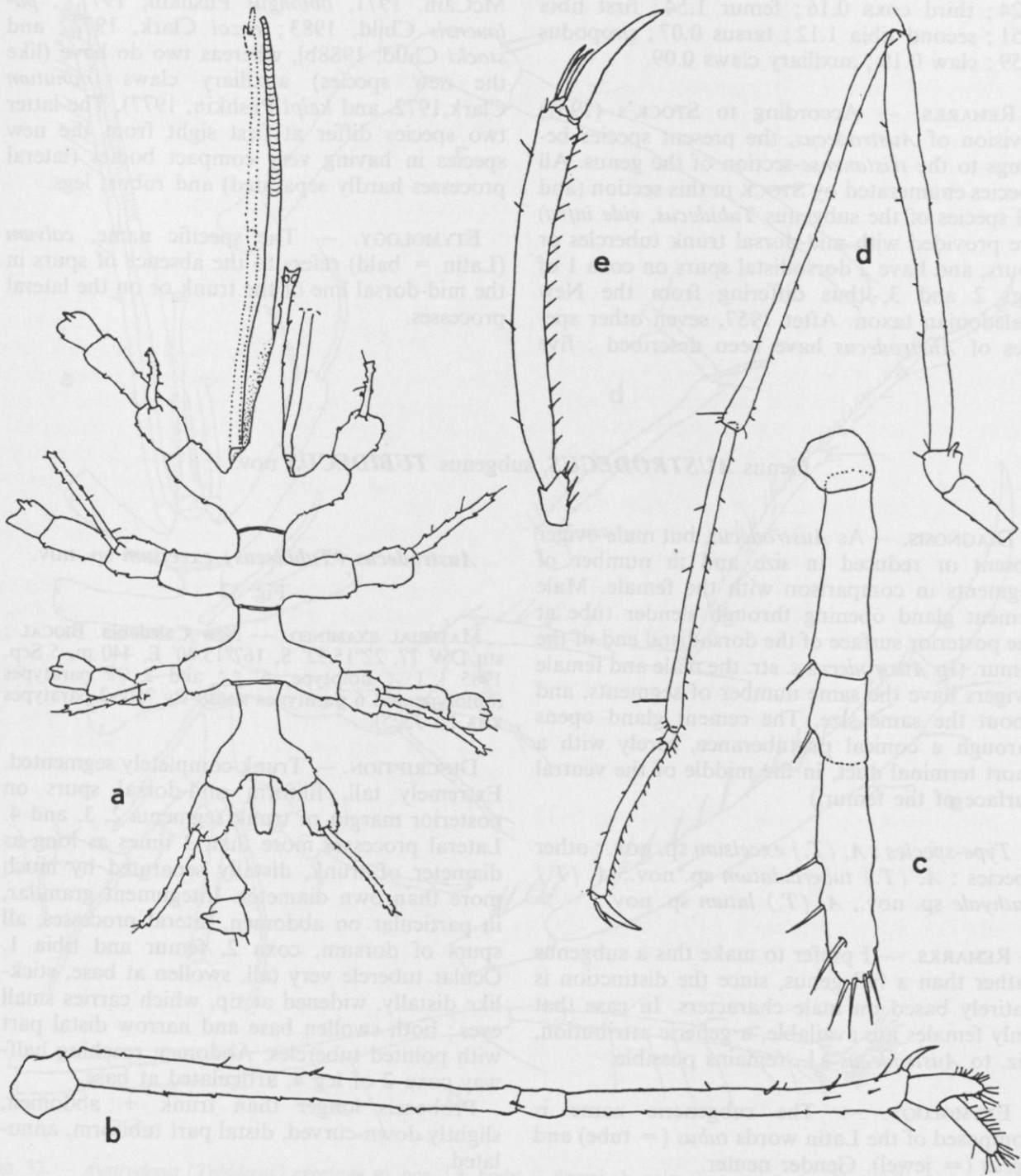


FIG. 31. — *Austrodecus* (s.l.) *calvum* sp. nov., ♀: a, body, dorsal; b, palp; c, oviger; d, fourth leg (to same scale as fig. 31a); e, distal segments of third leg.

Fourth leg : First coxa 0.19 ; second coxa 0.24 ; third coxa 0.16 ; femur 1.54 ; first tibia 1.51 ; second tibia 1.12 ; tarsus 0.07 ; propodus 0.59 ; claw 0.10 ; auxiliary claws 0.09.

REMARKS. — According to STOCK's (1957) revision of *Austrodecus*, the present species belongs to the *tristanense*-section of the genus. All species enumerated by STOCK in this section (and all species of the subgenus *Tubidecus*, *vide infra*) are provided with mid-dorsal trunk tubercles or spurs, and have 2 dorsodistal spurs on coxa 1 of legs 2 and 3, thus differing from the New Caledonian taxon. After 1957, seven other species of *Austrodecus* have been described : five

without auxiliary claws [*aconae* (Hedgpeth & McCain, 1971, *oblongus* Pushkin, 1977<sup>1</sup>; *palauensis* Child, 1983; *enzoii* Clark, 1972; and *stocki* Child, 1988b)], whereas two do have (like the new species) auxiliary claws (*minutum* Clark, 1972, and *kelpi* Pushkin, 1977). The latter two species differ at first sight from the new species in having very compact bodies (lateral processes hardly separated) and robust legs.

ETYMOLOGY. — The specific name, *calvum* (Latin = bald) refers to the absence of spurs in the mid-dorsal line of the trunk or on the lateral processes.

Genus *AUSTRODECUS*, subgenus *TUBIDECUS* nov.

DIAGNOSIS. — As *Austrodecus*, but male oviger absent or reduced in size and in number of segments in comparison with the female. Male cement gland opening through slender tube at the posterior surface of the dorsodistal end of the femur. (In *Austrodecus* s. str. the male and female ovigers have the same number of segments, and about the same size. The cement gland opens through a conical protuberance, rarely with a short terminal duct, in the middle of the ventral surface of the femur.)

*Type-species* : *A. (T.) excelsum* sp. nov. ; other species : *A. (T.) tuberculatum* sp. nov., *A. (T.) bathyale* sp. nov., *A. (T.) latum* sp. nov.

REMARKS. — I prefer to make this a subgenus rather than a full genus, since the distinction is entirely based on male characters. In case that only females are available, a generic attribution, viz. to *Austrodecus* s.l., remains possible.

ETYMOLOGY. — The subgeneric name is composed of the Latin words *tubus* (= tube) and *decus* (= jewel). Gender neuter.

*Austrodecus (Tubidecus) excelsum* sp. nov.

Fig. 32

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 77, 22°15.32' S, 167°15.40' E, 440 m, 5 Sep. 1985 : 1 ♂ holotype, 6 ♂♂ and 2 ♀♀ paratypes (holotype and 6 paratypes MNHN Py 750, 2 paratypes ZMA Pa 3325).

DESCRIPTION. — Trunk completely segmented. Extremely tall, filiform mid-dorsal spurs on posterior margin of trunk segments 2, 3, and 4. Lateral processes more than 3 times as long as diameter of trunk, distally separated by much more than own diameter. Integument granular, in particular on abdomen, lateral processes, all spurs of dorsum, coxa 2, femur and tibia 1. Ocular tubercle very tall, swollen at base, stick-like distally, widened at tip, which carries small eyes ; both swollen base and narrow distal part with pointed tubercles. Abdomen reaching half-coxa 2 of leg 4, articulated at base.

Proboscis longer than trunk + abdomen, slightly down-curved, distal part tubiform, annulated.

1. This species probably does not belong to *Austrodecus* at all, because of the aberrant shape of the proboscis and lateral processes, and the 4-segmented palp.



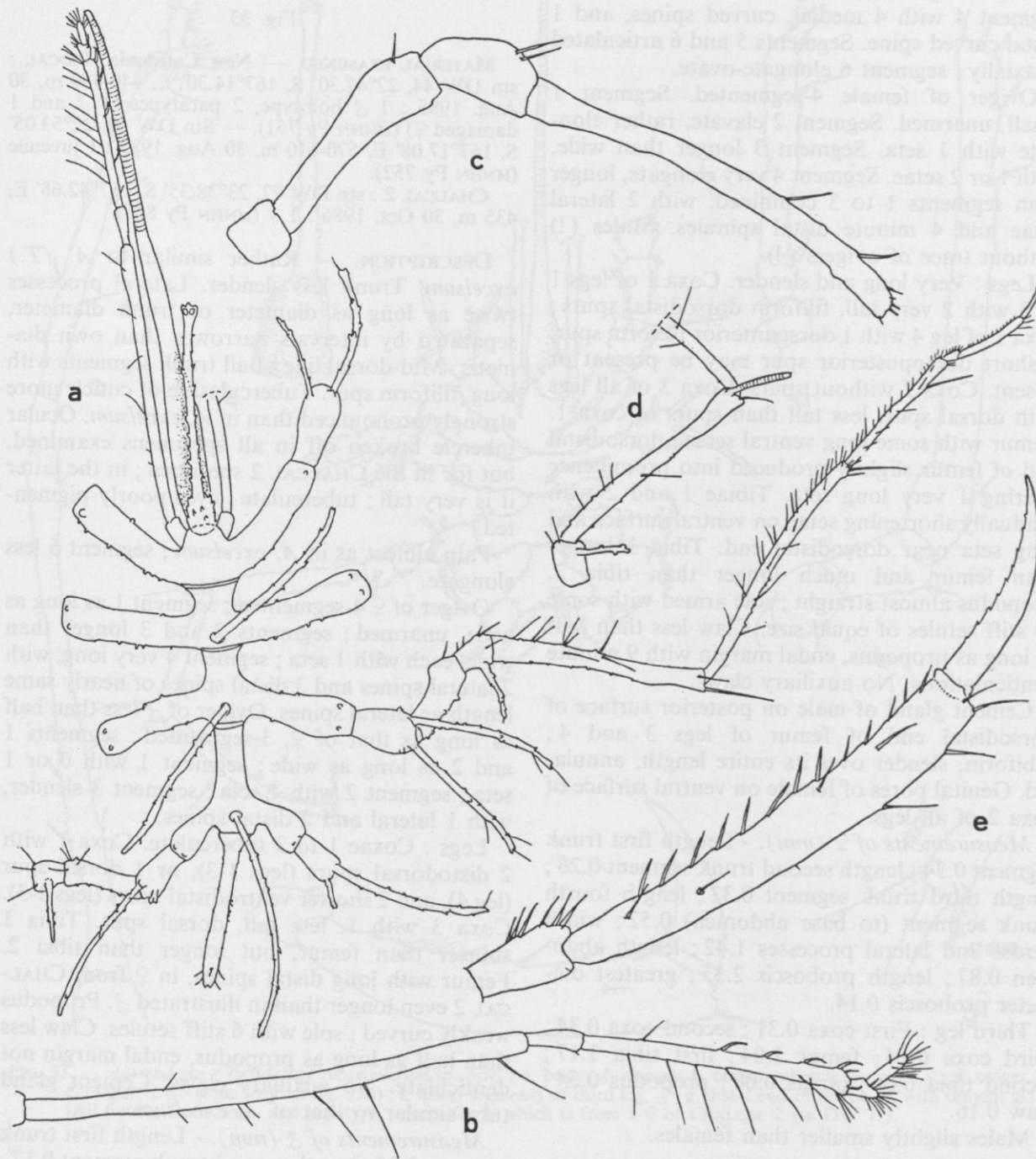


FIG. 32. — *Austrodecus (Tubidecus) excelsum* sp. nov. : a, body, ♀, dorsal ; b, palp, ♀ ; c, oviger, ♀ ; d, coxa 3 and femur of fourth leg, ♂ ; e, distal segments of third leg, ♀.

Palp 6-segmented; segment 2 very elongate; segment 4 with 4 medial, curved spines, and 1 distal curved spine. Segments 5 and 6 articulated anaxially; segment 6 elongate-ovate.

Oviger of female 4-segmented. Segment 1 small, unarmed. Segment 2 clavate, rather elongate with 1 seta. Segment 3 longer than wide, with 1 or 2 setae. Segment 4 very elongate, longer than segments 1 to 3 combined, with 2 lateral setae and 4 minute distal spinules. Males (!) without trace of ovigers (!).

Legs: Very long and slender. Coxa 1 of legs 1 to 3 with 2 very tall, filiform dorsodistal spurs; coxa 1 of leg 4 with 1 dorsoanterior filiform spur, a short dorsoposterior spur may be present or absent. Coxa 2 without spurs. Coxa 3 of all legs with dorsal spur, less tall than spurs of coxa 1. Femur with some long ventral setae; dorsodistal end of femur slightly produced into prominence bearing 1 very long seta. Tibiae 1 and 2 with gradually shortening setae on ventral surface and long seta near dorsodistal end. Tibia 1 longer than femur and much longer than tibia 2. Propodus almost straight; sole armed with some 13 stiff setules of equal size. Claw less than half as long as propodus, endal margin with 9 minute denticulations. No auxiliary claws.

Cement gland of male on posterior surface of dorsodistal end of femur of legs 3 and 4; tubiform, slender over its entire length, annulated. Genital pores of female on ventral surface of coxa 2 of all legs.

*Measurements of ♀ (mm).* - Length first trunk segment 0.34; length second trunk segment 0.26; length third trunk segment 0.32; length fourth trunk segment (to base abdomen) 0.52; width across 2nd lateral processes 1.42; length abdomen 0.87; length proboscis 2.35; greatest diameter proboscis 0.14.

Third leg: First coxa 0.31; second coxa 0.34; third coxa 0.14; femur 1.04; first tibia 1.17; second tibia 0.66; tarsus 0.08; propodus 0.34; claw 0.16.

Males slightly smaller than females.

**ETYMOLOGY.** — The specific name, *excelsum* (Latin = very strongly projecting), alludes to the tall spurs and the tall ocular tubercle.

*Austrodecus (Tubidecus) tuberculatum* sp. nov.

Fig. 33

**MATERIAL EXAMINED.** — **New Caledonia.** BIOCAL: stn DW 44, 22°47.30' S, 167°14.30' E, 440-450 m, 30 Aug. 1985: 1 ♂ holotype, 2 paratypes (1 ♂ and 1 damaged ♀) (MNHN Py 751). — Stn DW 46, 22°53.05' S, 167°17.08' E, 570-610 m, 30 Aug. 1985: 1 juvenile (MNHN Py 752).

CHALCAL 2: stn DW 77, 23°38.35' S, 167°42.68' E, 435 m, 30 Oct. 1986: 1 ♀ (MNHN Py 836).

**DESCRIPTION.** — Rather similar to *A. (T.) excelsum*. Trunk less slender. Lateral processes twice as long as diameter of trunk diameter, separated by intervals narrower than own diameter. Mid-dorsal line of all trunk segments with long, filiform spur. Tuberculation of cuticle more strongly pronounced than in *A. excelsum*. Ocular tubercle broken off in all specimens examined, but for in the CHALCAL 2 specimen; in the latter it is very tall; tuberculate; eyes poorly pigmented.

Palp almost as in *A. excelsum*; segment 6 less elongate.

Oviger of ♀ 4-segmented; segment 1 as long as wide, unarmed; segments 2 and 3 longer than wide, each with 1 seta; segment 4 very long, with 2 lateral spines and 3 distal spines of nearly same length as lateral spines. Oviger of ♂ less than half as long as that of ♀, 3-segmented; segments 1 and 2 as long as wide; segment 1 with 0 or 1 seta; segment 2 with 1 seta; segment 3 slender, with 1 lateral and 2 distal spines.

Legs: Coxae 1 to 3 tuberculate. Coxa 1 with 2 distodorsal spurs (legs 1-3), or 1 dorsal spur (leg 4), and 2 shorter ventrodorsal spurs (legs 1-3). Coxa 3 with 1, less tall, dorsal spur. Tibia 1 shorter than femur, but longer than tibia 2. Femur with long distal spines, in ♀ from CHALCAL 2 even longer than in illustrated ♂. Propodus weakly curved; sole with 6 stiff setules. Claw less than half as long as propodus, endal margin not denticulate. No auxiliary claws. Cement gland tube similar to that of *A. excelsum*.

*Measurements of ♂ (mm).* - Length first trunk segment 0.25; length second trunk segment 0.17; length third trunk segment 0.18; length fourth trunk segment (to base abdomen) 0.27; width across 2nd lateral processes 0.70; length abdomen 0.40; length proboscis 1.60; greatest diameter proboscis 0.11.

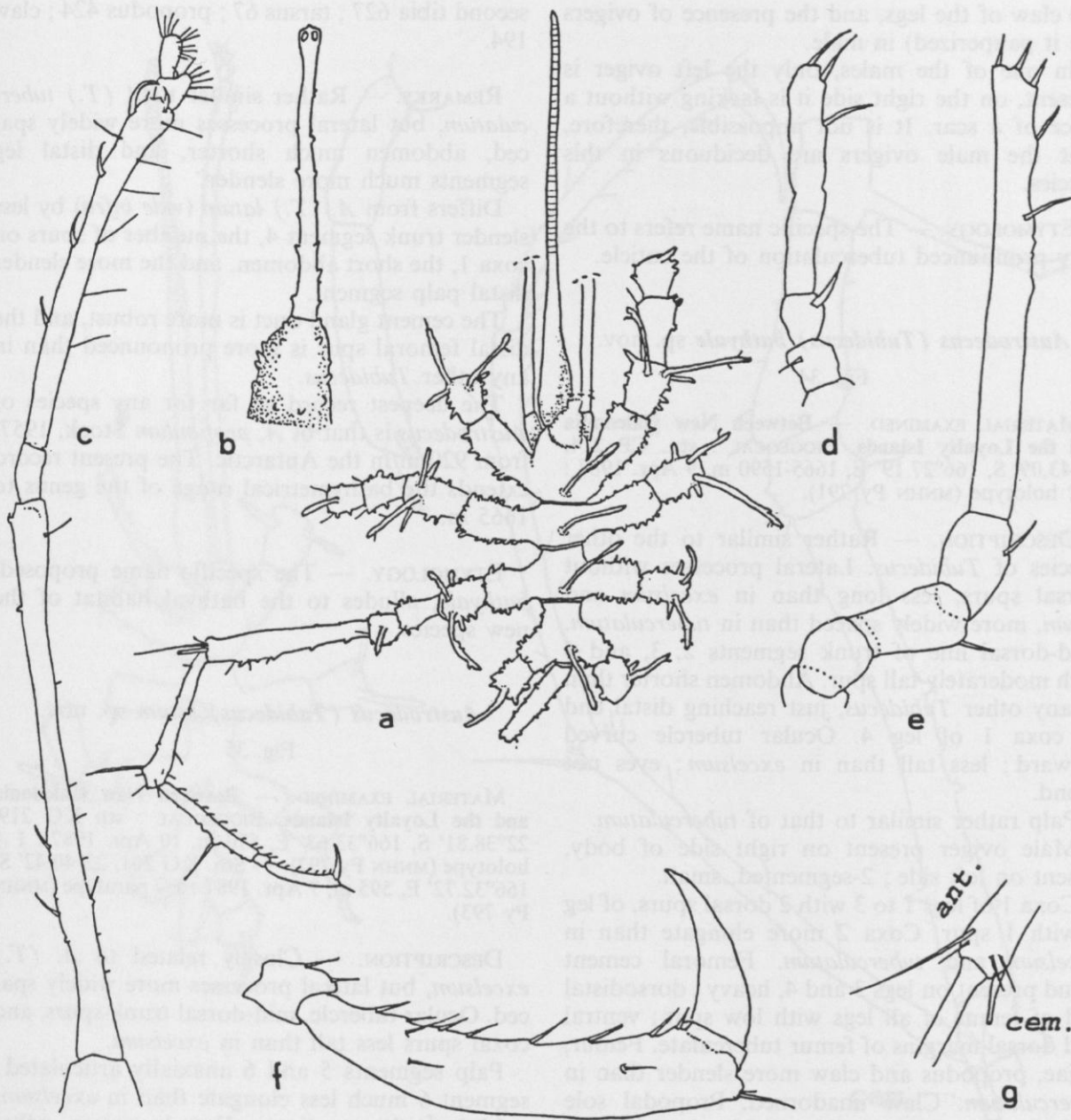


FIG. 33. — *Austrodecus (Tubidecus) tuberculatum* sp. nov. : a, body, ♂, dorsal; b, ocular tubercle; c, palp, ♀; d, oviger, ♂; e, oviger, ♀ (to same scale as fig. 33d); f, distal segments of third leg, ♂; g, distal end of femur, ♂, with cement gland. (All figures from holo- and paratype, except for b which is from a ♀ of CHALCAL 2 stn DW 77).

Third leg : First coxa 0.20 ; second coxa 0.14 ; third coxa 0.11 ; femur 0.56 ; first tibia 0.53 ; second tibia 0.47 ; tarsus 0.03 ; propodus 0.26 ; claw 0.10. Female larger than male.

REMARKS. — This species differs from *A. (T.) excelsum* mainly in the more compact trunk

(shorter lateral processes, less space between lateral processes) and legs (especially tibia 1 very much shorter), the presence of 4 (instead of 3) mid-dorsal trunk spurs, a more pronounced tuberculation of lateral processes and coxae, the presence of 4 distal spurs (instead of 2) on coxa 1 of legs 1 to 3, the absence of denticulations on



the claw of the legs, and the presence of ovigers (be it pauperized) in male.

In one of the males, only the left oviger is present, on the right side it is lacking without a trace of a scar. It is not impossible, therefore, that the male ovigers are deciduous in this species.

ETYMOLOGY. — The specific name refers to the very pronounced tuberculation of the cuticle.

*Austrodecus (Tubidecus) bathyale* sp. nov.

Fig. 34

MATERIAL EXAMINED. — Between New Caledonia and the Loyalty Islands. BIOGEOCAL : stn. CP 214, 22°43.09' S, 166°27.19' E, 1665-1590 m, 9 Apr. 1987 : 1 ♂ holotype (MNHN Py 791).

DESCRIPTION. — Rather similar to the other species of *Tubidecus*. Lateral processes without dorsal spurs, less long than in *excelsum* and *latum*, more widely spaced than in *tuberculatum*. Mid-dorsal line of trunk segments 2, 3, and 4 with moderately tall spur. Abdomen shorter than in any other *Tubidecus*, just reaching distal end of coxa 1 of leg 4. Ocular tubercle curved forward; less tall than in *excelsum*; eyes not found.

Palp rather similar to that of *tuberculatum*.

Male oviger present on right side of body, absent on left side; 2-segmented, small.

Coxa 1 of legs 1 to 3 with 2 dorsal spurs, of leg 4 with 1 spur. Coxa 2 more elongate than in *excelsum* and *tuberculatum*. Femoral cement gland present on legs 3 and 4, heavy; dorsodistal end of femur of all legs with low spur; ventral and dorsal margins of femur tuberculate. Femur, tibiae, propodus and claw more slender than in *tuberculatum*. Claw unadorned. Propodal sole and ventral margin of tibia 2 of leg 2 with more spinules than in leg 4 (latter illustrated).

Measurements of holotype ( $\mu\text{m}$ ). - Length first trunk segment 285; length second trunk segment 303; length third trunk segment 240; length fourth trunk segment (to tip 4th lateral process) 387; width across 2nd lateral processes 788; length proboscis 1955; greatest diameter proboscis 128; length ocular tubercle 560; length abdomen 175.

Fourth leg : First coxa 159; second coxa 306; third coxa 110; femur 830; first tibia 742;

second tibia 627; tarsus 67; propodus 424; claw 194.

REMARKS. — Rather similar to *A. (T.) tuberculatum*, but lateral processes more widely spaced, abdomen much shorter, and distal leg segments much more slender.

Differs from *A. (T.) latum* (*vide infra*) by less slender trunk segment 4, the number of spurs on coxa 1, the short abdomen, and the more slender distal palp segment.

The cement gland duct is more robust, and the distal femoral spur is more pronounced than in any other *Tubidecus*.

The deepest record so far for any species of *Austrodecus* is that of *A. profundum* Stock, 1957, from 920 m in the Antarctic. The present record extends the bathymetrical range of the genus to 1665 m.

ETYMOLOGY. — The specific name proposed, *bathyale*, alludes to the bathyal habitat of the new species.

*Austrodecus (Tubidecus) latum* sp. nov.

Fig. 35

MATERIAL EXAMINED. — Between New Caledonia and the Loyalty Islands. BIOGEOCAL : stn KG 219, 22°38.81' S, 166°33.63' E, 570 m, 10 Apr. 1987 : 1 ♂ holotype (MNHN Py 792). — Stn. KG 201, 22°40.42' S, 166°32.72' E, 595 m, 7 Apr. 1987 : 1 ♀ paratype (MNHN Py 793).

DESCRIPTION. — Closely related to *A. (T.) excelsum*, but lateral processes more widely spaced. Ocular tubercle, mid-dorsal trunk spurs, and coxal spurs less tall than in *excelsum*.

Palp segments 5 and 6 anaxially articulated; segment 6 much less elongate than in *excelsum*.

Male without ovigers. Female oviger rather similar to that of *excelsum*.

Legs : Coxa 1 of all legs with 1 long dorso-distal spur (2 in *excelsum*). Cement gland as in *excelsum*. Claw longer than in *excelsum* (about 2/3 of length of propodus), inner margin of claw smooth (not toothed).

Measurements of male holotype ( $\mu\text{m}$ ). - Length first trunk segment 261; length second trunk segment 312; length third trunk segment 343; length fourth trunk segment (to base abdomen) 459; length abdomen 518; width across 2nd

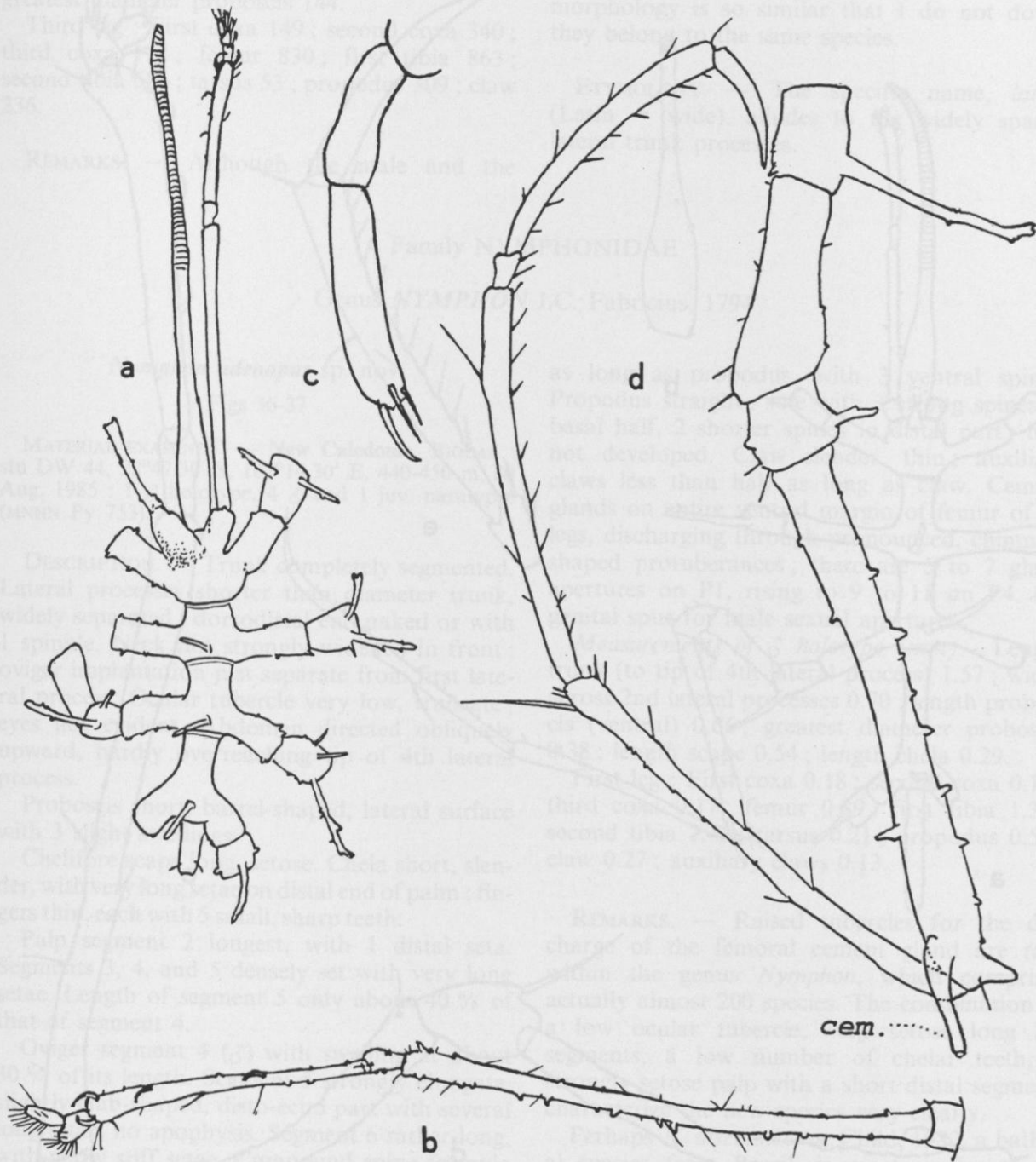


FIG. 34. — *Austrodecus (Tubidecus) bathyale* sp. nov., ♂ holotype : a, trunk, dorsal ; b, palp ; c, oviger ; d, leg 4.

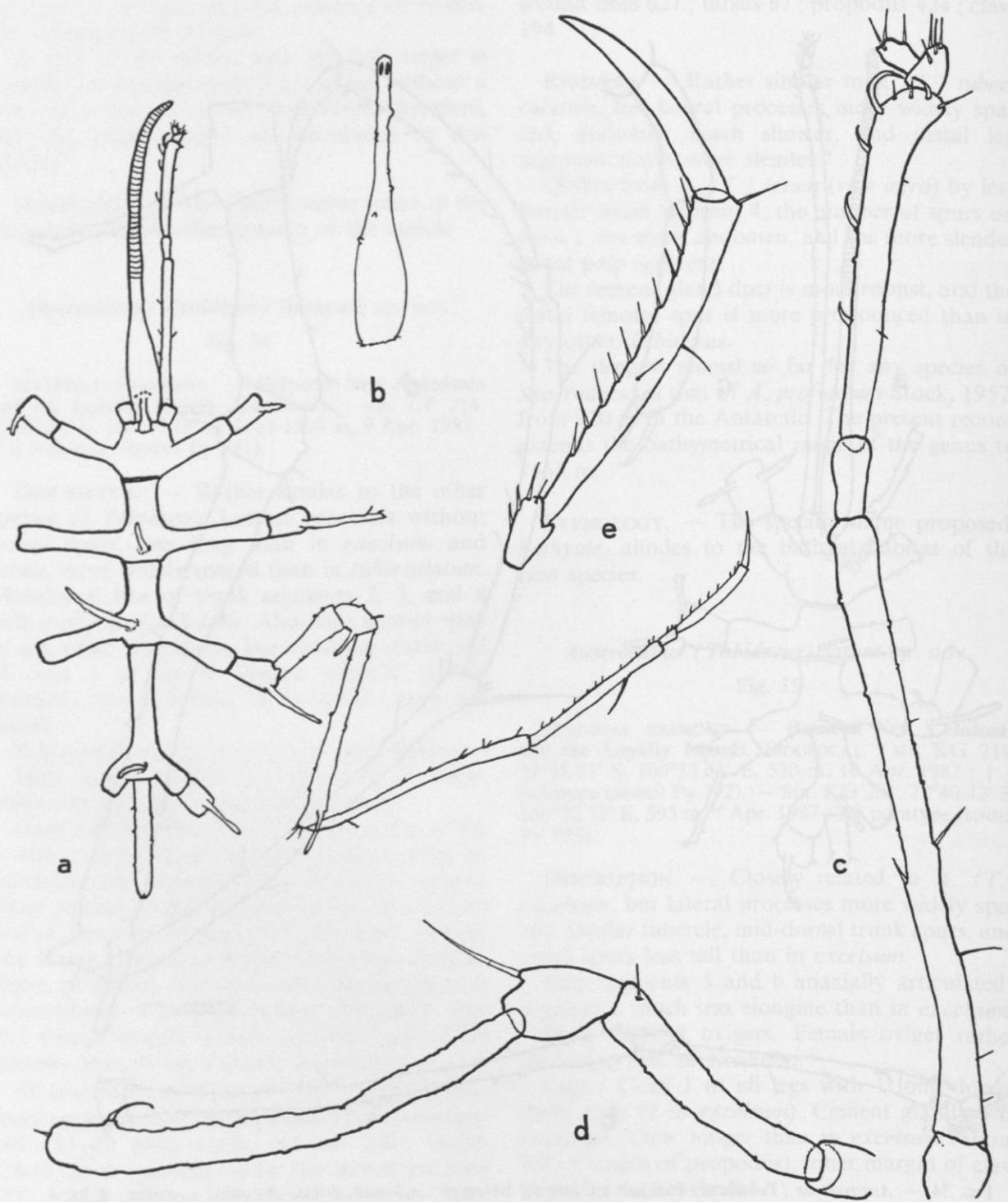


FIG. 35. — *Austrodecus (Tubidecus) latum* sp. nov. : a, body, ♂, dorsal; b, ocular tubercle, ♀; c, palp, ♂; d, oviger, ♀; e, distal segments of leg 2, ♂.



lateral processes 985; length proboscis 1222; greatest diameter proboscis 144.

Third leg: First coxa 149; second coxa 340; third coxa 114; femur 830; first tibia 863; second tibia 656; tarsus 53; propodus 309; claw 236.

REMARKS. — Although the male and the

female were taken at different stations, their morphology is so similar that I do not doubt they belong to the same species.

ETYMOLOGY. — The specific name, *latum* (Latin = wide), alludes to the widely spaced lateral trunk processes.

## Family NYMPHONIDAE

Genus *NYMPHON* J.C. Fabricius, 1794

### *Nymphon adenopus* sp. nov.

Figs 36-37

MATERIAL EXAMINED. — New Caledonia. BIOCAL: stn DW 44, 22°47.30' S, 167°14.30' E, 440-450 m, 30 Aug. 1985: 1 ♂ holotype, 4 ♂ and 1 juv. paratypes (MNHN Py 753).

DESCRIPTION. — Trunk completely segmented. Lateral processes shorter than diameter trunk, widely separated; dorsodistal end naked or with 1 spinule. Neck not strongly widened in front; oviger implantation just separate from first lateral process. Ocular tubercle very low, truncate; eyes not evident. Abdomen directed obliquely upward, hardly overreaching tip of 4th lateral process.

Proboscis short, barrel-shaped, lateral surface with 3 slight swellings.

Chelifore scape long, setose. Chela short, slender, with very long setae on distal end of palm; fingers thin, each with 5 small, sharp teeth.

Palp segment 2 longest, with 1 distal seta. Segments 3, 4, and 5 densely set with very long setae. Length of segment 5 only about 40% of that of segment 4.

Oviger segment 4 (♂) with swelling at about 30% of its length. Segment 5 strongly elongate, slightly club-shaped, disto-ectal part with several long setae, no apophysis. Segment 6 rather long, with many stiff setae. Compound spine formula 6:6:5:6. Compound spines with 1 pair of strong basal teeth and 3 pairs of small distal teeth. Claw curved, with 3 widely spaced teeth.

Legs: Coxae with some few setae. Femur with long, ventrally directed setae. Long setae, dorsal, ventral and lateral, on tibiae 1 and 2. Femur < tibia 1 << tibia 2. Tarsus slightly less than half

as long as propodus, with 3 ventral spines. Propodus straight; sole with 3 strong spines in basal half, 2 shorter spines in distal part; heel not developed. Claw slender, thin; auxiliary claws less than half as long as claw. Cement glands on entire ventral margin of femur of all legs, discharging through pronounced, chimney-shaped protuberances; there are 5 to 7 gland apertures on P1, rising to 9 to 11 on P4. No genital spur for male sexual apertures.

Measurements of ♂ holotype (mm) - Length trunk (to tip of 4th lateral process) 1.57; width across 2nd lateral processes 0.70; length proboscis (ventral) 0.66; greatest diameter proboscis 0.38; length scape 0.54; length chela 0.29.

First leg: First coxa 0.18; second coxa 0.17; third coxa 0.17; femur 0.89; first tibia 1.39; second tibia 2.43; tarsus 0.21; propodus 0.50; claw 0.27; auxiliary claws 0.13.

REMARKS. — Raised tubercles for the discharge of the femoral cement gland are rare within the genus *Nymphon*, which comprises actually almost 200 species. The combination of a low ocular tubercle, very setose long leg segments, a low number of chelar teeth, a strongly setose palp with a short distal segment, characterize the new species very clearly.

Perhaps *N. discorsicoxae* Child, 1982, a bathyal species from Brazil, is most similar to *N. adenopus*, but this species has numerous (27-31) teeth on the fingers of the chela.

ETYMOLOGY. — The specific name is composed of the Greek words ἀδῆν (= gland) and ποῦς (= leg), alluding to the conspicuous cement gland apertures on the legs.

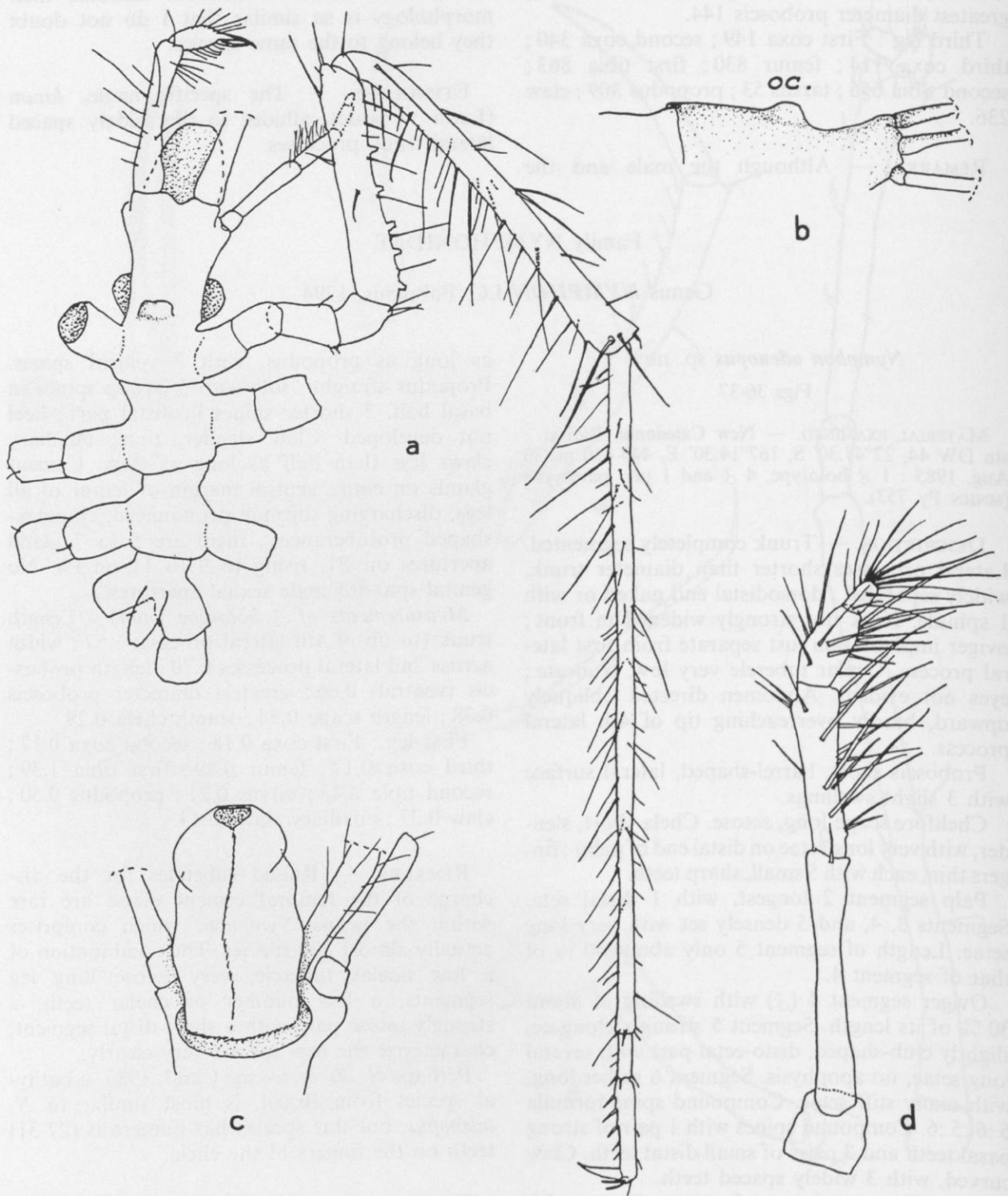


FIG. 36. — *Nymphon adenopus* sp. nov., ♂: **a**, body, dorsal; **b**, cephalic segment, from the right; **c**, proboscis, ventral; **d**, palp.

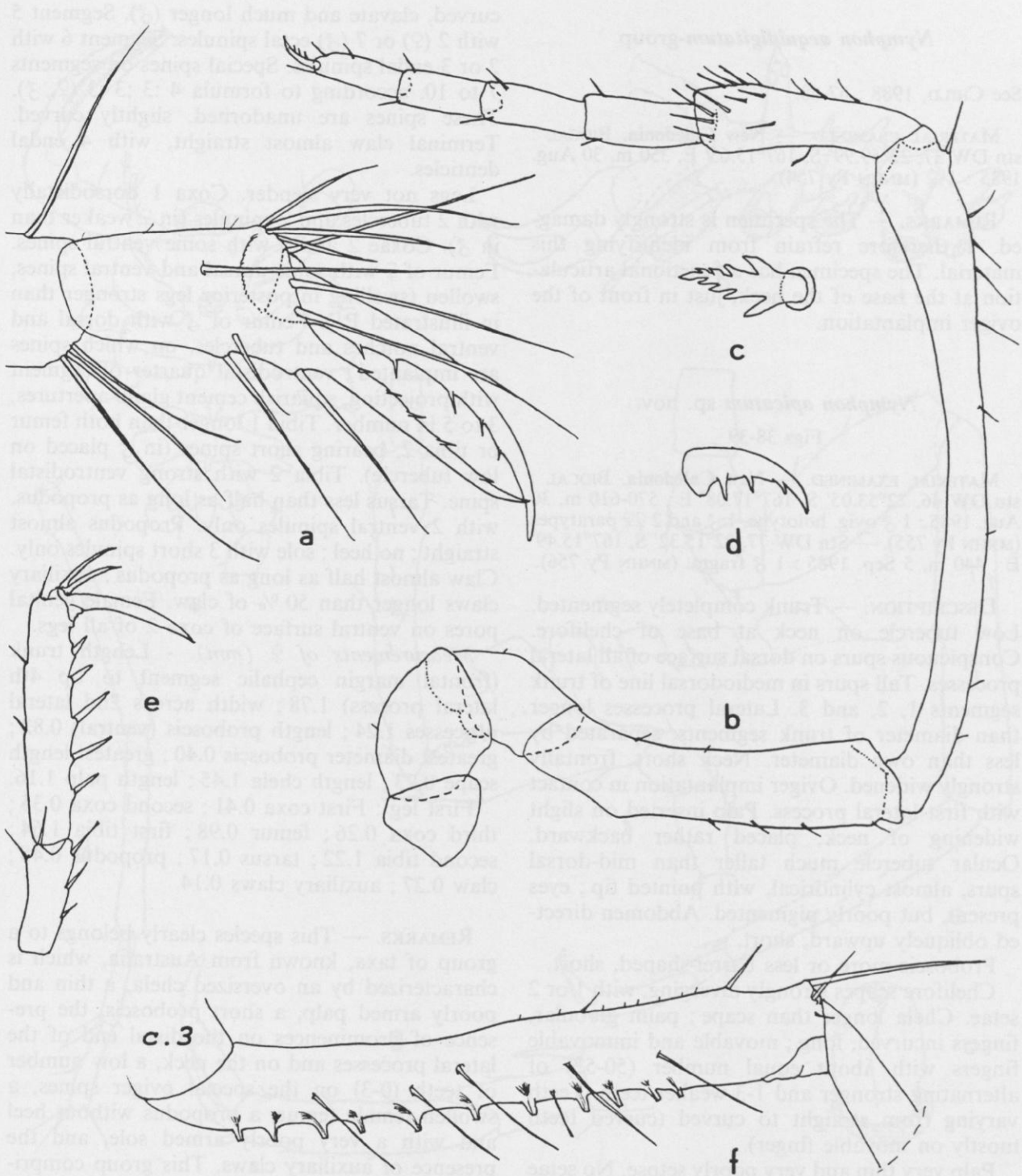


FIG. 37. — *Nymphon adenopus* sp. nov., ♂ : a, chela ; b, oviger ; c, distalmost compound spine of oviger segment 9 ; d, terminal claw of oviger ; e, distal segments of first leg ; f, femur of fourth leg, with cement glands.



*Nymphon aequidigitatum*-group

See CHILD, 1988 : 67-68.

**MATERIAL EXAMINED.** — **New Caledonia.** BIOCAL : stn DW 37, 22°59.99' S, 167°15.65' E, 350 m, 30 Aug. 1985 : 1 ♀ (MNHN Py 754).

**REMARKS.** — The specimen is strongly damaged. I therefore refrain from identifying this material. The specimen has a functional articulation at the base of the neck, just in front of the oviger implantation.

*Nymphon apicatum* sp. nov.

Figs 38-39

**MATERIAL EXAMINED.** — **New Caledonia.** BIOCAL : stn DW 46, 22°53.05' S, 167°17.08' E, 570-610 m, 30 Aug. 1985 : 1 ♂ ovig. holotype, 1 ♂ and 2 ♀♀ paratypes (MNHN Py 755). — Stn DW 77, 22°15.32' S, 167°15.49' E, 440 m, 5 Sep. 1985 : 1 ♂ fragm. (MNHN Py 756).

**DESCRIPTION.** — Trunk completely segmented. Low tubercle on neck at base of chelifore. Conspicuous spurs on dorsal surface of all lateral processes. Tall spurs in mediodorsal line of trunk segments 1, 2, and 3. Lateral processes longer than diameter of trunk segments, separated by less than own diameter. Neck short, frontally strongly widened. Oviger implantation in contact with first lateral process. Palp inserted on slight widening of neck, placed rather backward. Ocular tubercle much taller than mid-dorsal spurs, almost cylindrical, with pointed tip; eyes present, but poorly pigmented. Abdomen directed obliquely upward, short.

Proboscis more or less barrel-shaped, short.

Chelifore scapes strongly diverging, with 1 or 2 setae. Chela longer than scape; palm globular, fingers incurved, long; movable and immovable fingers with about equal number (50-52) of alternating stronger and 1-3 weaker teeth. Teeth varying from straight to curved (curved teeth mostly on movable finger).

Palp very thin and very poorly setose. No setae on segments 1 and 2, 1 seta on segment 3, 3 setae on segments 4 and 5. Segment 2 > 3; segments 4 and 5 subequal, together slightly shorter than segment 3.

Ovigers of both sexes rather weak. Segment 5 straight, slightly longer than segment 4 (♀), or

curved, clavate and much longer (♂). Segment 5 with 2 (♀) or 7 (♂) ectal spinules. Segment 6 with 2 or 3 endal spinules. Special spines on segments 7 to 10, according to formula 4 : 3 : 3 : 3 (♀, ♂). These spines are unadorned, slightly curved. Terminal claw almost straight, with 4 endal denticles.

Legs not very slender. Coxa 1 dorsodistally with 2 tubercles and 2 spinules (in ♀ weaker than in ♂). Coxae 2 and 3 with some ventral spines. Femur of ♀ with some dorsal and ventral spines, swollen (swelling in posterior legs stronger than in illustrated P1). Femur of ♂ with dorsal and ventral notches and tubercles, on which spines are implanted; ventrodiscal quarter of segment with projecting, squarish cement gland apertures, 3 to 5 in number. Tibia 1 longer than both femur or tibia 2, bearing short spines (in ♂ placed on low tubercle). Tibia 2 with strong ventrodiscal spine. Tarsus less than half as long as propodus, with 2 ventral spinules only. Propodus almost straight; no heel; sole with 3 short spinules only. Claw almost half as long as propodus; auxiliary claws longer than 50% of claw. Female genital pores on ventral surface of coxa 2 of all legs.

*Measurements of ♀ (mm).* - Length trunk (frontal margin cephalic segment to tip 4th lateral process) 1.78; width across 2nd lateral processes 1.24; length proboscis (ventral) 0.82; greatest diameter proboscis 0.40; greatest length scape 0.73; length chela 1.45; length palp 1.16.

First leg : First coxa 0.41; second coxa 0.35; third coxa 0.26; femur 0.98; first tibia 1.64; second tibia 1.22; tarsus 0.17; propodus 0.45; claw 0.27; auxiliary claws 0.14.

**REMARKS.** — This species clearly belongs to a group of taxa, known from Australia, which is characterized by an oversized chela, a thin and poorly armed palp, a short proboscis, the presence of prominences on the distal end of the lateral processes and on the neck, a low number of teeth (0-3) on the special oviger spines, a swollen female femur, a propodus without heel and with a very poorly armed sole, and the presence of auxiliary claws. This group comprises *N. singulare* Stock, 1954, *N. immane* Stock, 1954, and *N. novaehollandiae* Clark, 1963. *N. apheles* Child, 1979, from the Pacific coast of Panama, possibly also belongs to this group.

Some other species with tubercles or spurs on the lateral processes, such as *N. laterospinum*

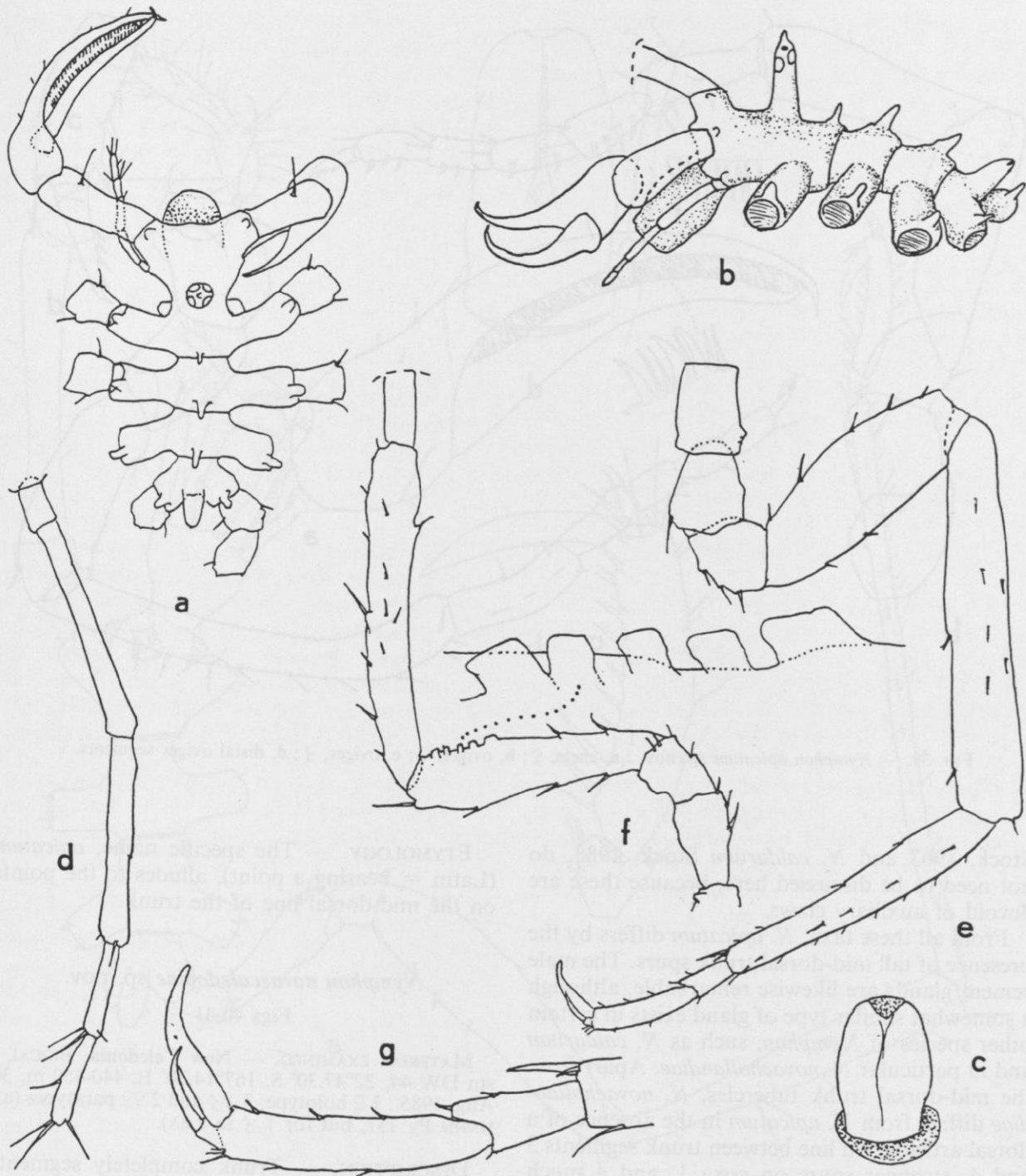


FIG. 38. — *Nymphon apicatum* sp. nov. : a, body, ♀, dorsal ; b, body, ♀, from the left ; c, proboscis, ♀, ventral ; d, palp, ♀ ; e, first leg, ♀ ; f, proximal leg segments, ♂, with cement gland apertures ; g, distal segments of first leg, ♀.

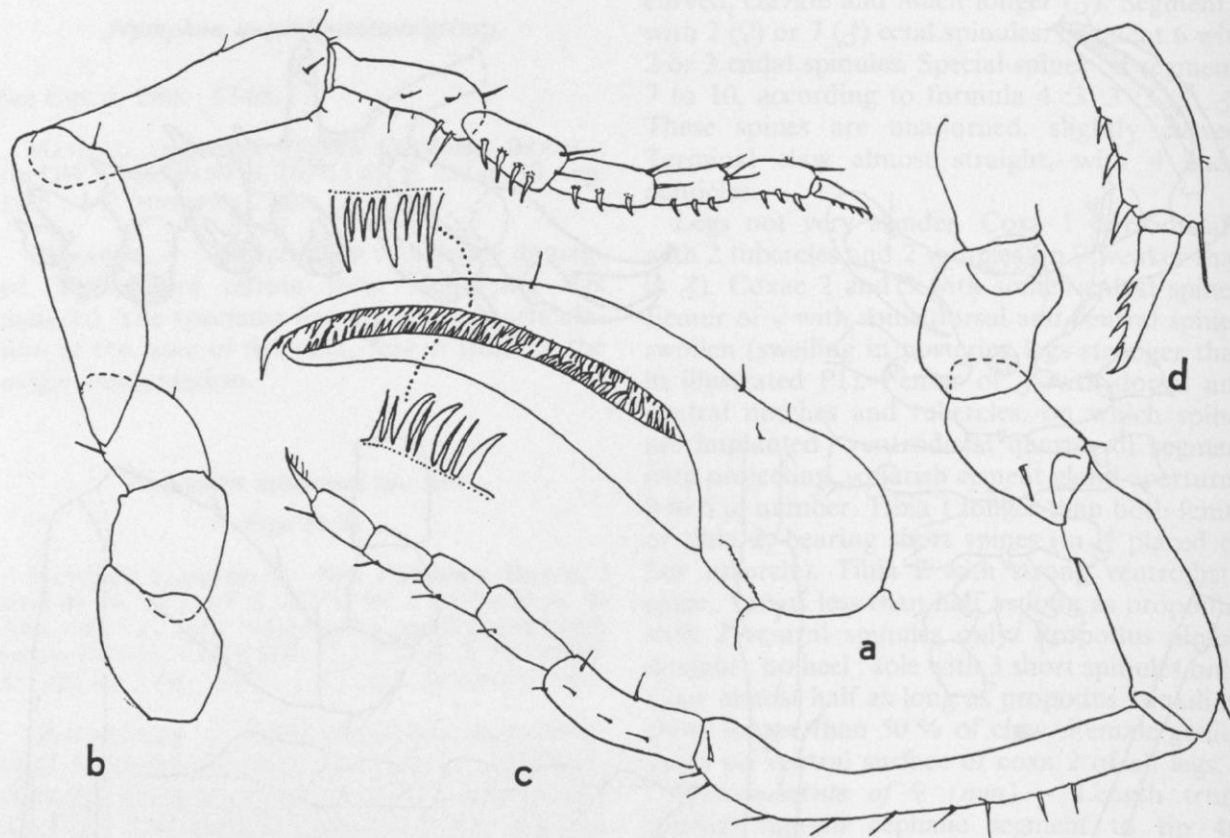


FIG. 39. — *Nymphon apicatum* sp. nov. : a, chela, ♀; b, oviger, ♀; c, oviger, ♂; d, distal oviger segments, ♀.

Stock, 1963 and *N. caldarium* Stock, 1988, do not need to be discussed here, because these are devoid of auxiliary claws.

From all these taxa, *N. apicatum* differs by the presence of tall mid-dorsal trunk spurs. The male cement glands are likewise remarkable, although a somewhat similar type of gland exists in certain other species of *Nymphon*, such as *N. caldarium* and in particular *N. novaehollandiae*. Apart from the mid-dorsal trunk tubercles, *N. novaehollandiae* differs from *N. apicatum* in the absence of a dorsal articulation line between trunk segments 3 and 4, stronger spurs on coxa 1, and a much lower number of teeth on the fingers of the chela.

*N. immane* and *N. singulare* differ from *N. apicatum* in having (poorly) toothed oviger spines, the presence of ectal and endal denticles on the oviger claw, a lower number of teeth on the movable finger of the chela, etc.

ETYMOLOGY. — The specific name, *apicatum* (Latin = bearing a point), alludes to the points on the mid-dorsal line of the trunk.

#### *Nymphon novaecaledoniae* sp. nov.

Figs 40-41

MATERIAL EXAMINED. — **New Caledonia.** BIOCAL : stn DW 44, 22°47.30' S, 167°14.30' E, 440-450 m, 30 Aug. 1985 : 1 ♀ holotype, 3 ♂♂ and 2 ♀♀ paratypes (all MNHN Py 757, but for 1 ♂ in ZMA).

DESCRIPTION. — Trunk completely segmented; trace of fold at base of neck in front of ocular tubercle (as in some members of the *N. aequidigitatum*-group). Lateral processes separated by twice their own diameter; dorsodistally with 1 or 2 small spinules. Ocular tubercle rather low, subcylindrical; apically truncate with 2



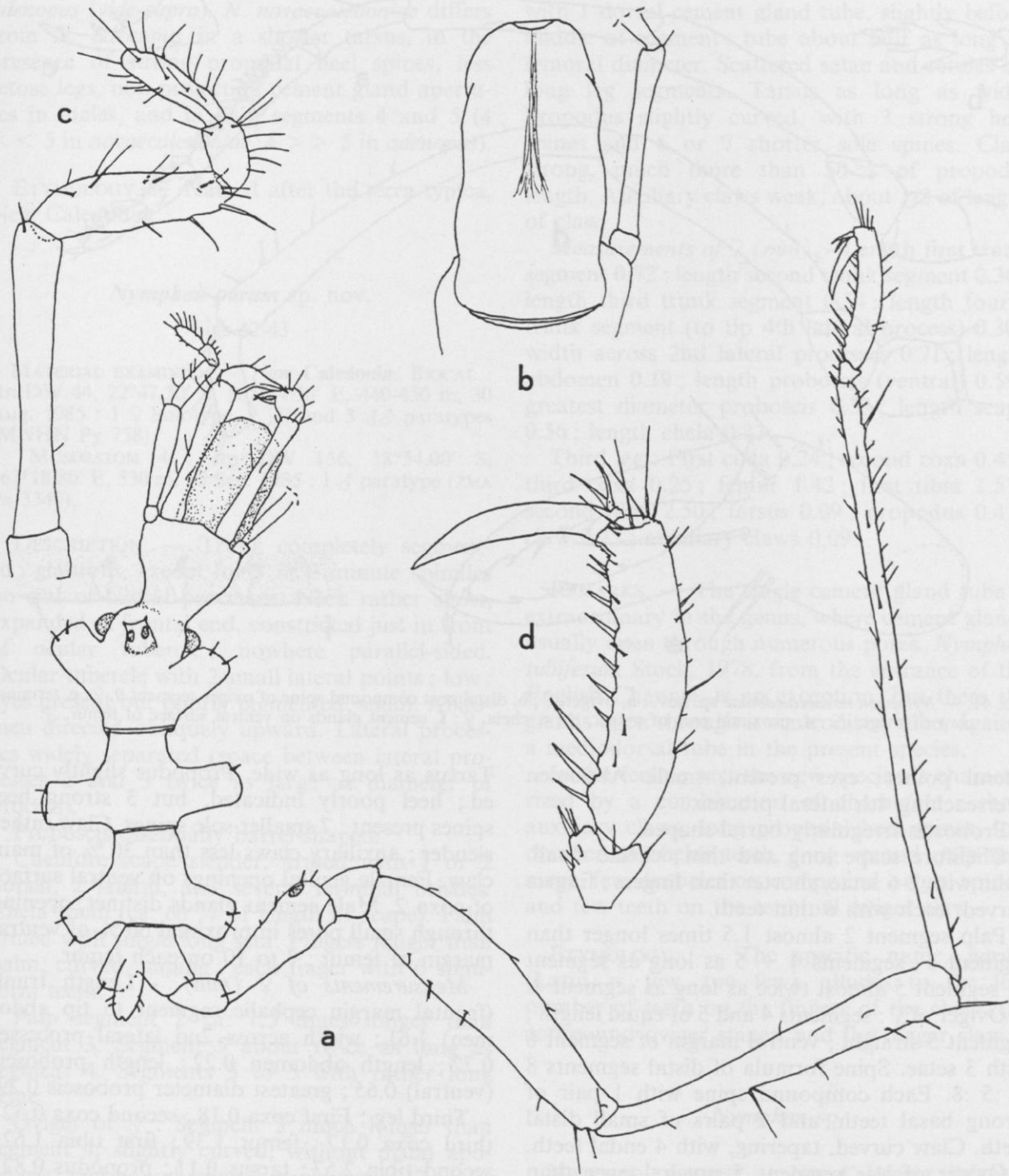


FIG. 40. — *Nymphon novaecaledoniae* sp. nov., ♀ : a, body, dorsal ; b, proboscis, ventral ; c, palp ; d, distal segments of third leg.

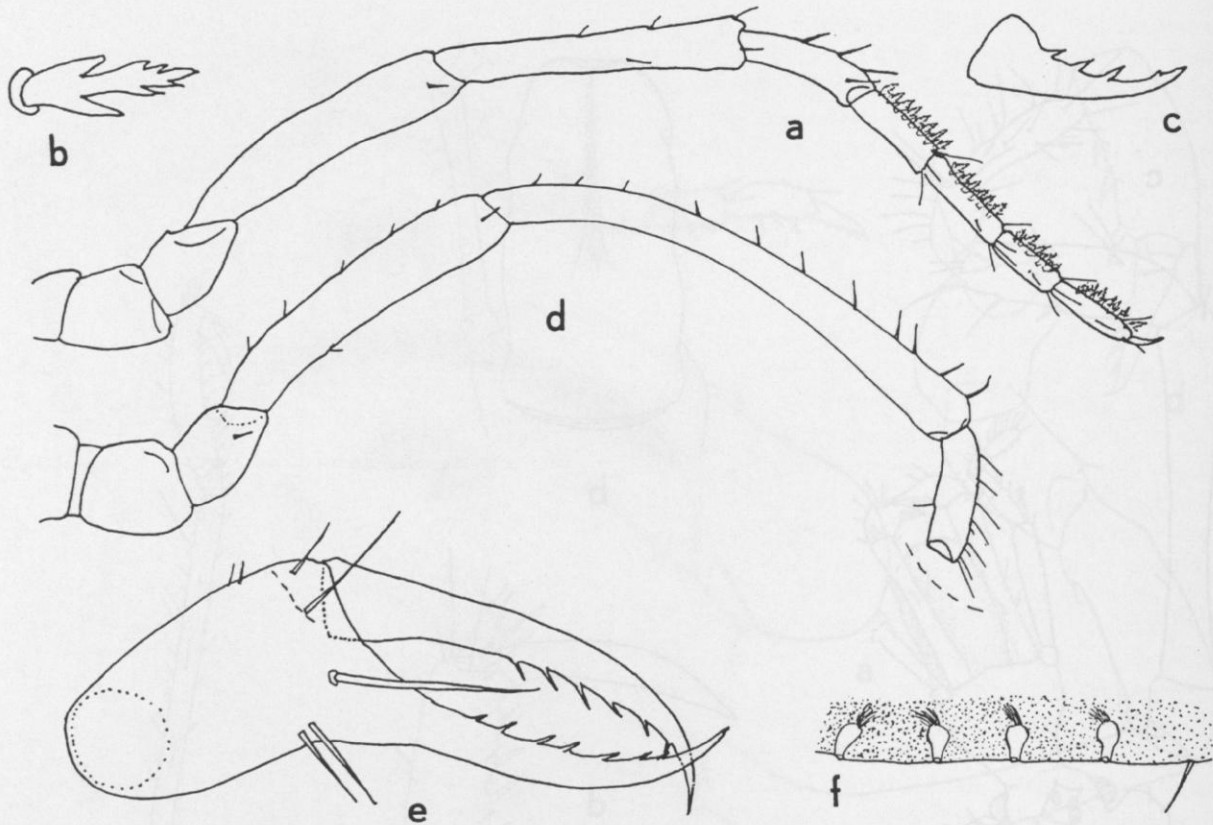


FIG. 41. — *Nymphon novaecaledoniae* sp. nov. : a, oviger, ♀; b, distalmost compound spine of oviger segment 9, ♀; c, terminal claw of oviger, ♀; d, proximal part of oviger, ♂; e, chela, ♀; f, cement glands on ventral surface of femur, ♂.

lateral points; eyes present, small. Abdomen overreaching 4th lateral process.

Proboscis irregularly barrel-shaped.

Cheliforme scape long and thin; chelae small. Palm with 2-6 setae, shorter than fingers; fingers curved, each with 6 thin teeth.

Palp segment 2 almost 1.5 times longer than segment 3; segments 4 + 5 as long as segment 3; segment 5 almost twice as long as segment 4.

Oviger of ♀: segments 4 and 5 of equal length; segment 5 straight; ventral margin of segment 6 with 3 setae. Spine formula of distal segments 8 : 6 : 5 : 8. Each compound spine with 1 pair of strong basal teeth, and 2 pairs of small distal teeth. Claw curved, tapering, with 4 endal teeth.

Oviger of ♂: segment 5 much longer than segment 4, curved, slightly club-shaped, with row of ventral setules; segment 6 with 6-8 ventral setae. Spine formula 7 : 6 : 5 : 7 : 4.

Legs long and slender, not very setose. Femur of ♀ slightly but distinctly swollen in basal half. Tibia 2 about 1.5 times longer than tibia 1.

Tarsus as long as wide. Propodus slightly curved; heel poorly indicated, but 3 strong heel spines present; 7 smaller sole spines. Claw rather slender; auxiliary claws less than 30% of main claw. Female genital openings on ventral surface of coxa 2. Male cement glands distinct, opening through small pores in proximal 60% of ventral margin of femur; 7 to 10 on each femur.

*Measurements of ♀ (mm).* - Length trunk (frontal margin cephalic segment to tip abdomen) 1.61; width across 2nd lateral processes 0.72; length abdomen 0.22; length proboscis (ventral) 0.65; greatest diameter proboscis 0.29.

Third leg: First coxa 0.18; second coxa 0.52; third coxa 0.17; femur 1.39; first tibia 1.62; second tibia 2.57; tarsus 0.11; propodus 0.82; claw 0.32; auxiliary claws 0.09.

**REMARKS.** — The low number of teeth on the chela, the low number of teeth on the oviger claw, the general structure of the compound oviger spines, the short auxiliary claws, and the

long 2nd segment of the palp, are shared by *N. adenopus* (vide supra). *N. novaecaledoniae* differs from *N. adenopus* in a shorter tarsus, in the presence of strong propodal heel spines, less setose legs, non-projecting cement gland apertures in males, and in palp segments 4 and 5 ( $4 < < 5$  in *novaecaledoniae*,  $4 > > 5$  in *adenopus*).

ETYMOLOGY. — Named after the terra typica, New Caledonia.

*Nymphon parum* sp. nov.

Figs 42-43

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 44, 22°47.30' S, 167°14.30' E, 440-450 m, 30 Aug. 1985 : 1 ♀ holotype, 2 ♀♀ and 3 ♂♂ paratypes (MNHN Py 758).

MUSORSTOM 4 : stn DW 156, 18°54.00' S, 163°18.80' E, 530 m, 15 Sep. 1985 : 1 ♂ paratype (ZMA Pa 3340).

DESCRIPTION. — Trunk completely segmented; glabrous, except for 1 or 2 minute spinules on end of lateral processes. Neck rather short, expanded at frontal end, constricted just in front of ocular tubercle; nowhere parallel-sided. Ocular tubercle with 2 small lateral points; low; eyes present but poorly pigmented, small. Abdomen directed obliquely upward. Lateral processes widely separated (space between lateral processes 2 and 3 twice as large as diameter of process).

Proboscis essentially barrel-shaped.

Chelifore scape slender, armed with 1 or 2 dorsal, 2 lateral, and several terminal bristles. Chela small (ca. 60 % of length of scape). Palm armed with single long seta. Fingers longer than palm, curved, gaping; each finger with 6 spiniform teeth.

Palp segment 2 ca. 1.5 times longer than segment 3. Segment 5 about twice as long as segment 4. Segments 3 to 5 with rather long setae.

Oviger of ♂ : Segment 5 much longer than segment 4, slightly curved, without distal apophysis; compound spine formula 6 : 6 : 5 : 7; claw with 4 teeth. Oviger of ♀ : Segments 4 and 5 subequal; segment 5 straight; compound spine formula 8 : 6 : 5 : 8; claw with 4 teeth. Compound spines (♂, ♀) with 1 pair of strong basal teeth and 2 pairs of much smaller distal teeth.

Legs : Femur of ♀ slightly swollen. Femur of ♂ with 1 dorsal cement gland tube, slightly before middle of segment; tube about half as long as femoral diameter. Scattered setae and setules on long leg segments. Tarsus as long as wide. Propodus slightly curved, with 3 strong heel spines and 6 or 7 shorter sole spines. Claw strong, much more than 50 % of propodal length. Auxiliary claws weak, about 1/3 of length of claw.

Measurements of ♀ (mm). - Length first trunk segment 0.72; length second trunk segment 0.36; length third trunk segment 0.34; length fourth trunk segment (to tip 4th lateral process) 0.30; width across 2nd lateral processes 0.71; length abdomen 0.19; length proboscis (ventral) 0.59; greatest diameter proboscis 0.33; length scape 0.56; length chela 0.33.

Third leg : First coxa 0.24; second coxa 0.45; third coxa 0.25; femur 1.42; first tibia 1.57; second tibia 2.50; tarsus 0.09; propodus 0.41; claw 0.25; auxiliary claws 0.09.

REMARKS. — The single cement gland tube is extraordinary in the genus, where cement glands usually open through numerous pores. *Nymphon tubiferum* Stock, 1978, from the entrance of the English Channel, is an exception, but there the glands open through a ventrodorsal tube, against a mediodorsal tube in the present species.

In the female sex, the new species is characterized by a combination of characters : short auxiliary claws, long propodal heel spines, low number of chelar teeth, long second palp segment, few denticles on compound oviger spines, and few teeth on the terminal oviger claw.

ETYMOLOGY. — The specific name, *parum* (Latin = few, too few), alludes to the low number of teeth on the fingers of the chela, the compound oviger spines, and the oviger claw.

*Nymphon* sp.

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn CP 13, 20°18.53' S, 167°17.65' E, 3690-3740 m, 13 Aug. 1985 : 1 ♂ (strongly damaged) (MNHN 759).

All legs, one oviger, one palp, the distal segments of the other palp, and the proboscis are lacking in this blind species.



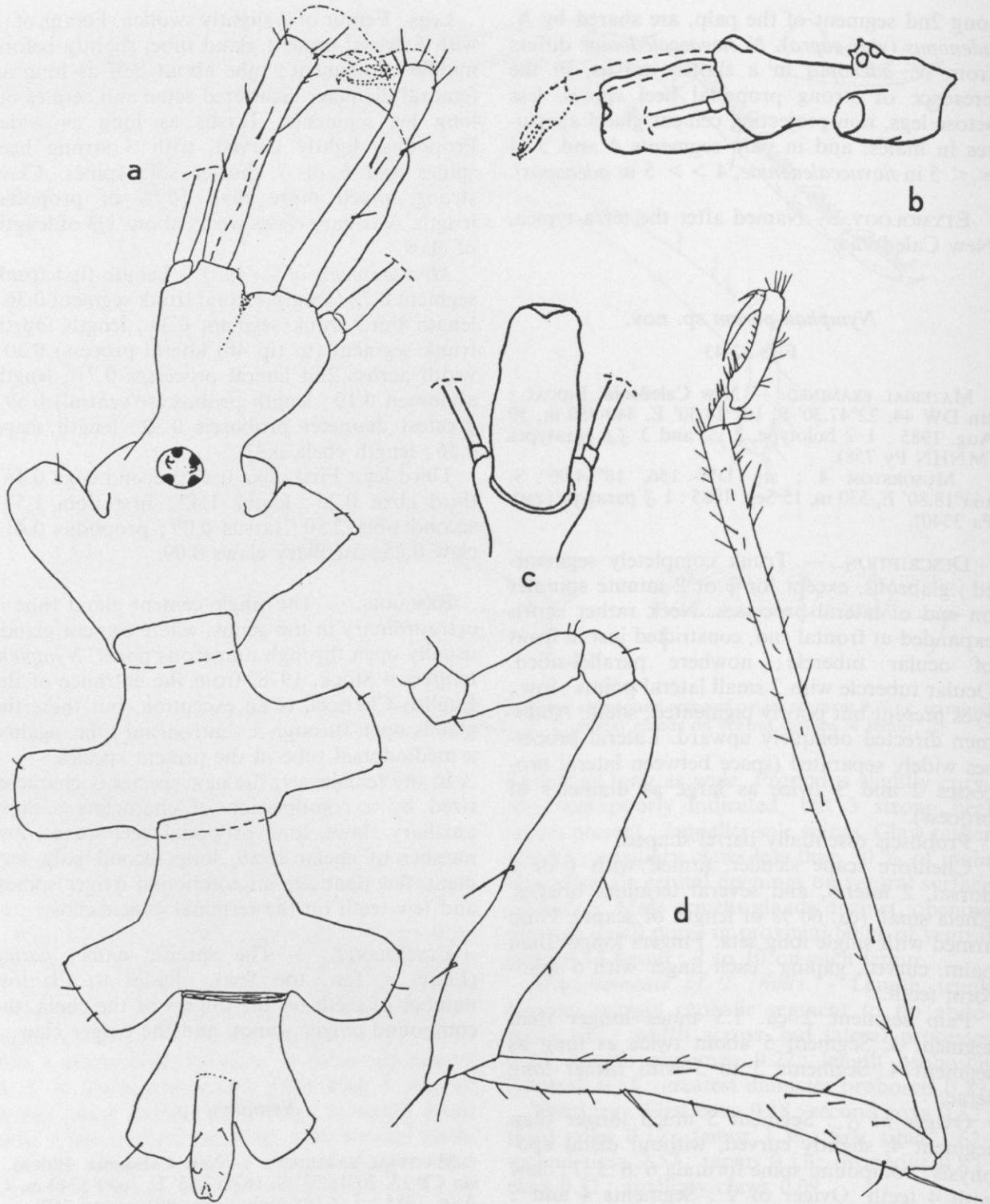


FIG. 42. — *Nymphon parum* sp. nov., ♀: a, body, dorsal; b, cephalic segment, from the left; c, proboscis, ventral; d, second leg.

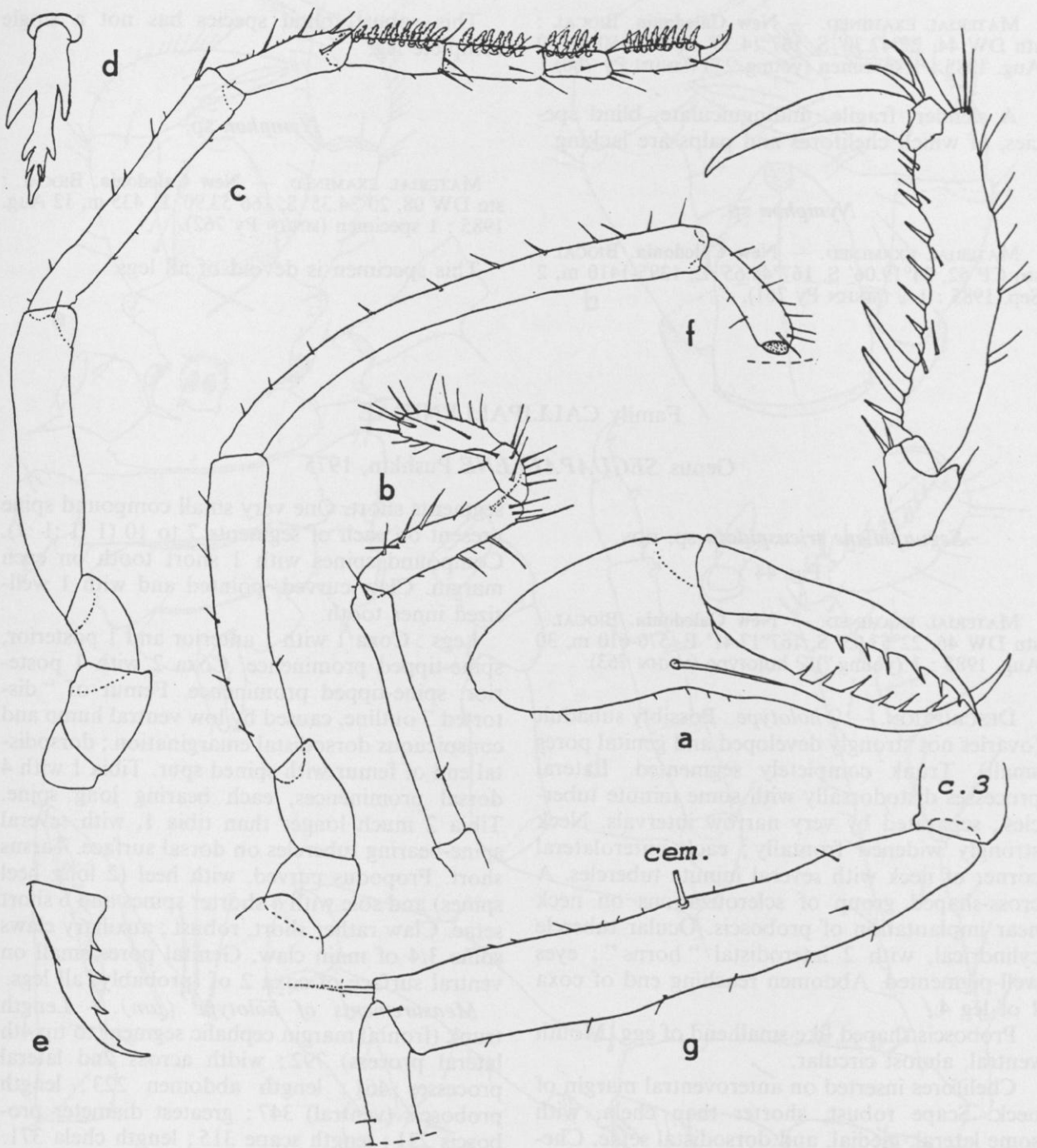


FIG. 43. — *Nymphon parum* sp. nov. : a, chela, ♀; b, palp, ♀; c, oviger, ♀; d, distalmost compound spine of oviger segment 9, ♀; e, terminal oviger claw, ♀; f, proximal part of oviger, ♂; g, femur, ♂; h, distal segments of third leg, ♀.

*Nymphon* sp.

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL : stn DW 44, 22°47.30' S, 167°14.30' E, 440-450 m, 30 Aug. 1985 : 1 specimen (young ♀?) (MNHN Py 760).

A slender, fragile, uniunguiculate, blind species, of which chelifores and palps are lacking.

*Nymphon* sp.

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL : stn CP 62, 24°19.06' S, 167°48.65' E, 1395-1410 m, 2 Sep. 1985 : 1 ♀ (MNHN Py 761).

This robust, blind species has not a single complete leg.

*Nymphon* sp.

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL : stn DW 08, 20°34.35' S, 166°53.90' E, 435 m, 12 Aug. 1985 : 1 specimen (MNHN Py 762).

This specimen is devoid of all legs.

## Family CALLIPALLENIDAE

Genus *SEGUAPALLENE* Pushkin, 1975*Seguapallene tricuspidata* sp. nov.

Fig. 44

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL : stn DW 46, 22°53.05' S, 167°17.41' E, 570-610 m, 30 Aug. 1985 : 1 (young ♀) holotype (MNHN 763).

DESCRIPTION. — ♀ *holotype* : Possibly subadult (ovaries not strongly developed and genital pores small). Trunk completely segmented. Lateral processes distodorsally with some minute tubercles; separated by very narrow intervals. Neck strongly widened frontally; each anterolateral corner of neck with several minute tubercles. A cross-shaped group of sclerotizations on neck near implantation of proboscis. Ocular tubercle cylindrical, with 2 laterodistal "horns"; eyes well-pigmented. Abdomen reaching end of coxa 1 of leg 4.

Proboscis shaped like small end of egg. Mouth ventral, almost circular.

Chelifores inserted on anteroventral margin of neck. Scape robust, shorter than chela, with some lateral, medial, and dorsodistal setae. Chela : ectal side of palm with many setae; fingers straight, with slightly incurved tips. Each finger with 9 small, sharp teeth.

No palps.

Oviger implantation in contact with first lateral process. Oviger 10-segmented, very weak and short. Segments 4 and 5 elongate, all other

segments short. One very small compound spine present on each of segments 7 to 10 (1 : 1 : 1). Compound spines with 1 short tooth on each margin. Claw curved, pointed and with 1 well-sized inner tooth.

Legs : Coxa 1 with 1 anterior and 1 posterior, spine-tipped prominence. Coxa 2 with 1 posterior, spine-tipped prominence. Femur of "distorted" outline, caused by low ventral hump and conspicuous dorsodistal emargination; dorsodistal end of femur with spined spur. Tibia 1 with 4 dorsal prominences, each bearing long spine. Tibia 2 much longer than tibia 1, with several spine-bearing tubercles on dorsal surface. Tarsus short. Propodus curved, with heel (2 long heel spines) and sole with 4 shorter spines and 6 short setae. Claw rather short, robust; auxiliary claws some 3/4 of main claw. Genital pores small on ventral surface of coxa 2 of (probably) all legs.

*Measurements of holotype* ( $\mu\text{m}$ ). - Length trunk (frontal margin cephalic segment to tip 4th lateral process) 792; width across 2nd lateral processes 461; length abdomen 223; length proboscis (ventral) 347; greatest diameter proboscis 231; length scape 315; length chela 371.

Third leg : First coxa 128; second coxa 303; third coxa 136; femur 641; first tibia 678; second tibia 1015; tarsus 56; propodus 313; claw 134; auxiliary claws 110.

REMARKS. — The new species described above resembles closely a form from New South Wales



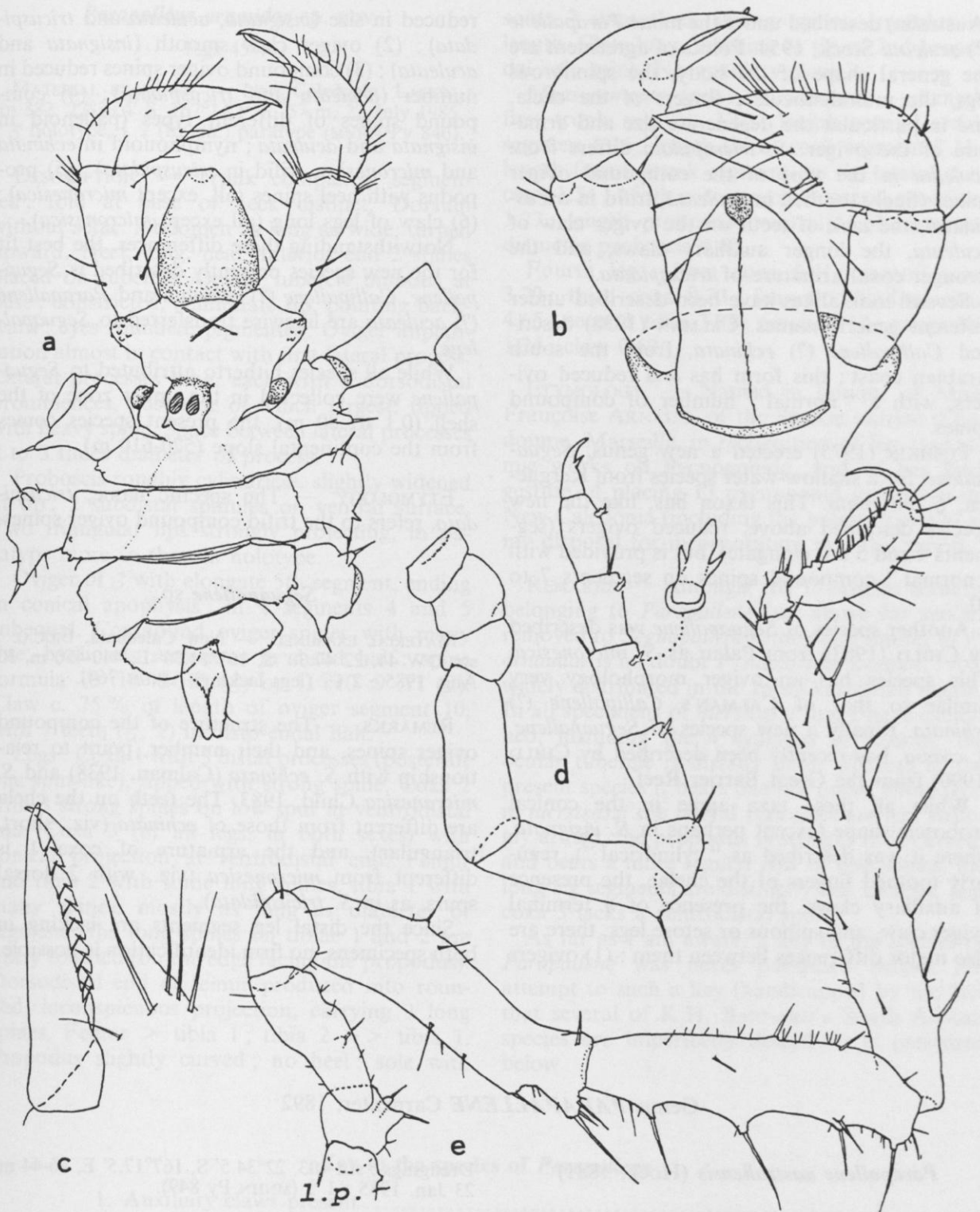


FIG. 44. — *Seguapallene tricuspadata* sp. nov., ♀ holotype : a, body, dorsal ; b, proboscis and cheliformes, ventral ; c, tip of chela ; d, oviger ; e, third leg (to same scale as fig. 44a).

(Australia) described under the name *Parapallene* (?) *aculeata* Stock, 1954. Points of agreement are the general shape of the body, the spiniferous legs, the multidenticulate fingers of the chela, and in particular the degenerate size and armature of the oviger. *S. tricuspadata* differs from *aculeata* in the type of the compound oviger spines (finely toothed in *aculeata*, trifold in *tricuspadata*), the lack of teeth on the oviger claw of *aculeata*, the longer auxiliary claws, and the stronger coxal armature of *tricuspadata*.

Several look-alikes have been described under different generic names. CALMAN (1938) described *Callipallene* (?) *echinata*, from the south Arabian coast; this form has less reduced ovigers, with a "normal" number of compound spines.

PUSHKIN (1975) erected a new genus, *Seguapallene*, for a shallow-water species from Kerguelen, *S. insignata*. This taxon has, like the new species described above, reduced ovigers (segments 4 and 5 not elongate), but is provided with "normal" compound spines on segments 7 to 10.

Another species of *Seguapallene* was described by CHILD (1983) from Palau as *S. micronesica*. This species has an oviger morphology very similar to that of CALMAN'S *Callipallene* (?) *echinata*. Finally a new species of *Seguapallene*, *S. crassa*, has recently been described by CHILD (1990) from the Great Barrier Reef.

While all these taxa agree in the conical proboscis shape (except perhaps in *S. insignata*, where it was described as "cylindrical"), regularly toothed fingers of the chelae, the presence of auxiliary claws, the presence of a terminal oviger claw, and spinous or setose legs, there are also major differences between them: (1) ovigers

reduced in size (*insignata*, *aculeata* and *tricuspadata*); (2) oviger claw smooth (*insignata* and *aculeata*); (3) compound oviger spines reduced in number (*aculeata* and *tricuspadata*); (4) compound spines of different types (pallenoid in *insignata* and *aculeata*; nymphonoid in *echinata* and *micronesica*, trifold in *tricuspadata*); (5) propodus with heel spines (all, except *micronesica*); (6) claw of legs long (all except *micronesica*).

Notwithstanding these differences, the best fit for the new species presently described is *Seguapallene*. *Callipallene* (?) *echinata* and *Parapallene* (?) *aculeata* are likewise transferred to *Seguapallene*.

While all species hitherto attributed to *Seguapallene* were collected in the upper zone of the shelf (0.1 to 80 m), the present species comes from the continental slope (570-610 m).

ETYMOLOGY. — The specific name, *tricuspadata*, refers to the trifold compound oviger spines.

#### *Seguapallene* sp.

MATERIAL EXAMINED. — **New Caledonia.** BIOCAL : stn DW 44, 22°47.30' S, 167°14.30' E, 440-450 m, 30 Aug. 1985 : 2 ♀♀ (legs lacking) (MNHN 764).

REMARKS. — The structure of the compound oviger spines, and their number, point to relationship with *S. echinata* (Calman, 1938) and *S. micronesica* Child, 1983. The teeth on the chela are different from those of *echinata* (viz., short, triangular), and the armature of coxa 1 is different from *micronesica* (viz., with 2 dorsal spurs, as in *S. tricuspadata*).

Since the distal leg segments are lacking in both specimens, no firm identification is possible.

### Genus *PARAPALLENE* Carpenter, 1892

#### *Parapallene australiensis* (Hoek, 1881)

*Parapallene australiensis* - CHILD, 1975 : 12 (older refs). — STAPLES, 1977 : 123, colour fig.; 1982 : 455-456. — STAPLES & WATSON, 1987 : 222.

MATERIAL EXAMINED. — **New Caledonia.** "Vauban"

Dredgings : stn 403, 22°34.5' S, 167°17.5' E, 46-44 m, 23 Jan. 1985 : 1 ♀ (MNHN Py 849).

REMARKS. — All previous records are around the Australian continent, in shallow waters.

*Parapallene arnaudae* sp. nov.

Figs 45-46

MATERIAL EXAMINED. — New Caledonia. LAGON : stn 382, 22°30.4' S, 167°14.1' E, 57 m, 22 July 1985 : 1 ♂ holotype, 1 ♀ (fragm.) paratype (MNHN Py 846).

DESCRIPTION. — Trunk completely segmented; fold at base of neck distinct. Dorsum without setae. Abdomen as long as wide, turned upward. Neck long, near anterior end 2 spines placed on tubercle. Ocular tubercle bulbous at base; constricted, acuminate tip, pointing backward; eyes rounded, pigmented. Oviger implantation almost in contact with first lateral process. Lateral processes long, each with 2 dorsodistal prominences, posterior of which largest, tipped with heavy spine. Space between lateral processes 2 to 3 times diameter of process.

Proboscis roughly cylindrical, slightly widened at tip; 2 subdistal spinules on ventral surface. Two triangular lips strongly projecting, in paratype more so than in holotype.

Oviger of ♂ with elongate 5th segment, ending in conical apophysis; in ♀ segments 4 and 5 subequal. Compound oviger spines with many fine, hyalinous serrations in distal half; spine formula 10 :10 :8 :10 (♂) or 11 :10 :9 :11 (♀). Claw c. 75 % of length of oviger segment 10, with 7 teeth (♂, ♀) in disto-endal half.

Legs : Coxa 1 with 3 distal processes (posterior one spur-like), tipped with strong spine. Coxa 2 with 3 strong spines on low spur at ventrodistal end. Coxa 3 (of all legs, in both sexes) with conical projection at ventrodistal end. Femur and tibia 2 with some long spines, tibia 1 with many spines, mostly as long as diameter of segment; the long spines on tibiae 1 and 2 are finely toothed (on the edge facing the propodus). Dorsodistal end of femur produced into rounded, inconspicuous projection, carrying 3 long spines. Femur > tibia 1; tibia 2 >> tibia 1. Propodus slightly curved; no heel; sole with

some 7 untoothed, strong spines, irregular in length. Claw long, reaching to tip of 2nd propodal sole spine. No auxiliary claws.

Measurements (mm) of holotype. — Length first trunk segment 3.52; length second trunk segment 1.36; length third trunk segment 1.33; length fourth trunk segment (to tip lateral process) 1.54; width across second lateral processes 3.27; length proboscis (ventral) 1.62; greatest diameter proboscis 0.60.

Fourth leg : First coxa 0.91; second coxa 3.20; third coxa 0.73; femur 5.78; first tibia 4.65; second tibia 7.88; tarsus 0.10; propodus 1.24; claw 0.62.

ETYMOLOGY. — Named in honour of Mme Françoise ARNAUD, of the Station marine d'Endoume, Marseille, in recognition of her taxonomic works on Pycnogonida, and of her kind gesture of placing 13 pycnogonid samples from New Caledonia (including the present sample) at my disposal for incorporation into this report.

REMARKS. — Amongst the 17 species actually belonging to *Parapallene* (see above for species removed to *Seguapallene*), the most similar to *P. arnaudae* is no doubt *P. nierstraszi* Loman, 1908, widely distributed in the Indo-Australian region. In all specimens of *nierstraszi* that I have examined, including the 4 syntypes of LOMAN, the ocular tubercle is distally bifid, whereas in the present species it bears one tall point. Moreover, in *nierstraszi* the lateral processes are less strongly armed, the propodus is straight (not curved) and bears a more regular row of sole spines, the long leg segments are distinctly less spinous, and coxa 3 lacks a ventrodistal spur.

As far as I am aware, a key to the species of *Parapallene* was never published before. An attempt to such a key (handicapped by the fact that several of K.H. BARNARD's South African species are imperfectly described) is presented below.

Key to the species of *Parapallene*

- 1. Auxiliary claws present ..... 2
- Auxiliary claws absent ..... 4
- 2. Propodal sole with few (4-5) spines. Auxiliary claws at least half as long as main claw. Terminal oviger claw as long as oviger segment 10 ..... 3



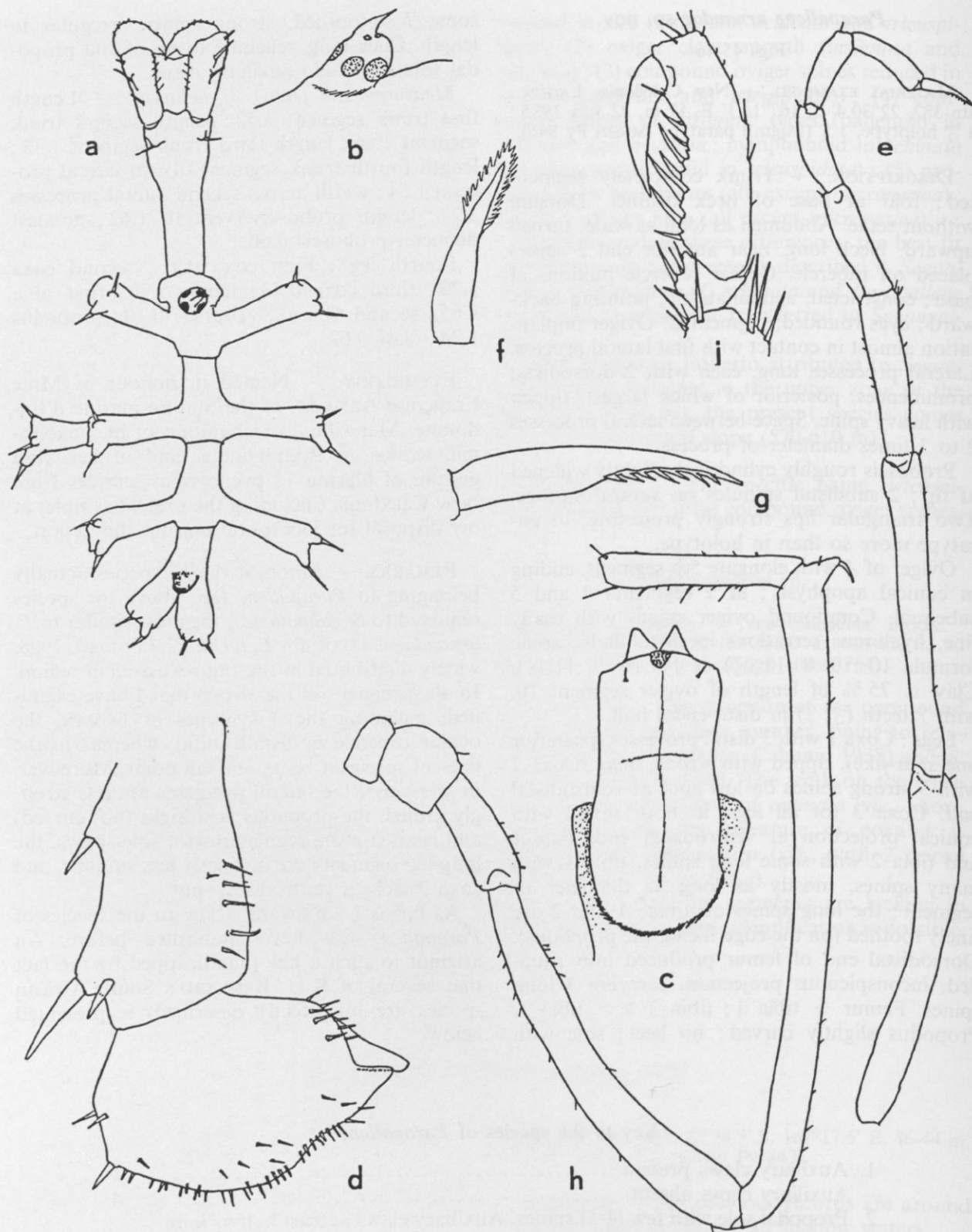


FIG. 45. — *Parapallene arnaudae* sp. nov., ♂ holotype and ♀ paratype : a, trunk, ♂, dorsal ; b, ocular tubercle, ♀, from the left ; c, proboscis, ♀, ventral ; d, chelifore, ♂ ; e, oviger segments 4 to 10, ♀ ; f, compound spine of oviger segment 10, ♀ ; g, terminal oviger claw, ♀ ; h, oviger segments 1 to 6, ♂ ; i, distal segments of leg 4, ♂.

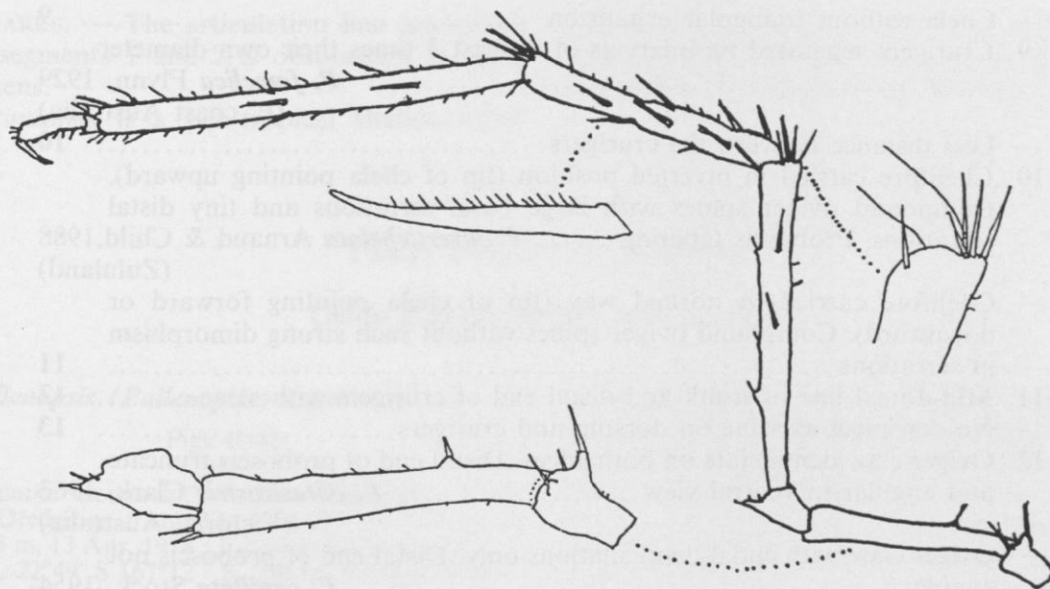


FIG. 46. — *Parapallene arnaudae* sp. nov. : ♂ holotype : leg 4.

- Propodal sole with many (> 20) spines. Auxiliary claws < 33 % of main claw. Terminal oviger claw rudimentary ..... *P. parviungularis* Stock, 1986 (Straits of Florida)
- 3. Crurigers separated by interval twice their own diameter. Ocular tubercle pointed. Neck very long ..... *P. bermudensis* Lebour, 1949 (Bermuda to Belize)
- Crurigers separated by interval of about their own diameter. Ocular tubercle obtuse. Neck medium-long..... *P. challengerii* Calman, 1927 (S.E. Australia)
- 4. Each cruriger with conspicuous, pointed, sometimes spiniferous process dorsally ..... **5**
- Crurigers without processes (or only with minute tubercles)..... **8**
- 5. Coxa 3 with distoventral process..... **6**
- Coxa 3 without such process ..... **7**
- 6. Femur, tibia 1 and propodus with dorsodistal spur(s)..... *P. spinosa* (Möbius, 1902) (Southern Africa)
- These segments without spurs..... *P. arnaudae* sp. nov. (New Caledonia)
- 7. Neck long. Coxa 2 slender, 4-5 times as long as wide..... *P. nierstraszi* Loman, 1908 (Indo-Australia)
- Neck short. Coxa 2 shorter, < 3 times as long as wide..... *P. calmani* Flynn, 1928 (*sensu* BARNARD, 1954) (Southern Africa)
- 8. Proximolateral corner of chela expanded and triangular ..... *P. avida* Stock, 1973 (S.E. Australia)

- Chela without triangular expansion ..... 9
9. Crurigers separated by intervals of at least 3 times their own diameter ..... *P. famelica* Flynn, 1929  
(E. coast Australia)
- Less distance between the crurigers ..... 10
10. Chelifore carried in inverted position (tip of chela pointing upward). Compound oviger spines with large basal serrations and tiny distal serrations. Proboscis tapering ..... *P. invertichelata* Arnaud & Child, 1988  
(Zululand)
- Chelifore carried in normal way (tip of chela pointing forward or downward). Compound oviger spines without such strong dimorphism in serrations ..... 11
11. Mid-dorsal line of trunk and distal end of crurigers with setae ..... 12
- No conspicuous setae on dorsum and crurigers ..... 13
12. Oviger claw denticulate on both edges. Distal end of proboscis truncate and angular in ventral view ..... *P. obtusirostris* Clark, 1963  
(Victoria, Australia)
- Oviger claw with endal denticulations only. Distal end of proboscis not angular ..... *P. capillata* Stock, 1954  
(Singapore)
13. Ocular tubercle low, truncate. Propodus tapering, with strong heel. Terminal oviger claw smooth ..... *P. exigua* Stock, 1954  
(New Zealand)
- These characters not combined ..... 14
14. Propodal heel well-developed. Distal end of femur and tibia 1 ending in process or spur ..... *P. haddoni* Carpenter, 1892  
(Torres Strait)
- No propodal heel. Femur and tibia 1 without distal spur (occasionally, small spiniferous tubercles may be present) ..... 15
15. Neck short. Oviger spines smooth or feebly serrate subapically ..... *P. hodgsoni* Barnard, 1946  
(Southern Africa)
- Neck moderately long. Oviger spines with strong teeth all over their length ..... *P. australiensis* (Hoek, 1881)  
(Australia)
- Neck long. Oviger spines smooth or feebly serrate subapically ..... 16
16. Neck 6 times as long as basal diameter. Femur and tibia 1 subequal in length. Tibia 2 less than twice as long as tibia 1 . *P. longipes* Calman, 1938  
(Zanzibar)
- Neck 4-5 times as long as basal diameter. Tibia 1 < femur. Tibia 2 twice as long as tibia 1 ..... *P. algoae* Barnard, 1946  
(Southern Africa)

Genus *PIGROGROMITUS* Calman, 1927

*Pigrogromitus timsanus* Calman, 1927

*P. timsanus* Calman, 1927 : 408-410, fig. 410. — CHILD, 1988a : 21 (refs). — NAKAMURA & CHILD, 1988 : 667.

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn CP 23, 22°45.84' S, 166°20.33' E, 2040 m, 28 Aug. 1985 : 1 ♀ (MNHN Py 765). — Stn KG 22 : 22°46.44' S, 166°19.93' E, 2050 m, 28 Aug. 1985 : 1 ♀ (?) (MNHN Py 766).



REMARKS. — The articulation line separating scape segments 1 and 2 is obsolescent in these specimens.

*P. timsanus* is a pan-tropical shallow-water

species. The present two records from deep-water stations (2040-2050 m), represent probably contamination from fouling of the ship's hull.

## Family PHOXICHILIDIIDAE

### Genus *PALLENOPSIS* Wilson, 1881

#### *Pallenopsis (Pallenopsis) angusta* sp. nov.

Figs 47-48

MATERIAL EXAMINED. — New Caledonia. "Vauban" Dredgings : stn 12, 22°47.05' S, 167°10' E, 360-365 m, 13 Apr. 1978 : 1 ♂ ovig. (MNHN Py 702). — Stn. 15, 22°49' S 167°12' E, 390 m, 10 Apr. 1978 : 1 ♀ (MNHN Py 701).

LAGON : stn CP 389, 22°43.3' S, 167°04.5' E, 274 m, 22 Jan. 1985 : 6 ♂♂, 2 ♀♀ (MNHN Py 817). — Stn. 393 bis, 22°42.2' S, 167°04.0' E, 284 m, 23 Jan. 1985 : 1 spm. (MNHN Py 818). — Stn. 395, 22°42.2' S, 167°07.6' E, 312-313 m, 23 Jan. 1985 : 3 ♂♂, 2 ♀♀ (MNHN Py 847). — Stn. 419, 22°42.3' S, 167°10.5' E, 325-330 m, 24 Jan. 1985 : 1 ♂, 1 ♀ (MNHN Py 816).

BIOCAL : stn CP42, 22°45.14' S, 167°12.12' E, 380 m, 30 Aug. 1985 : 2 ♀♀ (MNHN Py 706). — Stn CP84, 20°43.49' S, 167°00.27' E, 150-210 m, 6 Sep. 1985 : 1 ♀ (MNHN Py 708). — Stn CP 110, 22°12.38' S, 167°06.43' E, 275-320 m, 9 Sep. 1985 : 2 ♀♀ (MNHN Py 705).

MUSORSTOM 4 : stn CP 155, 18°52.80' S, 163°19.50' E, 570 m, 15 Sep. 1985 : 1 ♀ (MNHN Py 680). — Stn CP 195, 18°54.80' S, 163°22.20' E, 470 m, 19 Sep. 1985 : 2 ♂♂ (MNHN Py 675, 682). — Stn DW 197, 18°51.30' S, 163°21.00' E, 560 m, 20 Sep. 1985 : 1 ♂, 1 ♀ (MNHN Py 683). — Stn DW 209, 22°41.80' S, 167°09.10' E, 315 m, 28 Sep. 1985 : 1 ♀ (MNHN Py 666). — Stn DW 212, 22°47.40' S, 167°10.50' E, 380 m, 28 Sep. 1985 : 1 ♀ (MNHN Py 674). — Stn CP 213, 22°51.30' S, 167°12.00' E, 430 m, 28 Sep. 1985 : 3 ♂♂, 3 ♀♀ (ZMA Pa 3333). — Stn CP 214, 22°53.80' S, 167°13.90' E, 440 m, 28 Sep. 1985 : 1 ♂ (MNHN Py 679). — Stn CP 215, 22°55.70' S, 167°17.00' E, 520 m, 28 Sep. 1985 : 1 ♂, 1 ♀ (ZMA Pa 3335). — Stn DW 221, 22°58.60' S, 167°36.80' E, 560 m, 29 Sep. 1985 : 1 ♀ (MNHN Py 685). — Stn DW 230, 22°52.50' S, 167°11.80' E, 420 m, 30 Sep. 1985 : 1 ♂ (MNHN Py 684).

SMIB 2 : stn. DW 16, 22°51.2' S, 167°11.7' E, 390 m, 19 Sep. 1986 : 1 ♀ (MNHN Py 662).

CHALCAL 2 : stn CP 26, 23°18.15' S, 168°03.58' E, 296 m, 31 Oct. 1986 : 1 ♂ (MNHN Py 659). — Stn DW 83, 23°20.30' S, 168°05.50' E, 200 m, 31 Oct. 1986 : 2 ♀♀ (MNHN Py 660).

AZTÈQUE : stn 1, 23°16.7' S, 168°07.7' E, 290-460 m, 12 Feb. 1990 : 1 ♂ (ZMA Pa 3438).

Loyalty Islands. MUSORSTOM 6 : stn DW 399, 20°41.80' S, 167°00.20' E, 282 m, 14 Feb. 1989 : 1 ♂ holotype (MNHN Py 768). — Stn DW 482, 21°21.50' S, 167°46.80' E, 375 m, 23 Feb. 1989 : 1 ♀ allotype (MNHN Py 769).

DESCRIPTION. — *Types* : Trunk completely segmented. Lateral processes hardly longer than diameter of trunk, distally naked or with minute tubercle(s). Abdomen reaching end of coxa 1 of leg 4. Ocular tubercle (in side view) asymmetrical, conical, tip slightly curved forward; eyes well-pigmented, anterior pair of eyes larger than posterior pair.

Proboscis almost cylindrical, slightly swollen in middle and near tip.

Chelifore scape 1-segmented, poorly setose. Chela with slender palm (more than twice as long as wide), setose. Spiny cushion at base of movable finger inconspicuous, with 4 stiff setae only. Both fingers with rounded, low denticles in proximal part of endal margin.

Palp reduced to rounded hump, halfway ocular tubercle and first lateral process.

Oviger of ♂ 10-segmented. Segments 2 and 4 subequal, segment 5 < 4. Segments 6 to 9 more or less rectangular (not bulbous), irregularly armed with stiff setae. Segment 10 ovate, small, with long stiff setae.

Oviger of ♀ 9-segmented (fusion of segments 7 and 8). Segment 2 > 4 > 5. Distal segments armed with long stiff setae.

Legs : Femur and tibiae very slender and elongate. Scarce, short setae on coxae, femur, and tibia 1; slightly longer and more numerous setae and spinules on dorsal surface of tibia 2. Propodus and claw thick-set, short; propodus with 4 heel spines (proximal 2 shorter, distal 2 long), placed in proximal 40 % of ventral margin. Remaining 60 % with row of 8 to 11 shorter sole spines. Auxiliary claws long, some 2/3 of main claw. Male genital spur on ventrodorsal end of coxa 2 of legs 3 and 4. Cement gland discharging through duct on ventral surface of femur of all legs; length of duct less than femoral diameter; implantation of duct somewhat before middle of segment.

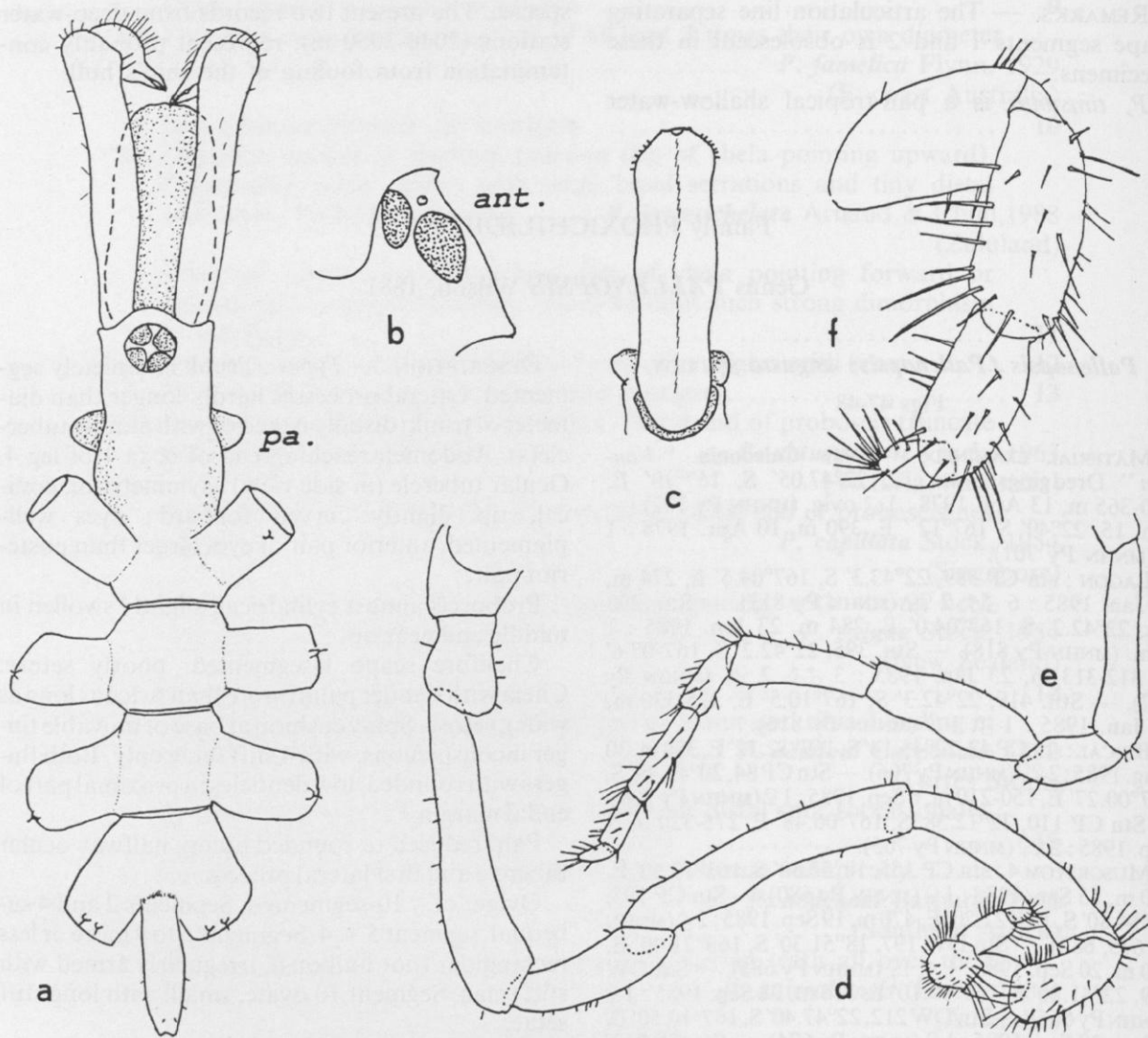


FIG. 47. — *Pallenopsis (Pallenopsis) angusta* sp. nov. : a, trunk, ♀, dorsal ; b, ocular tubercle, ♀, from the right ; c, proboscis, ♀, ventral ; d, oviger, ♂ ; e, oviger, ♀ ; f, distal oviger segments, ♂.

*Measurements of ♀ allotype (mm).* - Length trunk (frontal margin cephalic segment to tip abdomen) 8.0 ; width across 2nd lateral processes 3.7 ; length abdomen 1.3 ; length proboscis (ventral) 5.0 ; greatest diameter proboscis 1.3.

Third leg : First coxa 1.1 ; second coxa 3.0 ; third coxa 1.4 ; femur 13.0 ; first tibia 13.5 ; second tibia 15.6 ; tarsus + propodus 1.8.

*Variability.* - Some specimens have more spines on the "spiny cushion" of the chela, the teeth on the immovable finger may be vestigial or

absent, and the tibiae vary greatly in spinosity/setosity.

*REMARKS.* — This species is very similar to *P. (P.) dentifera* Stock, 1983, from the Philippines, but can be discriminated at first sight by shorter lateral processes and a much shorter propodus and claw. The propodus has 4 basal spines in its proximal 40-50 % in *angusta*, 3 basal spines in its proximal 20 % in *dentifera*.

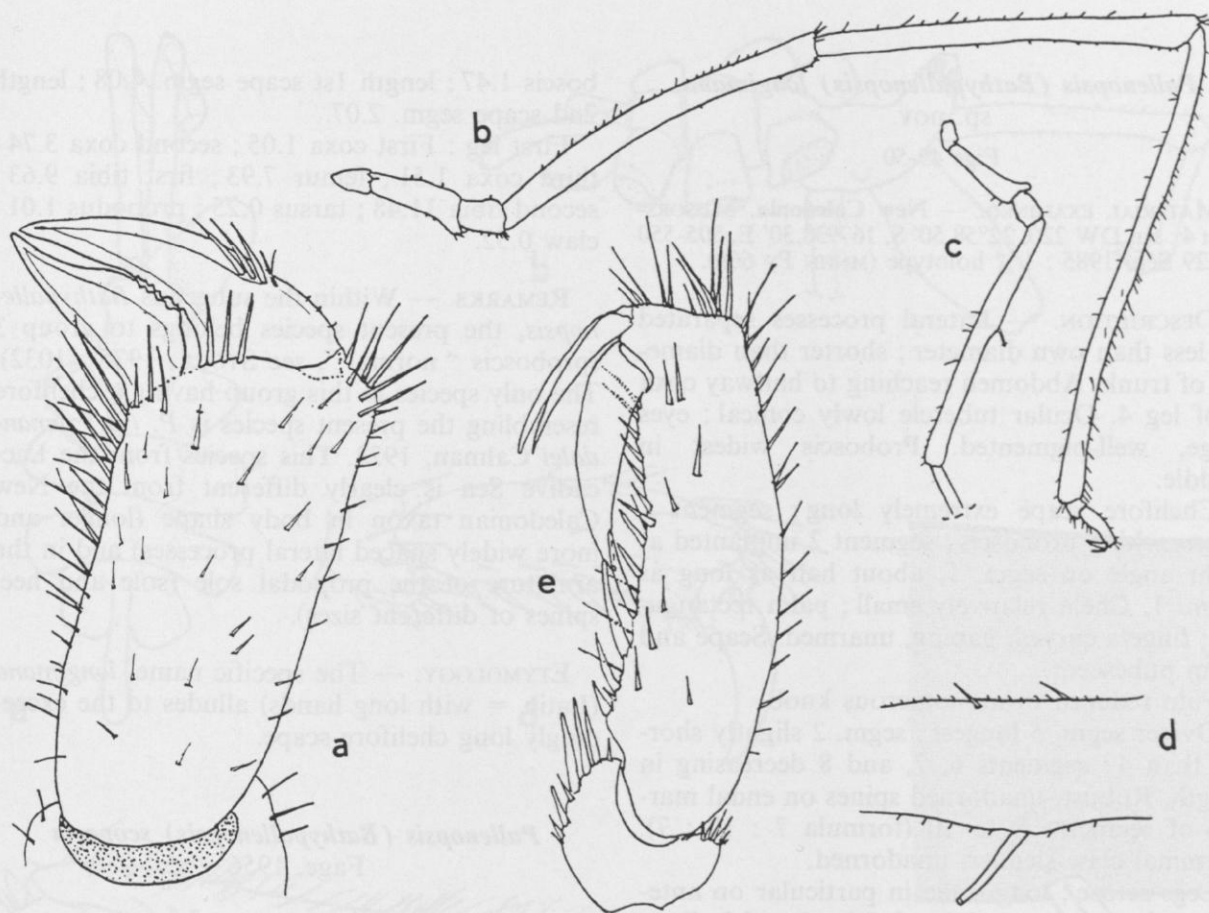


FIG. 48. — *Pallenopsis (Pallenopsis) angusta* sp. nov. : a, chela, ♂; b, third leg, ♀; c, coxae and femur of third leg, ♂; d, cement gland duct, ♂; e, distal segments of third leg, ♂.

ETYMOLOGY. — The specific name, *angusta* (Latin = thick-set) alludes to the short and robust propodus and claw.

***Pallenopsis (Pallenopsis) virgata* Loman, 1908**

*Pallenopsis (Rigona) virgatus* Loman, 1908 : 69-70, pl. 9 fig. 134, pl. 10 figs 135-136.

*Pallenopsis virgatus* -HEDGPETH, 1959 : 277-278, fig. 36 g-h. — NAKAMURA, 1987 : 13 (refs), pl. 10.

MATERIAL EXAMINED. — **New Caledonia.** LAGON : stn 540, 19°06.2' S, 163°15.8' E, 35-40 m, 6 Mar. 1985 : 1 ♂, 2 ♀ (MNHN Py 842). — Stn. 598, 22°19.1' S, 167°06.7' E, 73-75 m, 5 Aug. 1986 : 2 ♂♂ (MNHN Py 768).

CHALCAL 2, stn DW 83, 23°20'30" S, 168°05.50' E, 200 m, 31 Oct. 1986 : 1 ♀ (MNHN Py 794).

**Chesterfield Islands.** MUSORSTOM 5, stn DW 264,

25°19.69' S, 159°44'33' E, 56 m, 8 Oct. 1986 : 1 ♂ (MNHN Py 690).

REMARKS. — LOMAN's record is from Indonesia (E. of Sumbawa, 73 m) ; all other records are from Japan.

***Pallenopsis (Pallenopsis) sp.***

MATERIAL EXAMINED. — **New Caledonia.** LAGON : stn 129, Ile Ouen, Baie du Prony, 22°30.5' S, 166°47.2' E, 45-55 m, 23.08.1984 : 1 juv. (MNHN Py 658).

BIOCAL : stn DW 51, 23°05.27' S, 167°44.95' E, 680-700 m, 31 Aug. 1985 : 1 juv. (MNHN Py 771).

MUSORSTOM 4 : stn DW 234, 22°15.50' S, 167°08.30' E, 365 m, 2 Oct. 1985 : 1 juv. (MNHN Py 795).

REMARKS. — These juveniles cannot be identified properly.



*Pallenopsis (Bathypallenopsis) longimana*

sp. nov.

Figs 49-50

MATERIAL EXAMINED. — **New Caledonia.** MUSORSTOM 4 : stn DW 220, 22°58.50' S, 167°38.30' E, 505-550 m, 29 Sep. 1985 : 1 ♂ holotype (MNHN Py 669).

DESCRIPTION. — Lateral processes separated by less than own diameter ; shorter than diameter of trunk. Abdomen reaching to halfway coxa 1 of leg 4. Ocular tubercle lowly conical ; eyes large, well-pigmented. Proboscis widest in middle.

Chelifore scape extremely long ; segment 1 overreaching proboscis ; segment 2 implanted at right angle on segm. 1, about half as long as segm. 1. Chela relatively small ; palm rectangular ; fingers curved, gaping, unarmed. Scape and palm pubescent.

Palp reduced to monomeric knob.

Oviger segm. 5 longest ; segm. 2 slightly shorter than 4 ; segments 6, 7, and 8 decreasing in length. Robust, unadorned spines on endal margin of segments 8 to 10 (formula 7 : 10 : 7). Terminal claw slender, unadorned.

Legs setose ; long setae in particular on anterior and posterior surface of tibiae 1 and 2. Coxa 2 long. Tibia 2 > tibia 1 > femur. Cement gland tube on ventral margin of femur, less than half as long as femoral diameter. Propodus short, about 3 x as long as wide ; sole with 4 or 5 subequal spines (no differentiation between sole and heel spines). Claw about half as long as propodus. Auxiliary claws vestigial, placed on lateral surface of claw (not dorsally).

*Measurements of holotype (mm).* - Length trunk (frontal margin cephalic segment to tip 4th lateral process) 6.66 ; width across 2nd lateral processes 3.25 ; length abdomen 1.83 ; length proboscis (ventral) 3.66 ; greatest diameter pro-

boscis 1.47 ; length 1st scape segm. 4.08 ; length 2nd scape segm. 2.07.

First leg : First coxa 1.05 ; second coxa 3.74 ; third coxa 1.51 ; femur 7.93 ; first tibia 9.63 ; second tibia 11.48 ; tarsus 0.25 ; propodus 1.01 ; claw 0.52.

REMARKS. — Within the subgenus *Bathypallenopsis*, the present species belongs to group 3 (proboscis "normal", see STOCK, 1975 : 1032). The only species in this group having a chelifore resembling the present species is *P. (B.) annandalei* Calman, 1923. This species from the Laccadive Sea is clearly different from the New Caledonian taxon in body shape (longer and more widely spaced lateral processes) and in the armature of the propodal sole (sole and heel spines of different sizes).

ETYMOLOGY. — The specific name, *longimana* (Latin = with long hands) alludes to the exceedingly long chelifore scape.

*Pallenopsis (Bathypallenopsis) scoparia*

Fage, 1956

*Pallenopsis scoparia* Fage, 1956 : 171-172, figs 1-4. — STOCK, 1988 : 516 (refs), figs 13-15.

MATERIAL EXAMINED. — **Chesterfield Islands.** CO-RAIL 2 : stn DE 14, 21°00.69' S, 160°57.18' E, 650-660 m, 21 July 1988 : 1 ♀ (MNHN Py 796).

REMARKS. — This specimen confirms STOCK's (1988) statement, that P1 through P3 have a tarsal and propodal armature different from that of P4.

The species has a wide distribution : western Mediterranean, Rockall Trough, Bay of Biscay, Bahamas, off Kenya, and now New Caledonia. Bathymetrical range 400-1520 m.

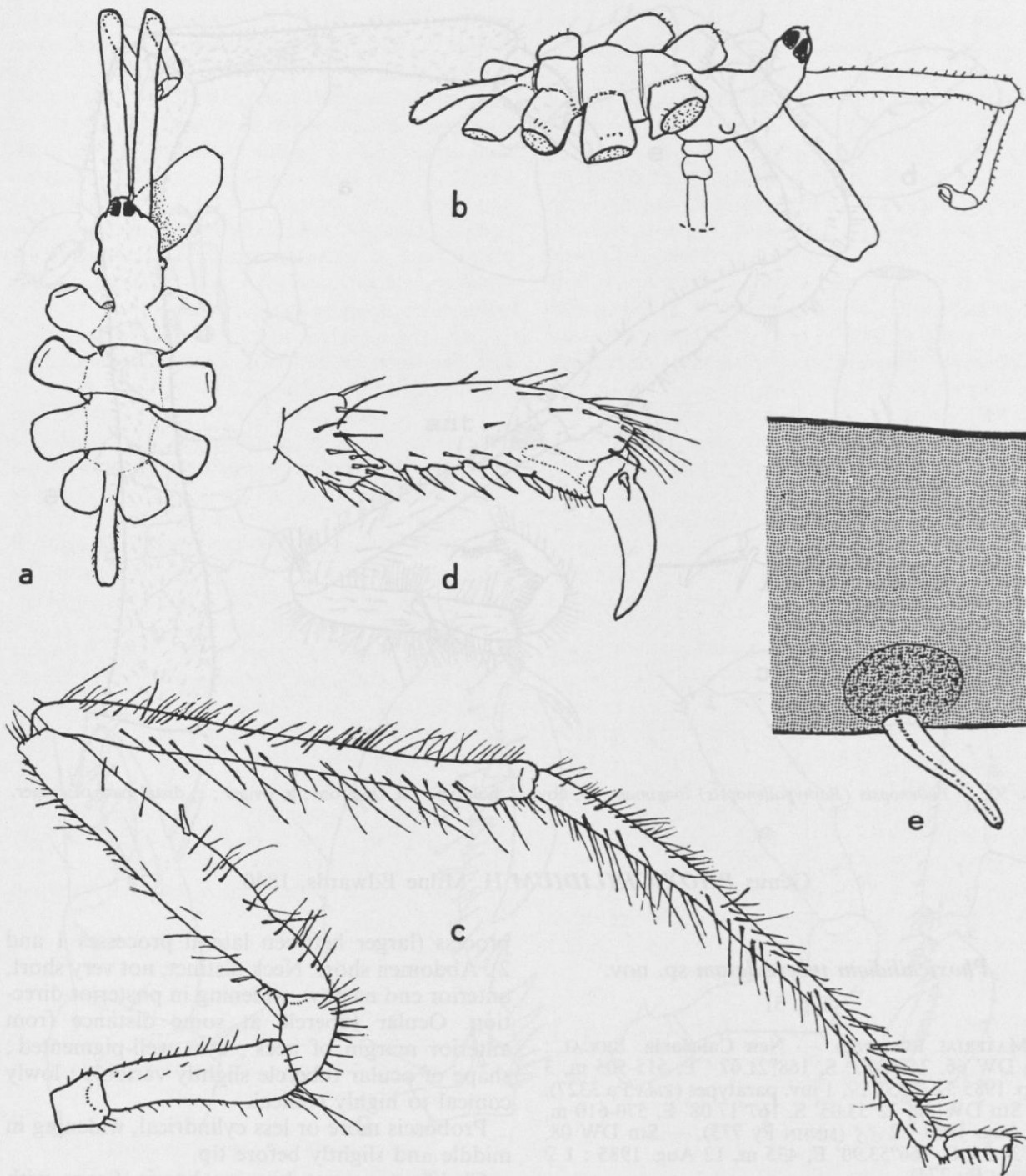


FIG. 49. — *Pallenopsis (Bathypallenopsis) longimana* sp. nov., ♂ holotype : a, trunk, dorsal ; b, trunk, from the right (same scale as a) ; c, leg 1 (same scale as a) ; d, propodus of leg 1 ; e, cement gland duct on femur of leg 1.

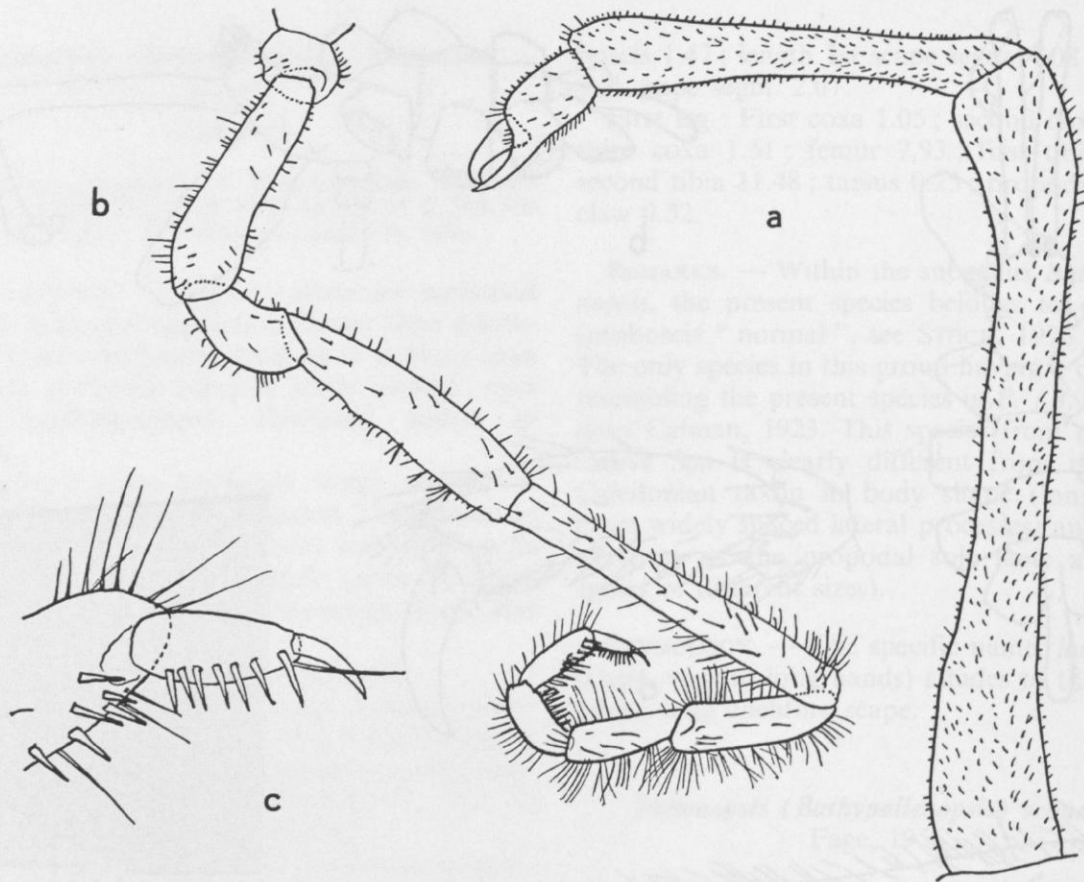


FIG. 50. — *Pallenopsis* (*Bathypallenopsis*) *longimana* sp. nov., ♂ holotype : a, chelifore ; b, oviger ; c, distal part of oviger.

Genus *PHOXICHILIDIUM* H. Milne Edwards, 1840

*Phoxichilidium tuberculatum* sp. nov.

Fig. 51

MATERIAL EXAMINED. — **New Caledonia**. BIOCAL : stn DW 66, 24°55.43' S, 168°21.67' E, 515-505 m, 3 Sep. 1985 : 2 ♂♂, 2 ♀♀, 1 juv. paratypes (ZMA Pa 3327). — Stn DW 46, 22°53.05' S, 167°17.08' E, 570-610 m, 30 Aug. 1985 : 2 ♂♂ (MNHN Py 773). — Stn DW 08, 20°34.35' S, 166°53.90' E, 435 m, 12 Aug. 1985 : 1 ♀ (MNHN Py 774).

MUSORSTOM 4 : stn DW 222, 22°57.60' S, 167°33.00' E, 440 m, 30 Sep. 1985 : 1 ♂ holotype, 2 ♀♀ paratypes (MNHN Py 772).

DESCRIPTION. — Trunk completely segmented. Lateral processes unarmed; interval between lateral processes 2 and 3 as large as diameter of

process (larger between lateral processes 1 and 2). Abdomen short. Neck distinct, not very short, anterior end narrow, widening in posterior direction. Ocular tubercle at some distance from anterior margin of neck; eyes well-pigmented; shape of ocular tubercle slightly variable: lowly conical to highly conical.

Proboscis more or less cylindrical, widening in middle and slightly before tip.

Chelifore overreaching proboscis. Scape with some distal setules. Chela with slightly curved fingers; immovable finger with 1 tooth and 2 setae, movable finger with 2 teeth and 7 setae.

No palps.

Oviger of ♂ : segment 1 short, unarmed; segments 2 and 3 of equal length, with some



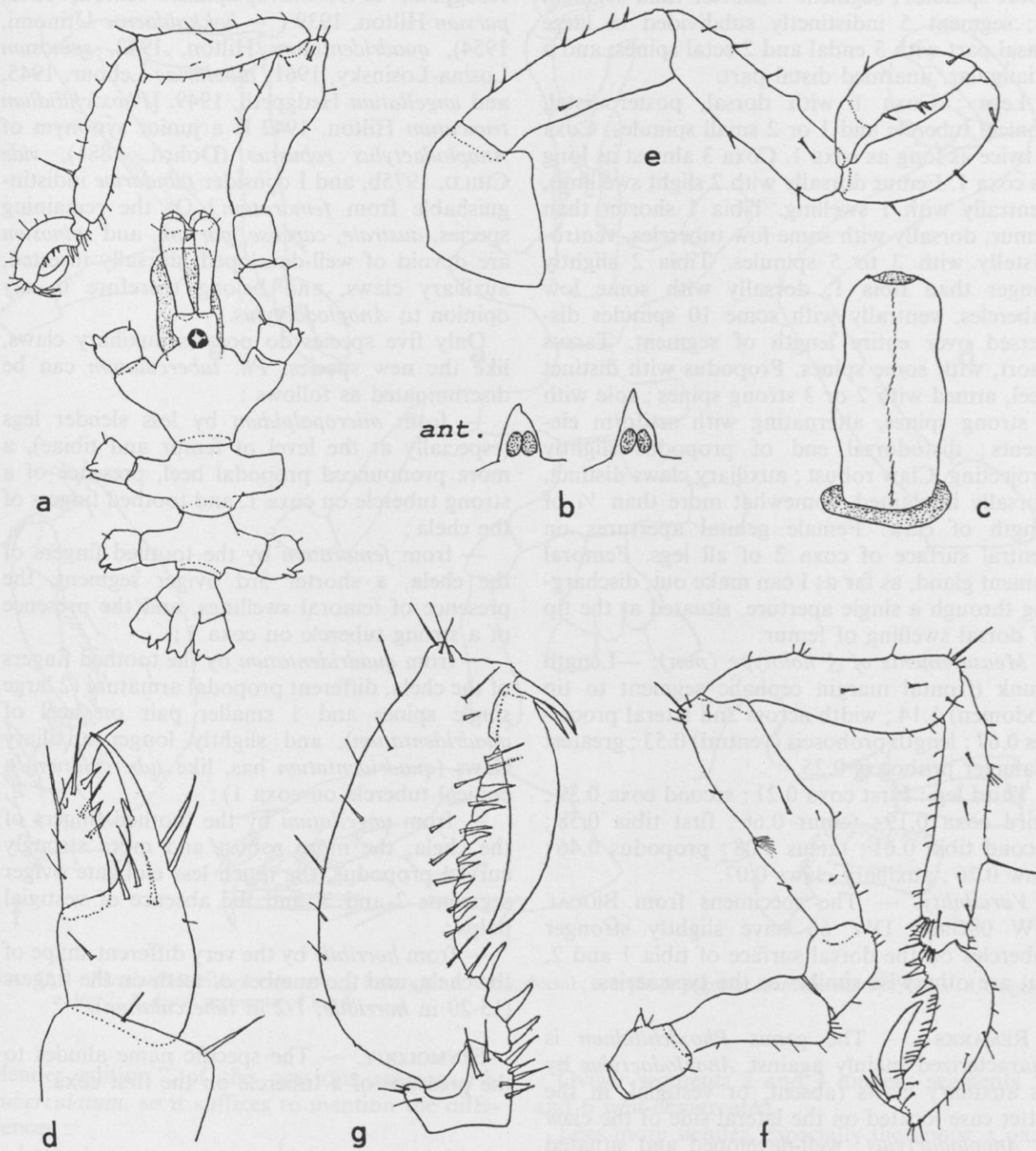


FIG. 51. — *Phoxichilidium tuberculatum* sp. nov. : a, body, ♀, dorsal ; b, ocular tubercle, from the left (left : ♀ ; right : ♂) ; c, proboscis, ♀, ventral ; d, chela, ♂ ; e, oviger, ♂ ; f, third leg, ♂ ; g, distal segments of third leg, ♂.

short spinules; segment 4 shorter than segment 3; segment 5 indistinctly subdivided in large basal part with 3 endal and 2 ectal spines, and a triangular, unarmed distal part.

Legs: Coxa 1 with dorsal, posterodistal, conical tubercle and 1 or 2 small spinules. Coxa 2 twice as long as coxa 1. Coxa 3 almost as long as coxa 1. Femur dorsally with 2 slight swellings, ventrally with 1 swelling. Tibia 1 shorter than femur, dorsally with some low tubercles, ventrodistally with 3 to 5 spinules. Tibia 2 slightly longer than tibia 1, dorsally with some low tubercles, ventrally with some 10 spinules dispersed over entire length of segment. Tarsus short, with some spines. Propodus with distinct heel, armed with 2 or 3 strong spines; sole with 6 strong spines, alternating with setiform elements; distodorsal end of propodus slightly projecting. Claw robust; auxiliary claws distinct, dorsally implanted, somewhat more than  $\frac{1}{4}$  of length of claw. Female genital apertures on ventral surface of coxa 2 of all legs. Femoral cement gland, as far as I can make out, discharging through a single aperture, situated at the tip of dorsal swelling of femur.

*Measurements of ♂ holotype (mm).* — Length trunk (frontal margin cephalic segment to tip abdomen) 1.14; width across 2nd lateral processes 0.67; length proboscis (ventral) 0.53; greatest diameter proboscis 0.25.

Third leg: First coxa 0.21; second coxa 0.39; third coxa 0.19; femur 0.66; first tibia 0.58; second tibia 0.61; tarsus 0.08; propodus 0.46; claw 0.26; auxiliary claws 0.07.

*Variability.* — The specimens from BIOCAL DW 08 and DW 66 have slightly stronger tubercles on the dorsal surface of tibia 1 and 2, but are otherwise similar to the type series.

**REMARKS.** — The genus *Phoxichilidium* is characterized mainly against *Anoplodactylus* by its auxiliary claws (absent, or vestigial, in the latter case located on the lateral side of the claw in *Anoplodactylus*; well-developed and situated at dorsal side of the claw in *Phoxichilidium*). Most species of *Phoxichilidium* have 5-segmented male ovigers, in most species of *Anoplodactylus* these are 6-segmented, but this character is not 100% exclusive.

Ten species are frequently classified with *Phoxichilidium*: *australe* Hodgson, 1914, *capense* Flynn, 1928, *femoratum* (Rathke, 1799), *horribile*

Hedgpeth, 1949, *micropalpidum* Hilton, 1942, *parvum* Hilton, 1939 (= *hokkaidoense* Utinomi, 1954), *quadridentatum* Hilton, 1942, *spinorum* Losina-Losinsky, 1961, *tubulariae* Lebour, 1945, and *ungellatum* Hedgpeth, 1949. [*Phoxichilidium truncatum* Hilton, 1942 is a junior synonym of *Anoplodactylus robustus* (Dohrn, 1881), vide CHILD, 1975b, and I consider *tubulariae* indistinguishable from *femoratum*.] Of the remaining species, *australe*, *capense*, *parvum*, and *spinorum* are devoid of well-developed, dorsally inserted, auxiliary claws, and belong therefore in my opinion to *Anoplodactylus*.

Only five species do possess auxiliary claws, like the new species. *Ph. tuberculatum* can be discriminated as follows:

— from *micropalpidum* by less slender legs (especially at the level of femur and tibiae), a more pronounced propodal heel, presence of a strong tubercle on coxa 1, and toothed fingers of the chela;

— from *femoratum* by the toothed fingers of the chela, a shorter 3rd oviger segment, the presence of femoral swellings, and the presence of a strong tubercle on coxa 1;

— from *quadridentatum* by the toothed fingers of the chela, different propodal armature (2 large single spines and 1 smaller pair on heel of *quadridentatum*), and slightly longer auxiliary claws (*quadridentatum* has, like *tuberculatum*, a conical tubercle on coxa 1);

— from *ungellatum* by the toothed fingers of the chela, the more robust and more strongly curved propodus, the much less elongate oviger segments 2 and 3, and the absence of vestigial palps;

— from *horribile* by the very different shape of the chela, and the number of teeth on the fingers (15-20 in *horribile*, 1-2 in *tuberculatum*).

**ETYMOLOGY.** — The specific name alludes to the presence of a tubercle on the first coxa.

### *Phoxichilidium forfex* sp. nov.

Fig. 52

**MATERIAL EXAMINED.** — New Caledonia. MUSORTOM 4: stn DW 156, 18°54.00' S, 163°18.80' E, 530 m, 15 Sep. 1985: 1 ♂ holotype, 1 ♀ paratype (MNHN Py 840).

**DESCRIPTION.** — Very much like a “more

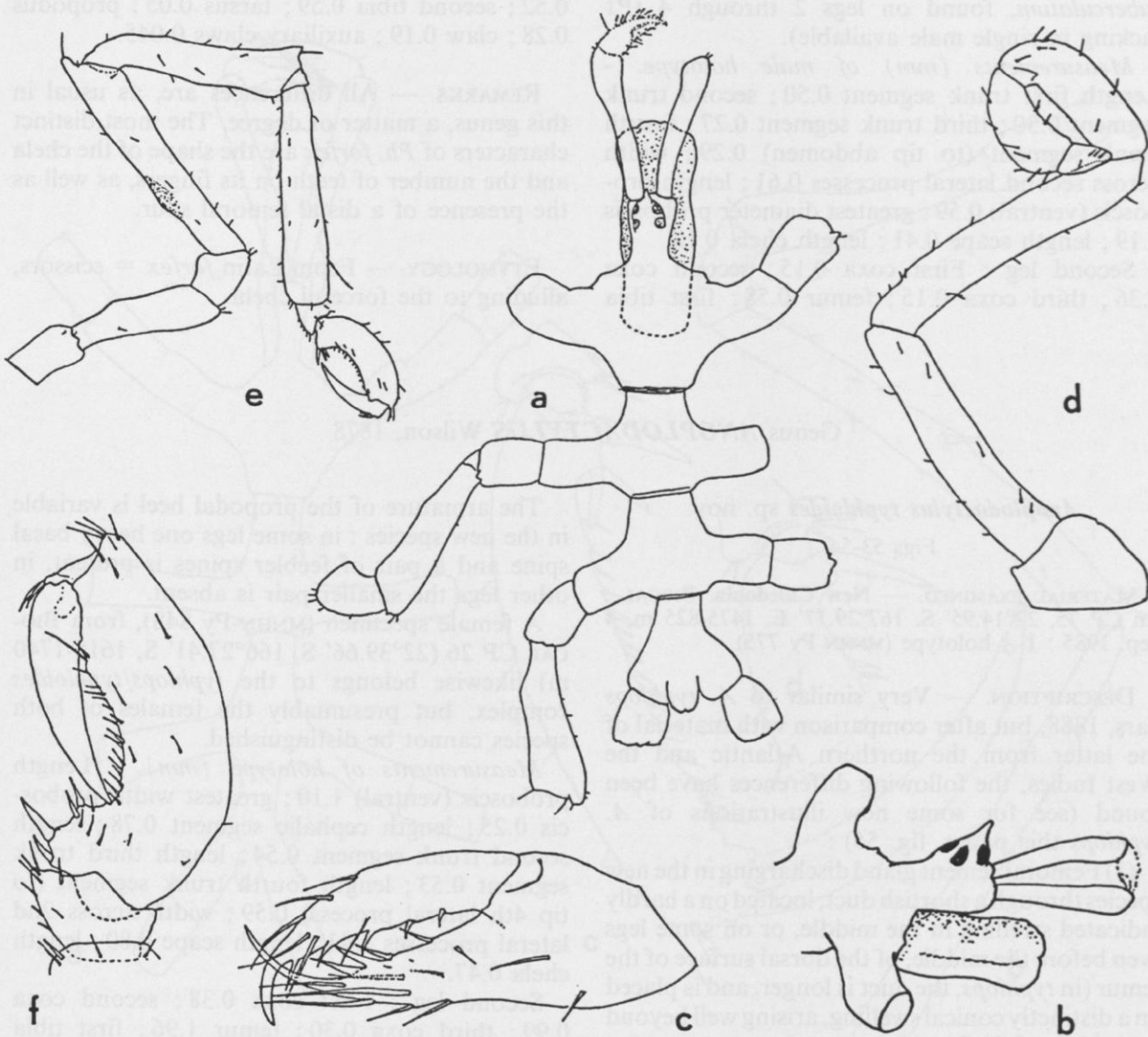


FIG. 52. — *Phoxichilidium forfex* sp. nov., ♂ holotype : a, body, dorsal ; b, cephalic segment from the right ; c, chela ; d, oviger ; e, leg 2 ; f, distal segments of leg 4.

slender edition” of the previous species, *Ph. tuberculatum*, so it suffices to mention the differences :

Lateral processes more widely separated. Neck longer than wide. A small protuberance on border connecting neck with first lateral process (♂, ♀) may represent rudiment of palp.

Chela more elongate in outline, fingers densely setose ; immovable finger with 4 long, strong teeth ; movable finger with 5, somewhat shorter, teeth.

Oviger segments 2 and 3 longer ; segments 5 and 6 well-demarcated.

Legs more slender, especially the femur. Coxa 1 (♂) with small distal tubercle in P1 and P2, with inconspicuous swelling in P3 and P4 ; no tubercles in ♀. Femur without bosses, but with well-marked dorsodistal spur. Smaller dorsodistal spur on tibia 1. Propodal heel with 1 or 2 large spines + pair of smaller spines ; sole with 12-16 thin spinules. Auxiliary claws about 25 % of claw. Cement gland more or less as in *Ph.*



*tuberculatum*, found on legs 2 through 4 (P1 lacking in single male available).

*Measurements (mm) of male holotype.* - Length first trunk segment 0.50; second trunk segment 0.30; third trunk segment 0.27; fourth trunk segment (to tip abdomen) 0.29; width across second lateral processes 0.61; length proboscis (ventral) 0.59; greatest diameter proboscis 0.19; length scape 0.41; length chela 0.18.

Second leg : First coxa 0.15; second coxa 0.36; third coxa 0.15; femur 0.58; first tibia

0.52; second tibia 0.59; tarsus 0.05; propodus 0.28; claw 0.19; auxiliary claws 0.045.

**REMARKS.** — All differences are, as usual in this genus, a matter of degree. The most distinct characters of *Ph. forfex* are the shape of the chela and the number of teeth on its fingers, as well as the presence of a distal femoral spur.

**ETYMOLOGY.** — From Latin *forfex* = scissors, alluding to the forceful chela.

### Genus *ANOPLODACTYLUS* Wilson, 1878

#### *Anoplodactylus typhloides* sp. nov.

Figs 53-54

**MATERIAL EXAMINED.** — **New Caledonia.** BIOCAL : stn CP 75, 22°14.95' S, 167°29.17' E, 1475-825 m, 4 Sep. 1985 : 1 ♂ holotype (MNHN Py 775).

**DESCRIPTION.** — Very similar to *A. typhlops* Sars, 1888, but after comparison with material of the latter from the northern Atlantic and the West Indies, the following differences have been found (see for some new illustrations of *A. typhlops* this paper, fig. 55) :

(1) Femoral cement gland discharging in the new species through a shortish duct, located on a hardly indicated swelling in the middle, or on some legs even before the middle, of the dorsal surface of the femur (in *typhlops*, the duct is longer, and is placed on a distinctly conical swelling, arising well beyond the middle of the femur).

(2) The oviger implantation is halfway the ventral surface of the first lateral process (in *typhlops*, it is in the proximal half of this surface).

(3) Coxa 2 is slightly more than 50 % of the length of the femur (in *typhlops* 30-40 % of the femoral length).

The armature of the propodal heel is variable in the new species : in some legs one heavy basal spine and a pair of feebler spines is present, in other legs the smaller pair is absent.

A female specimen (MNHN-Py 848), from BIOCAL CP 26 (22°39.66' S, 166°27.41' S, 1618-1740 m) likewise belongs to the *typhlops/typhloides* complex, but presumably the females of both species cannot be distinguished.

*Measurements of holotype (mm).* - Length proboscis (ventral) 1.10; greatest width proboscis 0.25; length cephalic segment 0.78; length second trunk segment 0.54; length third trunk segment 0.53; length fourth trunk segment (to tip 4th lateral process) 0.59; width across 2nd lateral processes 1.43; length scape 0.80; length chela 0.47.

Second leg : First coxa 0.38; second coxa 0.99; third coxa 0.30; femur 1.96; first tibia 1.87; second tibia 2.04; tarsus 0.12; propodus 0.88; claw 0.70.

**ETYMOLOGY.** — The specific name alludes to the close resemblance of the new species to *A. typhlops*.

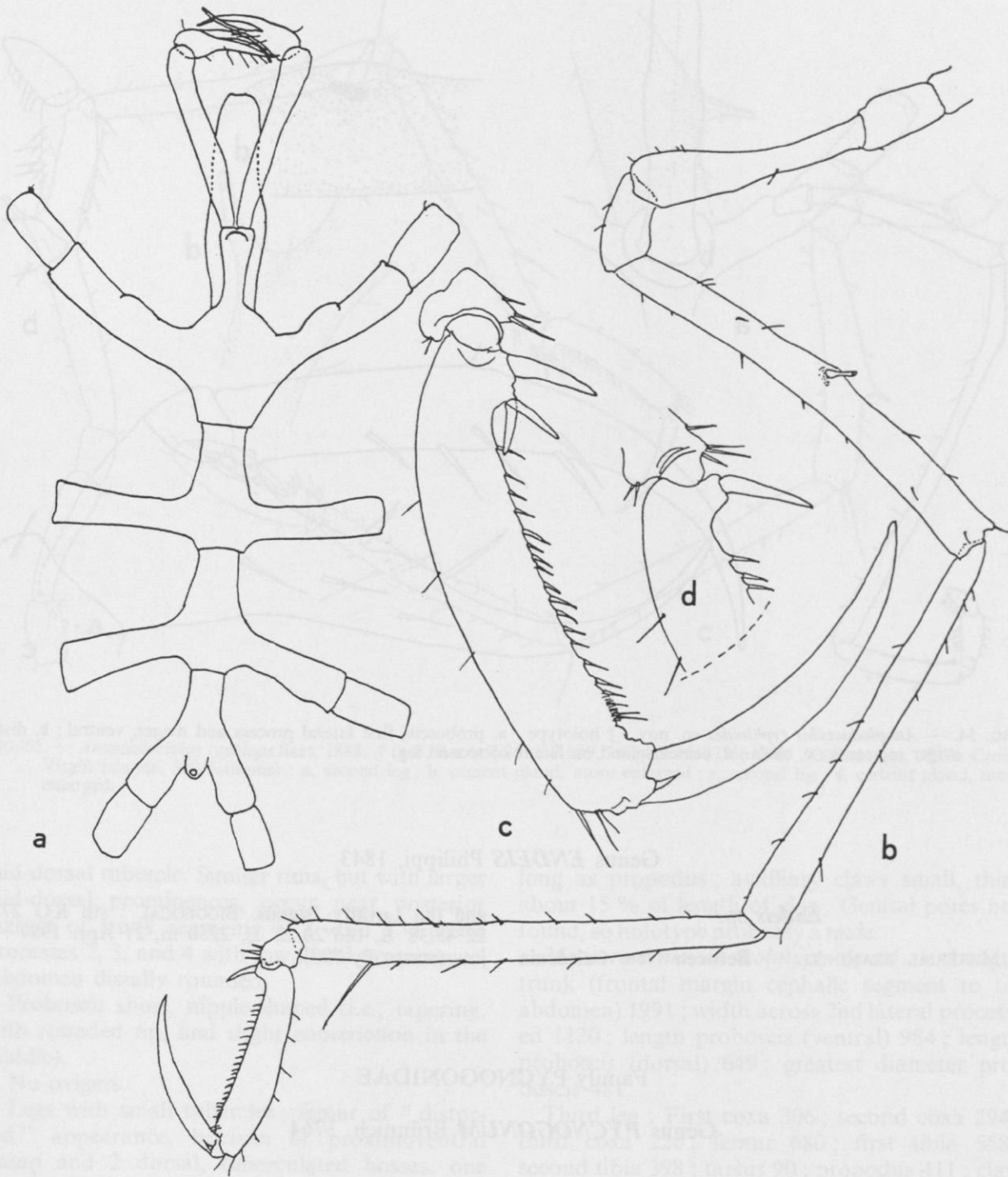


FIG. 53. — *Anoplodactylus typhloides* sp. nov., ♂ holotype : **a**, body, dorsal ; **b**, second leg (to same scale of fig. 53a) ; **c**, distal segments of fourth leg ; **d**, propodal heel of second leg.

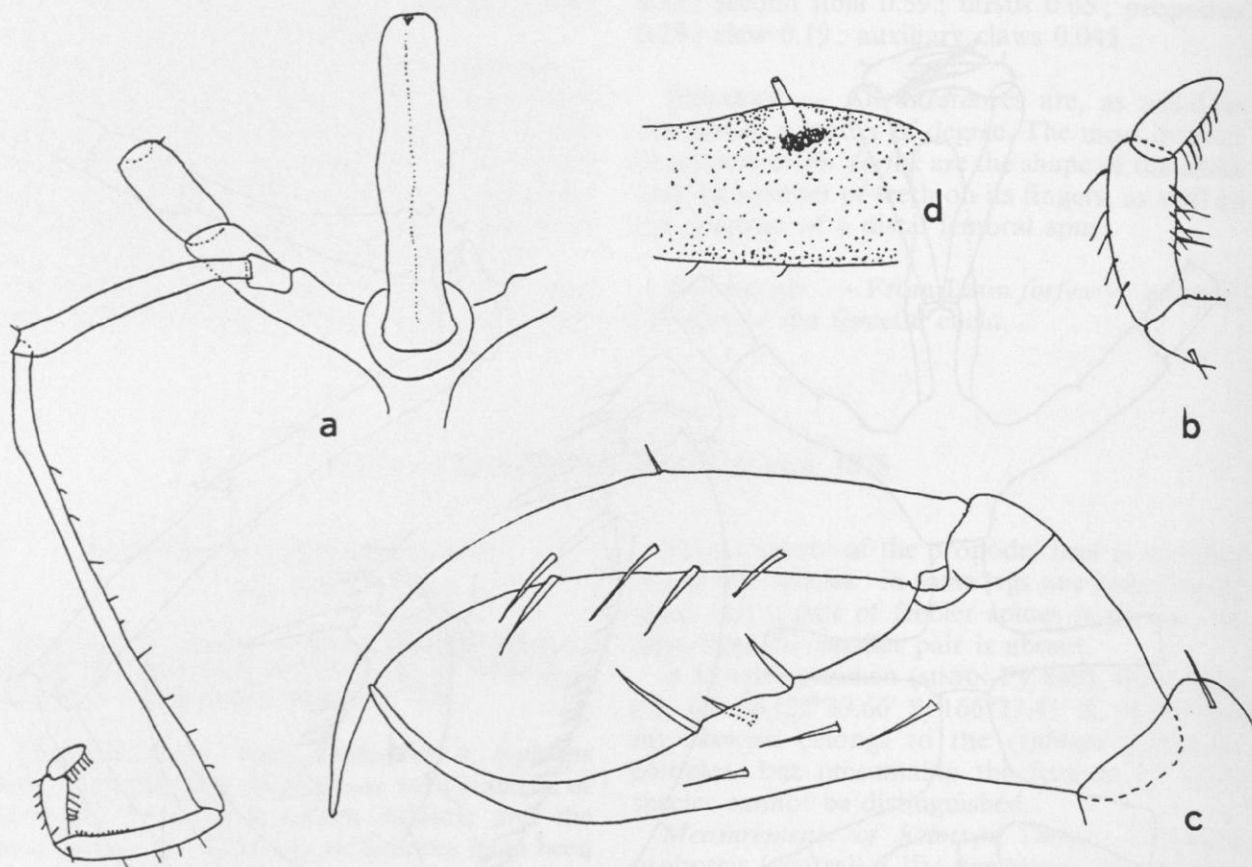


FIG. 54. — *Anoplodactylus typhloides* sp. nov., ♂ holotype : a, proboscis, first lateral process and oviger, ventral ; b, distal oviger segments ; c, chela ; d, cement gland on femur of second leg.

Genus *ENDEIS* Philippi, 1843

*Endeis* sp.

and the Loyalty Islands. BIOGEOCAL : stn KG 278, 22°48.38' S, 166°20.22' E, 2250 m, 21 Apr. 1987 : 1 juv. (MNHN Py 797).

MATERIAL EXAMINED. — Between New Caledonia

Family PYCNOGONIDAE

Genus *PYCNOGONUM* Brünnich, 1764

*Pycnogonum* (s.l.) *crossnieri* sp. nov.

Fig. 56

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 44 : 22°47.30' S, 167°14.30' E, 440-450 m, 30 Aug. 1985 : 1 holotype (possibly ♂) (MNHN Py 776).

DESCRIPTION. — Integument granulated and pitted. Lateral processes separated by narrow intervals. Ocular tubercle situated not far from anterior margin of cephalic segment, rather low, rounded ; eyes pigmented. Behind the ocular tubercle, a raised rim is produced into a low



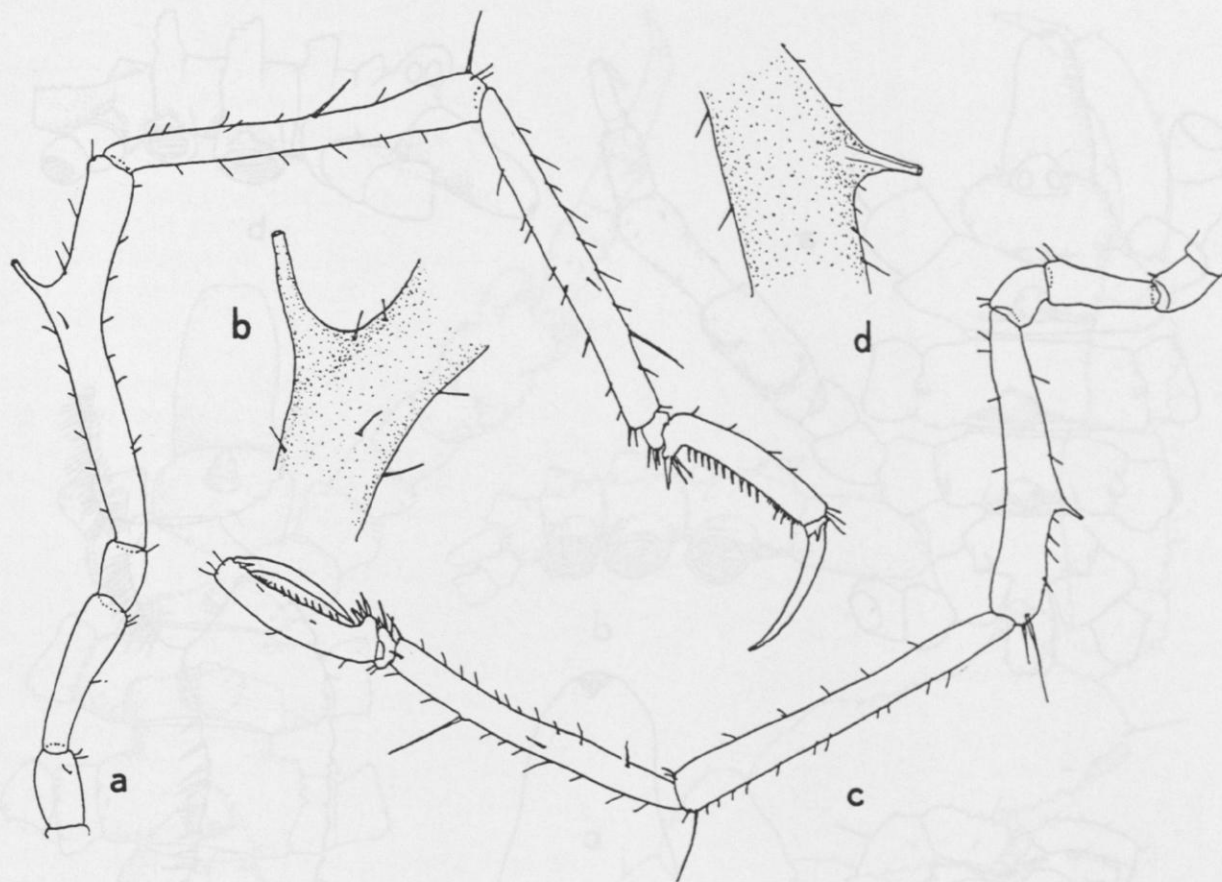


FIG. 55. — *Anoplodactylus typhlops* Sars, 1888, ♂ (a-b, BALGIM Stn CP 109, 36°14.5' N, 07°56.4' W, 1200 m; c-d, off St. Croix, Virgin Islands, 500 fathoms) : a, second leg; b, cement gland, more enlarged; c, second leg; d, cement gland, more enlarged.

mid-dorsal tubercle. Similar rims, but with larger mid-dorsal prominences, occur near posterior margin of trunk segments 1, 2, and 3. Lateral processes 2, 3, and 4 with low distal prominence. Abdomen distally rounded.

Proboscis short, nipple-shaped (i.e., tapering, with rounded tip, and slight constriction in the middle).

No ovigers.

Legs with small tubercles; femur of "distorted" appearance, because of proximoventral hump and 2 dorsal, tuberculated bosses, one beyond the middle of segment, other at distal end. Tibia 2 short, but much longer than wide. Dense brushes of spiniform setae ("spiny cushion") at distoventral end of tibia 2 and on ventral surface of tarsus. Propodus slightly curved, slightly tapering. Sole with ca. 12 slender spines. Claw about half as

long as propodus; auxiliary claws small, thin, about 15% of length of claw. Genital pores not found, so holotype probably a male.

*Measurements of holotype (μm).* - Length trunk (frontal margin cephalic segment to tip abdomen) 1991; width across 2nd lateral process 1120; length proboscis (ventral) 984; length proboscis (dorsal) 649; greatest diameter proboscis 481.

Third leg: First coxa 306; second coxa 294; third coxa 226; femur 680; first tibia 558; second tibia 398; tarsus 90; propodus 411; claw 211.

**REMARKS.** — This new species is not unlike *P. sivertseni* Stock, 1955, from the Tristan da Cunha group. The auxiliary claws are, however, less rudimentary in the new species, and the

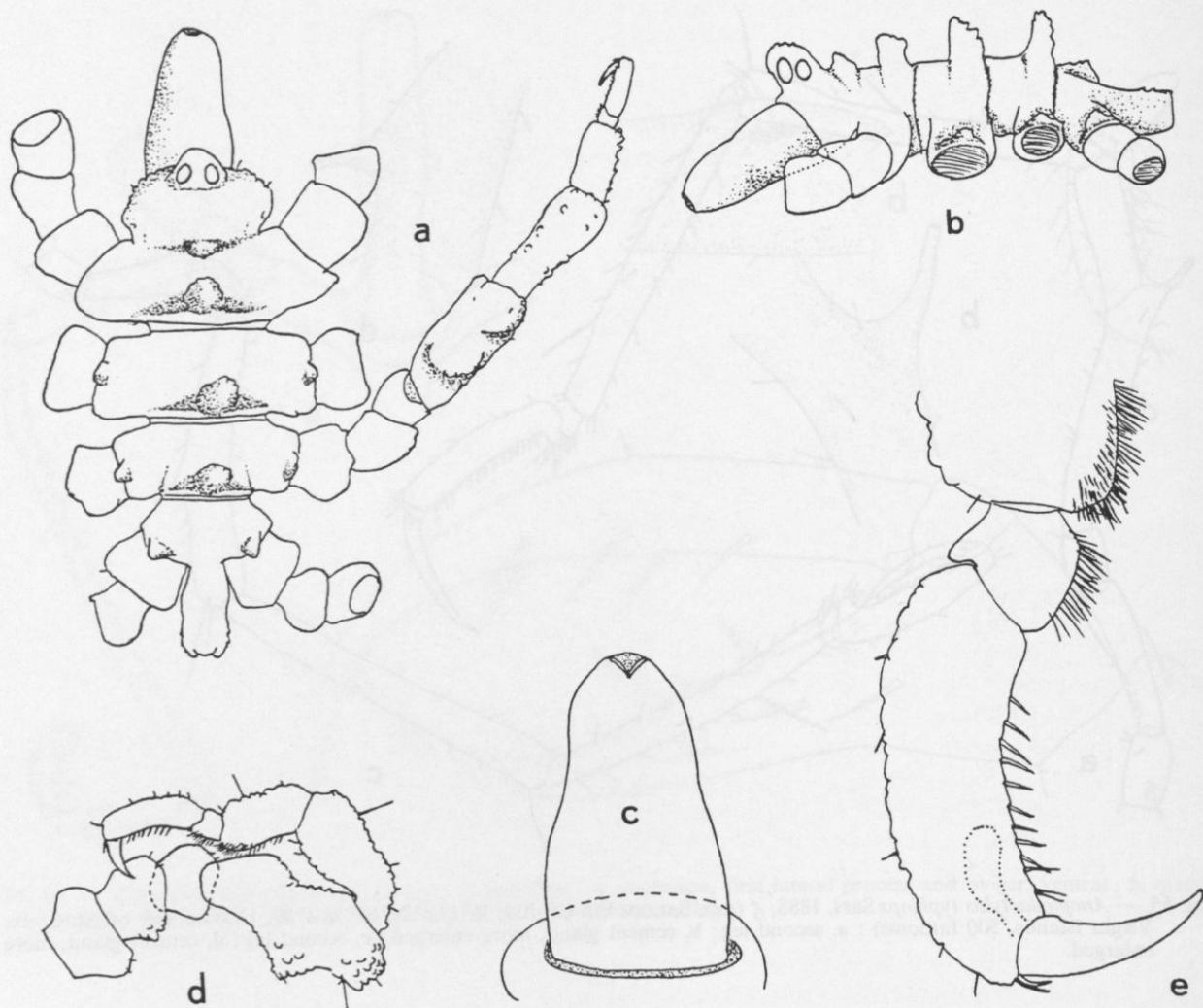


FIG. 56. — *Pycnogonum* (s.l.) *crosnieri* sp. nov., holotype : a, body, dorsal ; b, body, from the left ; c, proboscis, ventral ; d, third leg ; e, distal segments of third leg.

femur is more "distorted". The thick cushion of bristles at the end of tibia 2 appears to be another good character of the new species.

ETYMOLOGY. — Named in honour of Dr Alain CROSNIER, of ORSTOM and the Muséum national d'Histoire naturelle, Paris, one of the biologists during the BIOCAL cruises.

*Pycnogonum* (*Nulloviger*) *lobipes* sp. nov.

Fig. 57

MATERIAL EXAMINED. — New Caledonia. BIOCAL : stn DW 51, 23°05.27' S, 167°44.95' E, 700-680 m, 31

Aug. 1985 : 1 ♂ holotype (MNH Py 777).

DESCRIPTION. — Integument granular. Lateral processes well-separated, armed with minute tubercles only. Trunk segments 1, 2, and 3 with raised posterior rim, culminating in strong mid-dorsal boss. Ocular tubercle directed obliquely forward, acuminate; eyes poorly pigmented in preserved state. Abdomen widest in middle, without tubercles, distally truncate.

Proboscis unornamented, barrel-shaped.

Oviger absent in male.

Legs : Minute tubercles on coxae 1 and 2 ; femur with 2 strong centrodorsal humps, 2 strong distodorsal lobes, and 2 digitiform ven-

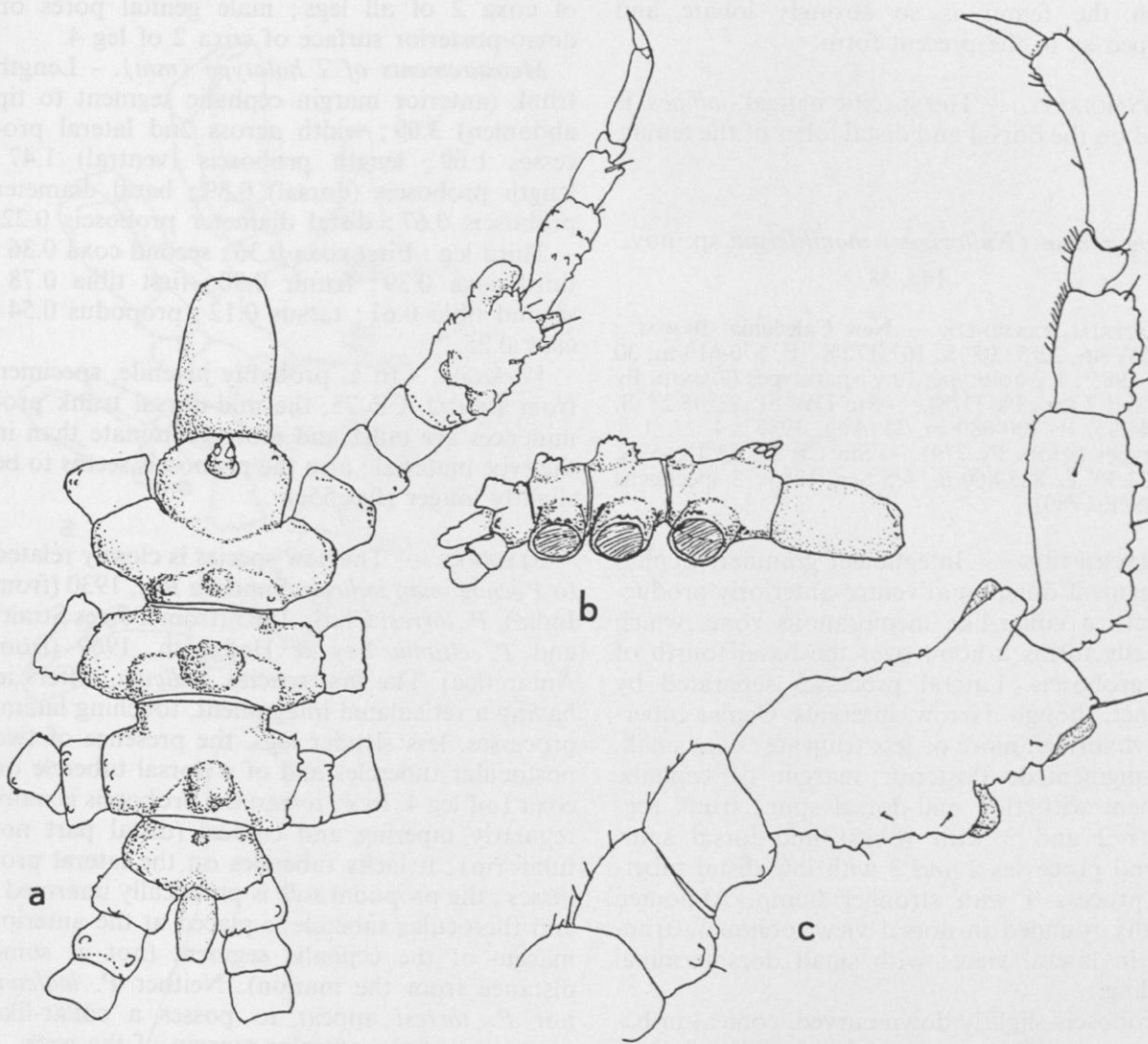


FIG. 57. — *Pycnogonum (Nulloviger) lobipes* sp. nov., ♂ holotype : a, body, dorsal ; b, body, from the right ; c, third leg.

trodistal processes ; dorsal surface of tibiae 1 and 2 tuberculate. Propodus slightly but regularly curved, slightly widening towards distal end ; propodal sole with a few, minute spinules only ; claw less than half as long as propodus ; no auxiliary claws. Male genital apertures on ventral side of coxa 2 of leg 4.

*Measurements of holotype (μm).* - Length trunk (frontal margin cephalic segment to tip abdomen 2834 ; width across 2nd lateral processes 1278 ; length proboscis (ventral) 1029 ; length proboscis (dorsal) 850 ; greatest diameter proboscis 517.

Third leg : First coxa 323 ; second coxa 319 ; third coxa 260 ; femur 918 ; first tibia 634 ; second tibia 328 ; tarsus 328 ; propodus 510 ; claw 236.

REMARKS. — Perhaps the only species bearing some resemblance to the present one (in proboscis shape and in the absence of ovigers in the male) is *P. anovigerum* Clark, 1956. However, in this New Zealand species, the lateral processes are much closer together, and the femur is devoid of bosses and processes.

I know in fact of no *Pycnogonum* species in



which the femur is so strongly lobate and humped as in the present form.

ETYMOLOGY. — The specific named, *lobipes*, is based on the dorsal and distal lobes of the femur.

*Pycnogonum (Nulloviger) moniliferum* sp. nov.

Fig. 58

MATERIAL EXAMINED. — **New Caledonia.** BIOCAL : stn DW 46, 22°53.05' S, 167°17.08' E, 570-610 m, 30 Aug. 1985 : 1 ♀ holotype, 10 ♀♀ paratypes (9 MNHN Py 778, and 2 ZMA Pa 3328). — Stn DW 51, 23°05.27' S, 167°44.95' E, 700-680 m, 31 Aug. 1985 : 4 ♀♀, 1 ♂ paratypes (MNHN Py 779). — Stn CP 75, 22°18.65' S, 167°23.30' E, 825-860 m, 4/5 Sep. 1985 : 3 specimens (MNHN Py 780).

DESCRIPTION. — Integument granular. Cephalic segment dorso- and ventro-anteriorly produced into a collar-like membranous zone, which dorsally forms a hood over the basal fourth of the proboscis. Lateral processes separated by distinct, though narrow, intervals. Ocular tubercle cylindrical, more or less truncate; eyes small, well-pigmented. Posterior margin of cephalic segment with thin mid-dorsal spur; trunk segments 2 and 3 with robust mid-dorsal spur. Lateral processes 2 and 3 with low distal tubercle, process 4 with stronger hump. Abdomen distally rounded in dorsal view, obliquely truncate in lateral view; with small dorsoterminal swelling.

Proboscis slightly down-curved, conical in basal part, rapidly narrowing into tubiform distal part.

Ovigers absent in both sexes.

Legs : Coxae 1 to 3 subequal, without spurs; femur and tibia 1 about twice as long as wide, with rounded tubercles; tibia 2 shorter than tibia 1 but longer than propodus, slightly tuberculate, slightly more than twice as long as wide. Propodus tapering, almost straight; sole armed with 8 to 11 spinules; claw slightly curved, less than half as long as propodus; no auxiliary claws. Female genital apertures on mid-dorsal surface

of coxa 2 of all legs; male genital pores on dorso-posterior surface of coxa 2 of leg 4.

*Measurements of ♀ holotype (mm).* - Length trunk (anterior margin cephalic segment to tip abdomen) 3.09; width across 2nd lateral processes 1.69; length proboscis (ventral) 1.47; length proboscis (dorsal) 0.89; basal diameter proboscis 0.67; distal diameter proboscis 0.22.

Third leg : First coxa 0.36; second coxa 0.36; third coxa 0.39; femur 0.90; first tibia 0.78; second tibia 0.61; tarsus 0.12; propodus 0.54; claw 0.25.

*Variation.* - In a, probably juvenile, specimen from BIOCAL CP 75, the mid-dorsal trunk prominences are taller and more acuminate than in the type material; also the proboscis seems to be slightly longer (fig. 55c).

REMARKS. — The new species is closely related to *Pycnogonum indicum* Sundara Raj, 1930 (from India), *P. torresi* Clark, 1963 (from Torres Strait) and *P. eltanin* Fry & Hedgpeth, 1969 (from Antarctica). The first species, *indicum*, differs in having a reticulated integument, touching lateral processes, less slender legs, the presence of two postocular tubercles and of a dorsal tubercle on coxa 1 of leg 4. In *P. torresi* the proboscis is more regularly tapering and conical (distal part not tubiform); it lacks tubercles on the lateral processes; the propodal sole is practically unarmed; and the ocular tubercle is placed at the anterior margin of the cephalic segment (not at some distance from the margin). Neither *P. indicum* nor *P. torresi* appear to possess a collar-like expansion of the anterior margin of the neck.

Finally, the new species differs from *P. eltanin* in the proboscis (evenly tapered and strongly down-curved in *eltanin*) and the legs (in *eltanin* the femur and tibiae are devoid of tubercles, and the propodal sole is armed with very small spinules only).

ETYMOLOGY. — The specific name, *moniliferum* (Latin = bearing a collar), alludes to the collar-like anterior margin of the cephalic segment.

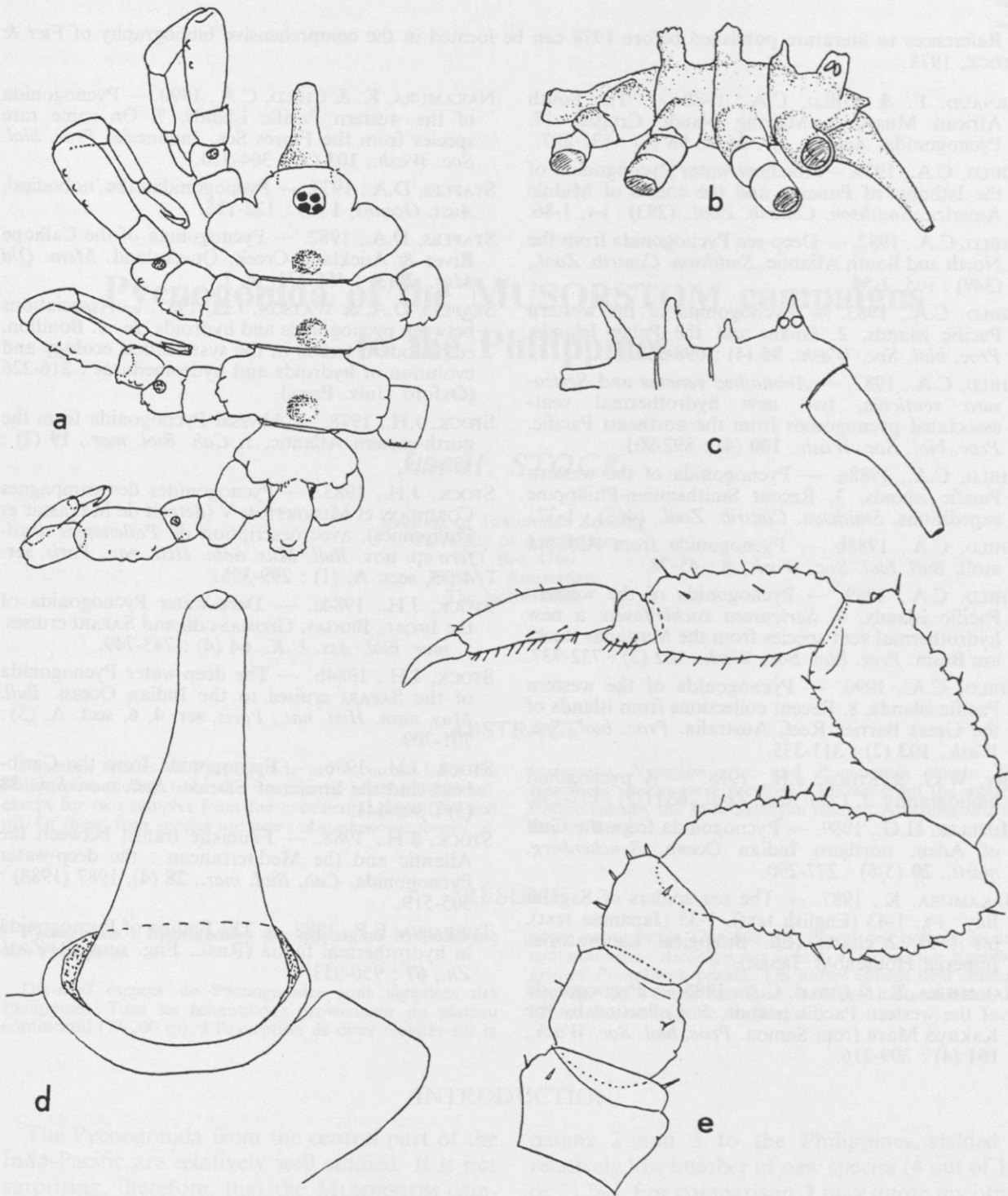


FIG. 58. — *Pycnogonum (Nulloviger) monoliferum* sp. nov. (a, b, d, e : ♀ holotype ; c : juvenile from BIOCAL Stn CP 75) : a, body, dorsal ; b, body, from the right ; c, contour of dorsum, from the right ; d, proboscis, ventral ; e, third leg.

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