

Deep-Sea Pycnogonida
from the
North and South Atlantic Basins

C. ALLAN CHILD

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ABSTRACT

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Deep-Sea Pycnogonida from the North and South Atlantic Basins

C. Allan Child

Introduction

The pycnogonid fauna of the Atlantic abyssal basins is poorly known at best. Often, distribution records are known only from the type or type series of abyssal species. A number of these basins have scarcely been sampled. This paper treats 46 of these abyssal species, proposing 13 of them as new species and naming four new genera, one for a previously known species. The collections were made, for the most part, from various vessels operated by the Woods Hole Oceanographic Institution. An additional few specimens are added from other sources in order to include as many new deep-sea faunal records as possible.

The North American Basin is, perhaps, best known of all Atlantic basins because of the pioneering deep-sea work of vessels from America, Britain, France, Norway, Monaco, and others. Even with seemingly good knowledge of this area's abyssal fauna, the pycnogonids discussed in this report contain two new species out of 17 (12%) from the North American Basin. The West European and Labrador basins contain 10 species in this report, two of which are new to science (20%).

When the Brazil and Argentine basins are con-

sidered, almost nothing is known of their deep-water fauna. The Brazil Basin pycnogonids in this report number only seven species, but over half of them, including two new genera—new species and two other new species (57%), are new to science. The Argentine Basin is as poorly known. Of 17 Argentine Basin species discussed herein, one new genus—new species and five other new species are reported (35%). In addition, a sizable Antarctic and subantarctic pycnogonid fauna is now known to inhabit the Argentine Basin, perhaps riders of the northerly flowing bottom currents from the Antarctic Peninsula, Drake Passage, and the Scotia Sea. Another Antarctic species is now known to inhabit the Walvis Ridge, north of the Cape Basin of South Africa.

ACKNOWLEDGMENTS.—I wish to thank Dr. L. R. McCloskey, Walla Walla College, Walla Walla, Washington, for generously relinquishing part of the Woods Hole collections to me for examination. He had received many of the earlier samples and had begun work on them before I received the remainder of the specimens. He gave me these samples so that the Woods Hole collections could be reported on as a unit.

I am very grateful to Dr. Howard L. Sanders and Mr. George R. Hampson of the Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, for entrusting me with these collections and for patiently answering my questions con-

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cerning data with the specimens. The Woods Hole deep-sea project was aided by grant OCE 76-20833 from the National Science Foundation.

This report includes several other specimens received from the Smithsonian Oceanographic Sorting Center, for which I express my thanks. All specimens are deposited in the National Museum of Natural History, Smithsonian Institution, under catalog numbers of the former United States National Museum (USNM).

HISTORICAL BACKGROUND.—The first deep-sea pycnogonids reported on from the Atlantic basins were those of the *Challenger* expedition, treated by Hoek (1881). Hoek described *Colossendeis minuta* from the North American Basin in 2286 meters and *Phoxichilidium oscitans* (= *Pallenopsis longirostris*) from 3063 meters at the edge of the Labrador Basin. In the Argentine Basin, he recorded *Phoxichilidium patagonicum* var. *elegans* (= *Pallenopsis patagonica*) in 1097 meters and *Colossendeis brevipes* (= *C. media*?) from 4846 meters. He also described *Nymphon longicoxa* from east of New Zealand in 2012 meters. This species is now known to have a wide distribution, including the Atlantic basins, and is represented in this report from the Argentine Basin.

Sars (1891) presented a very thorough report on the pycnogonids taken during the Norwegian North Atlantic expedition of 1876–1878, of which a good number were deep-sea species. Of the deep-sea species reported in the present paper, Sars described three, *Colossendeis angusta*, *Anoplo-dactylus typhlops*, and *Nymphon tenellum*, and listed *N. macrum*. These specimens were taken in the Norwegian and Greenland basins. Meinert's (1899) Ingolf expedition monograph treated pycnogonids from the same two basins. He listed several species reported on herein, including *Colossendeis angusta*, *C. macerrima*, *Nymphon longitarse*, *N. macrum*, *N. tenellum*, *Paranymphon spinosum*, and *Callipallene acus*.

North and South Atlantic deep-sea species continued to appear occasionally in taxonomic papers, mostly from European authors, until Hedgpeth's western North Atlantic monograph appeared in 1948. He discussed 15 species reported

on herein, including the new species *Achelia brevichelifera*, which I have placed in the new genus *Megarhethus* for reasons discussed under that genus. Stock has added several new Atlantic deep-sea species since Hedgpeth's monograph, and, in 1975, Stock discussed eight other species reported on in this paper. The most recent Atlantic deep-sea papers are again by Stock (1978a,b), from the Northeast Atlantic Basin. Among these eight species is *Ascorhynchus turritus*, which is recorded only for the second time in the present report. One of his *Nymphon* species (1978a:212–214, fig. 9e–j) is unnamed for lack of a complete specimen. This species was also discovered among the Woods Hole collections, and I have proposed the name "*Heteronymphon ponsitor*" for the species.

ANTARCTIC-ARGENTINE-BRAZIL BASINS RELATIONSHIPS.—There are no less than eight species reported in this paper that were previously known from Antarctic and subantarctic localities. Most of these species have been taken in the Straits of Magellan–Falkland Islands area, but one, *Sericosura mitrata*, was known only from the high Antarctic shelf at 62°E. This species is now known also from the Walvis Ridge. One new genus, *Dromedopycnon acanthus*, was collected in several subantarctic localities near Cape Horn and also is distributed as far north as the Brazil Slope. These facts tell us two things. The first and most obvious is that the Brazil and Argentine basins have rarely been collected and that much of the South Atlantic fauna, with a few exceptions, remains unknown. Second, the northward-flowing Antarctic bottom currents must serve to transport some benthic fauna for long distances northward from the Antarctic Ocean into the South Atlantic. It has long been known that extremely cold Antarctic bottom currents flow northward into the South Atlantic, and these currents have been found to extend even into the North Atlantic before mixing entirely with southerly flowing deep-bottom waters from the northern basins. Three of the eight species reported herein from the Argentine and Brazil basins have been found previously in the Ross Sea, and, although *Colossendeis macerrima* is now known to have a world-

wide deep-sea distribution, *Ammothea longispina* and *A. spinosa* were previously thought to inhabit only Antarctic and subantarctic waters. The distribution of the other three species, *Ascorhynchus cuculus*, *Cilunculus acanthus*, and *Callipallene margarita*, is poorly known and based on only a few records in subantarctic localities. The distribution of all these species is greatly extended northwards by the present collections. Based on the few records of distribution presented herein for *Dromedopycnon acanthus*, new genus, new species, the midwater and surface currents' faunal barrier, which supposedly occurs off the mouth of the Rio de la Plata, does not limit the distribution of at least one species in the benthic fauna from a more northerly distribution to at least the Brazil Basin. The northern limits of distribution for all of these "Antarctic" species may, in fact, be the Brazil Basin or even as far north as the equator. It is to be expected that further deep-sea collecting in these South Atlantic basins will yield many more pycnogonids thought to have only Antarctic and subantarctic distributions.

PYCNOGONIDA

Family AMMOTHEIDAE

Genus *Ammothea* Leach, 1814

Ammothea longispina Gordon

Ammothea longispina Gordon, 1932b:101-103, figs. 50-52.—Clark, 1977:174 [list], 175 [key].

Ammothea (Homathea) longispina.—Fry and Hedgpeth, 1969:88-90, figs. 104, 105, 132-136 [literature].—Turpaeva, 1974:284.

MATERIAL EXAMINED.—Argentine Basin, SE of Rio de la Plata: *Atlantis II* cruise 60, sta 237, 36°32.6'S, 53°23.0'W, epibenthic sled, 993-1011 m, 11 Mar 1971 (2♂ with eggs, 2♀, 3 juveniles).

REMARKS.—The three juveniles are in various stages of growth, from postlarval to subadult, and reveal an interesting pattern of progression in palp and oviger growth. Both appendages appear to erupt from the surface of the cephalic segment

and to develop at the same pace. The postlarval specimen has both palp and oviger buds only. The one subadult specimen has both palps and ovigers of approximately the same length, about half the length of these appendages in adults. At both stages of growth, the scape and chela are massive in relation to palp and oviger size. The juvenile proboscis in the Argentine specimens is not nearly so styliform distally as figured by Fry and Hedgpeth (1969:89, fig. 135) but tapers gradually to a very thin distal section.

This species is known from specimens taken from waters around the Antarctic coast, Ross Sea, and the Scotia Sea. One specimen is reported from north of the Falkland Islands, and the captures range from 219 to 1454 meters. The present specimens occur within these depths but, like other species in this report, occur much further north than any previous captures.

Ammothea spinosa (Hodgson)

Leionymphon spinosum Hodgson, 1907:49, 50, pl. vii: fig. 2.

Ammothea spinosa.—Bouvier, 1913:123 [key].—Clark, 1977:174 [list], 175 [key].

Ecleipsothremma spinosa.—Fry and Hedgpeth, 1969:96, 97, figs. 104, 105, 126, 129, 148, 149 [literature].—Turpaeva, 1974:285.

MATERIAL EXAMINED.—Argentine Basin, SE of Rio de la Plata: *Atlantis II* cruise 60, sta 239A, 36°49.0'S, 53°15.4'W, epibenthic sled, 1661-1679 m, 11 Mar 1971 (1♀, 3 juveniles, 2 larvae).

REMARKS.—This species is previously known from the Ross Sea, Antarctic Peninsula islands, Scotia Sea, and the Falkland Islands area of the South Atlantic in depths of 146 to 1660 meters. These specimens extend the depth of capture a few meters deeper and a long distance to the north. This is another Antarctic species moved by the cold bottom currents north into South Atlantic basins and illustrates our inadequate knowledge of the fauna of these basins.

There are some slight differences in this adult female specimen from the figures of the species as shown by Fry and Hedgpeth (1969, fig. 126). The median trunk tubercles are much less setose than

figured, and the ocular tubercle cap of all these specimens is taller and more pointed. The chelifores appear slightly shorter in these Argentine specimens, but the palps, ovigers, and legs, including the differing anterior and posterior propodi, are very like the figures of these parts. The female has genital pores on all four 2nd coxae.

I do not find enough differences in this species from the generic diagnosis of *Ammothea* to warrant use of Fry and Hedgpeth's proposed designation of *Ecleipsothremma*.

Genus *Ascorhynchus* Sars, 1877

Ascorhynchus athernum, new species

FIGURE 1

MATERIAL EXAMINED.—North American Basin: *Chain* cruise 50, sta 76(HH), 39°38.3'N, 67°57.8'W, epibenthic sled, 2862 m, 29 Jun 1965 (1♂ holotype, USNM 181043; 1♂, 2♀ paratypes, USNM 181044).

DESCRIPTION.—Trunk oval, completely segmented. Posterior of first 3 trunk segments with extremely large bell-shaped cowl topped by tall conical median tubercle. Neck short, flaring anteriorly to broad anterior-pointing tubercles on anteriolateral margins. Lateral processes short, separated by about half their diameters, each armed dorsodistally with a slender conical anterior-pointing tubercle. Ocular tubercle tall, anterior-pointing, without eyes, with papillae mediolaterally. Abdomen long, distinctly segmented at base, carried ventrally at oblique angle.

Proboscis large, ovoid, with extremely blunt square oral surface.

Chelifore scape 1-segmented, thick, only about 3 times as long as wide, armed with several distal setae. Chela tiny, carried anaxially, with minute but apparently functional fingers, which cross at tips.

Palps with segments 2 and 4 equal, 4 distal segments approximately equal in length, armed with few ventral and lateral setae longer than

segment diameter. Segment 3 no longer than wide.

Oviger segments 5 and 6 with lateral row of recurved spines. Segments 4 and 6 equal in length, segment 5 slightly longer. 4 terminal segments, the strigilis, armed with few lateral and dorsal setae and denticulate spines numbering 5:4:2:4, with unarmed terminal claw almost as long as terminal segment. Denticulate spines with 3 lobes per side.

Anterior and posterior leg segment lengths approximately alike, moderately long, slender, armed with dorsal, lateral, and ventral setae, none as long as the segment diameter. Tibia 1 the longest segment, with femur and tibia 2 equal in length. Tarsus 0.9 length of propodus, armed with very few dorsal and ventral setae. Propodus without heel or heel spines, armed with 3 to 5 small sole setae. Claw robust, 0.6 length of propodus. Femoral cement gland a single raised distally pointing cone at 0.6 the dorsal length of femur. Cement gland a prominent dark mass beneath cone. Sexual pores on posterior 4 legs.

Female: Prominent sexual pores on all 2nd coxae. Lateral processes and ocular tubercle with slightly shorter tubercles. Oviger with fewer setae.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (anterior tubercle projections to tubercle tip 4th lateral process), 2.9; trunk width (across 2nd lateral process tubercle tips), 2.11; proboscis laterally, 2.14; abdomen laterally, 0.9; 3rd leg, coxa 1, 0.42; coxa 2, 1.29; coxa 3, 0.68; femur, 2.48; tibia 1, 3.1; tibia 2, 2.4; tarsus, 0.8; propodus, 0.94; claw, 0.58.

DISTRIBUTION.—The proposed species is known only from its type-locality, the North American Basin, in 2862 meters.

ETYMOLOGY.—The specific name *athernum* is Greek (armed with spikes), pertaining to the large lateral process and middorsal and anteriolateral cephalic segment tubercles.

REMARKS.—This species is much more compact and smaller than most of the deep-water species of *Ascorhynchus*. It is approximately the same size and is perhaps closest to *A. cuculum*, a subantarctic species recorded elsewhere in this paper. The

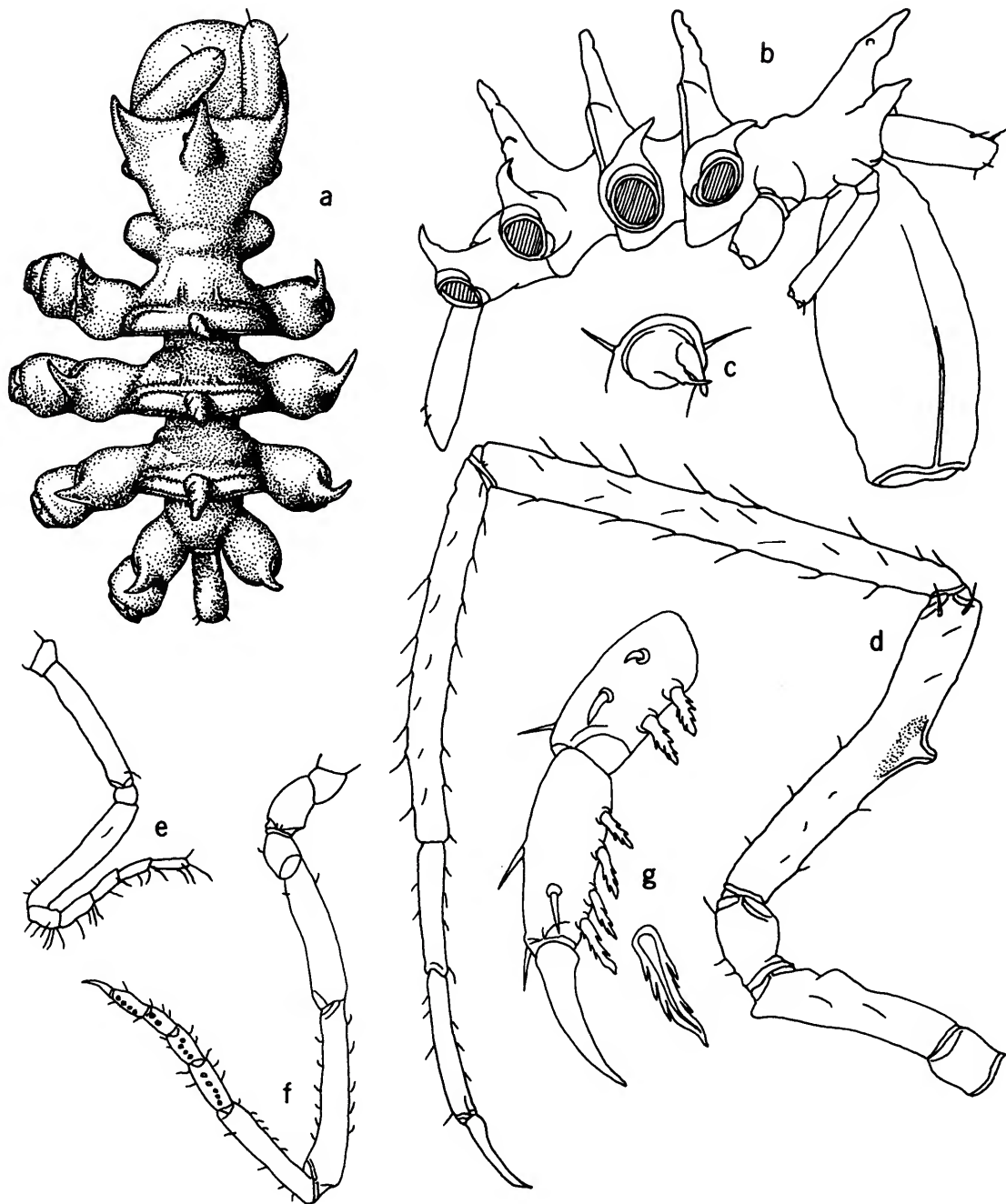


FIGURE 1.—*Ascorhynchus athernum*, new species, holotype, male: *a*, trunk, dorsal view; *b*, trunk, lateral view; *c*, distal tip of chelifore; *d*, 3rd leg; *e*, palp; *f*, oviger; *g*, terminal segments of oviger with enlargement of typical denticulate spine.

single dorsal femoral cement gland is also atypical of deep-water species, where the glands are usually many per femur and often are arranged in a line along the entire lateral surface of the segment. Many deep-water species have large tubercles over the chelifore insertion, but those of *A. athernum* appear to be as large or larger in relation to trunk size than those of any other known species. The tiny but functional chelae of this species are also atypical. The chelae usually atrophy in adults of this genus.

Ascorhynchus cuculum Fry and Hedgpeth

FIGURE 2a,b

Ascorhynchus cuculus Fry and Hedgpeth, 1969:123, 124, figs. 203, 204.

Ascorhynchus hedgpethi Turpaeva, 1974:285-287, fig. 4.

MATERIAL EXAMINED.—Argentine Basin, SE of Rio de la Plata: *Atlantis II* cruise 60, sta 237, 36°32.6'S, 53°23.0'W, epibenthic sled, 993-1011 m, 11 Mar 1971 (1♂). Sta 240, 36°53.4'S, 53°10.2'W, epibenthic sled, 2195-2323 m, 12 Mar 1971 (1♂).

REMARKS.—Comparison of these two male specimens with the type (a male) and with Turpaeva's figures convinces me that these are all one species. Both sets of figures are drawn poorly and in such a way as to make the specimens appear sufficiently different for proposing separate names. The abdomen of Fry and Hedgpeth's type is drawn from the anal end in figure 203e and is, therefore, very foreshortened from what it looks like in lateral view. The ocular tubercle has characteristically large lateral papillae, which are only hinted at in the figures. The male leg in figure 204a of the type does not show the five to seven low cement gland cones on the dorsal surface. Turpaeva's figure 4(5) shows them well. Cement glands are present only on the anterior four legs on a swollen surface not present on the posterior legs. There is no evidence of cement glands on the posterior legs of Fry and Hedgpeth's type.

This species is another small member of a genus

characterized by large deep-water species. It has some similarities to *Ascorhynchus inflatum* in the lateral process and anterior cephalic segment tubercles. The chelifores are shorter, and the tarsus is much longer in *A. cuculum*. The ocular tubercle is very characteristic for this species. Its posterior surface slopes gradually, but the anterior surface is vertical. It is without eyes, and the large lateral papillae are conspicuous on the ocular tubercle.

Ascorhynchus cuculum is known previously from the Scotia Sea Basin in 3475 to 3910 meters. These Argentine Basin specimens extend the known range to much more shallow water and considerably to the north.

Ascorhynchus ovicoxa Stock

Ascorhynchus ovicoxa Stock, 1975:969-972, figs. 5, 6.

MATERIAL EXAMINED.—North American Basin, N of Bermuda: *Atlantis II* cruise 24, sta 119, 32°15.8'N, 64°31.6'W, epibenthic sled, 2095-2223 m, 19 Aug 1966 (1♀).

REMARKS.—This specimen has the inflated 2nd coxae as figured by Stock (1975, fig. 6b) and agrees very well with other diagnostic characters of the species. It lacks all terminal leg segments, but this does not hinder determination of this easily recognized species.

This record extends considerably the depth and geographic ranges of the species. It was described from specimens taken in the Straits of Florida. Two other unrecorded specimens in the National Museum of Natural History collections were taken within this area and within the reported depth range of 403 to 715 meters. The Bermuda specimen triples the known depth range for this species and extends its distribution well out into the North American Basin.

Ascorhynchus pyrginospinum McCloskey

Ascorhynchus pyrginospinum McCloskey, 1967:125-128, figs. 12-17.—Kraeuter, 1973:495.—Krapp and Kraeuter, 1976:342.

Nanympheon grasslei McCloskey, 1967:123-125, figs. 7-11.

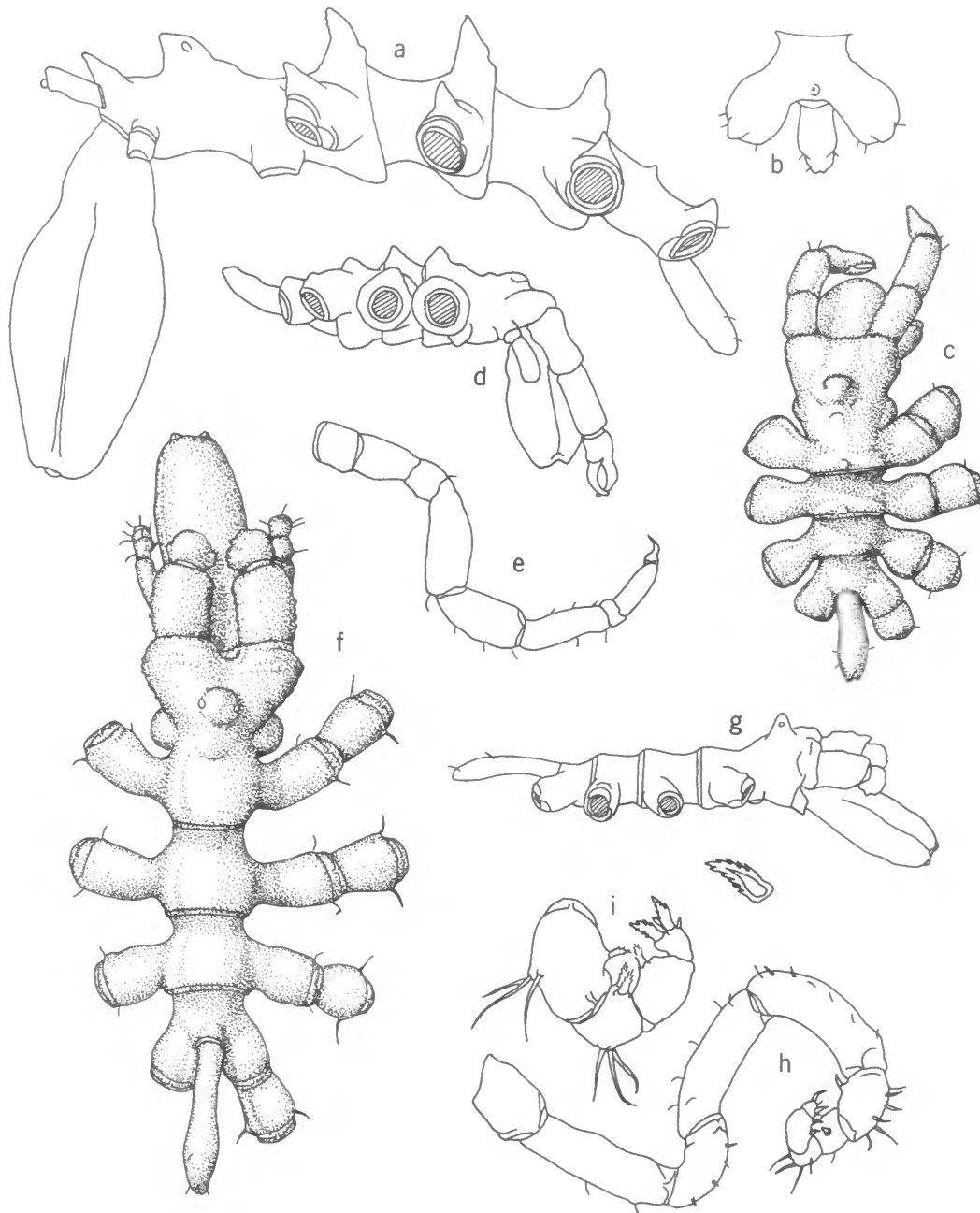


FIGURE 2.—*Ascorhynchus cuculum*: a, lateral view; b, posterior trunk segment, dorsal view. *Ascorhynchus* species: c, trunk, dorsal view; d, trunk, lateral view; e, 3rd leg. *Megathethus brevicheliferus*, new genus: f, trunk, dorsal view; g, trunk, lateral view; h, male oviger; i, oviger terminal segments with enlargement of typical denticulate spine.

MATERIAL EXAMINED.—North American Continental Slope: *Atlantis I* cruise 277, sta D-1, 39°54.5'N, 70°35.0'W, 467–509 m, 23 May 1962 (1♂ with eggs). *Chain* cruise 50, sta 88, 39°54.1'N, 70°37.0'W, epibenthic sled, 478 m, 6 Jul 1965 (1♂ with eggs, 2♂, 2♀, 3 juveniles). *Chain* cruise 58, sta 96, 39°55.2'N, 70°39.5'W, epibenthic sled, 498 m, 27 Apr 1966 (26 specimens). *Chain* cruise 58, sta 105B, 39°56.6'N, 71°03.6'W, epibenthic sled, 530 m, 5 May 1966 (1♂, 3 juveniles, 1 larva). *Atlantis II* cruise 40, sta 172, 40°12.3'N, 70°44.7'W, epibenthic sled, 119 m, 27 Nov 1967 (1♂). *Knorr* cruise 35, sta 346, 39°54.1'N, 70°10.7'W, epibenthic sled, 457 m, 3 Dec 1973 (1♂ with eggs, 1♀, 1 juvenile, 5 larvae). *Chain* cruise 88, sta 207, 39°51.3'N, 70°54.3'W, epibenthic sled, 805–811 m, 21 Feb 1969 (1♂, 1 juvenile).

REMARKS.—Comparison of McCloskey's type specimen *Nanympheon grasslei* with several juveniles in this collection convinces me that his type is a juvenile of *Ascorhynchus pyrginospinum*. I was unable to find all of the leg segments that McCloskey found, but it appears as though some are wrinkle artifacts.

This material is from considerably deeper water than the previously reported captures from 40 to 123 meters, and all of these specimens are slightly different from the type. Even though the species is very characteristic, the deeper-water specimens of this report are universally larger and have lateral process and ocular tubercles twice as tall as the type. I do not consider these depth and morphological differences sufficient justification for creating a new species or even a new subspecies. I think it is possible that they represent two distinct populations.

The male specimen from *Knorr* station 346 presents an anomaly. It is a fully chelate adult bearing eggs in a genus characterized by atrophied chelae in the adult. This specimen and all others examined bear the typical endal barb on each propodal claw and agree in almost all characters with the type, except for those differences mentioned above.

These records extend the known depth and

geographic range for this species from Georgia and North Carolina to the New England continental slope and to 811 meters.

Ascorhynchus turritus Stock

Ascorhynchus turritus Stock, 1978a:192–194, fig. 2.

MATERIAL EXAMINED.—North American Basin, N of Bermuda: *Atlantis II* cruise 23, sta 106, 32°10.5'N, 64°40.7'W, epibenthic sled, 2291 m, 6 Aug 1966 (1 juvenile). *Atlantis II* cruise 24, sta 119, 32°15.8'N, 64°31.6'W, epibenthic sled, 2095–2223 m, 19 Aug 1966 (1♂, 2 juveniles).

REMARKS.—There is little difference between these specimens and the Bay of Biscay specimens figured by Stock. The legs are less setose, and the ocular tubercle is slightly longer in the juveniles.

The depths of capture occur within the known range for this species of 1900 to 4400 meters. These Bermuda specimens extend considerably the geographical distribution of *Ascorhynchus turritus* from the Bay of Biscay and help to underscore the rarity of deep-sea collections and the resulting gaps in our knowledge of deep-sea animal distribution.

Ascorhynchus species

FIGURE 2c-e

MATERIAL EXAMINED.—North American Basin: *Chain* cruise 58, sta 103G, 39°43.6'N, 70°37.4'W, epibenthic sled, 2022 m, 4 May 1966 (3 juveniles, 9 larvae).

REMARKS.—This is undoubtedly a new species, which will not be named here for lack of an adult. I include figures of the most advanced juvenile, which reveal two-segmented chelifore scapes, a low eyeless ocular tubercle, lateral processes separated by less than half their diameter and without marked distal tubercles, and the beginning of what possibly will be large median trunk tubercles. The juveniles are very small and undoubtedly will not develop into one of the large deep-sea species of *Ascorhynchus*, such as *A. armatus*, from Atlantic deep-water habitats.

There are very few species of this genus without eyes. One of these, *Ascorhynchus turritus*, is also recorded in this report from the North American Basin, north of Bermuda. This species also has two-segmented scapes, small pointed median trunk tubercles, and lateral processes separated by about their own diameter. It is very difficult to predict what a juvenile specimen will look like on becoming an adult, but these 12 specimens, to be considered as juveniles of *A. turritus*, should have a longer pointed ocular tubercle, particularly in the subadult juvenile figured here, and more evidence of sharp-pointed lateral process tubercles.

There is no other known blind species in this genus from the North Atlantic basins except *A. abyssii* and *A. athernum*, but these species have a one-segmented scape, among other differences. The number of scape segments is determined very early in the embryology of species in this genus. The leg of this juvenile has no peculiarities to note except that the tarsus will be short, probably less than half the length of the propodus.

Genus *Cilunculus* Loman, 1908

Cilunculus acanthus Fry and Hedgpeth

Cilunculus acanthus Fry and Hedgpeth, 1969:126, 127, figs. 207-209.—Stock, 1978a:197 [key].

MATERIAL EXAMINED.—Argentine Basin, SE of Rio de la Plata: *Atlantis II* cruise 60, sta 262A, 36°05.2'S, 52°17.9'W, epibenthic sled, 2440–2480 m, 27 Mar 1971 (6♂, 7♀, 5 juveniles).

REMARKS.—Superficially, this species appears more like a species of *Ascorhynchus* or *Bathyzetes* than of the genus *Cilunculus*. The long chelifores and median trunk tubercles create this impression. The chelifores do not originate within a cephalic hood, nor are there auxiliary claws, two characters common to *Cilunculus*. Closer examination of these specimens and the types reveals only nine palp segments and no oviger terminal claw, in keeping with the definition of the genus *Cilunculus*, except for the species *C. kravcovi*, which

has an oviger terminal claw. Differentiation between these genera and some deep water species of the genus *Ammothella* is becoming more difficult as additional species are described in each.

This is only the second capture record for this species. The other is from west of the Antarctic Peninsula in about 2700 meters. Other species with similar capture records in this report confirm the presence of northward-flowing bottom currents contributing toward dispersal of deep-living species known from the Antarctic basins into more northerly basins of the South Atlantic.

Cilunculus tubicinis, new species

FIGURE 3

MATERIAL EXAMINED.—West European Basin, SW of Ireland: *Chain* cruise 106, sta 321, 50°12.3'N, 13°35.8'W, epibenthic sled, 2890–2868 m, 20 Aug 1972 (1♀ holotype, USNM 181070; 1 juvenile paratype, USNM 181071).

DESCRIPTION.—Trunk completely segmented, posterior of 1st 3 segments with inflated rims, without median tubercles. Lateral processes well separated by at least twice their diameter distally, armed with 4 or 5 distal setae not so long as segment diameter. Cephalic segment extended anteriorly into hood covering most of chelifore length. Abdomen articulated at base, extending almost to distal tip of coxa 2 of 4th legs, armed with several dorsal setae. Ocular tubercle tall, curving anteriorly, bifurcated at tip, without eyes. Ovigera insert anterior to and do not touch 1st lateral processes.

Proboscis long, ovate, tapering proximally to small base, without constrictions.

Chelifores very short, hardly longer than wide. 1-segmented scape cylindrical, armed with 3 distal setae. Chela tiny, cylindrical, carried slightly within and anaxially to scape, a suggestion of a tiny finger ventrally.

Palp of 9-segments, 2nd slightly longer than 4th. 5 terminal segments short, their collective length less than 4th segment length, armed with many setae longer than each segment length.

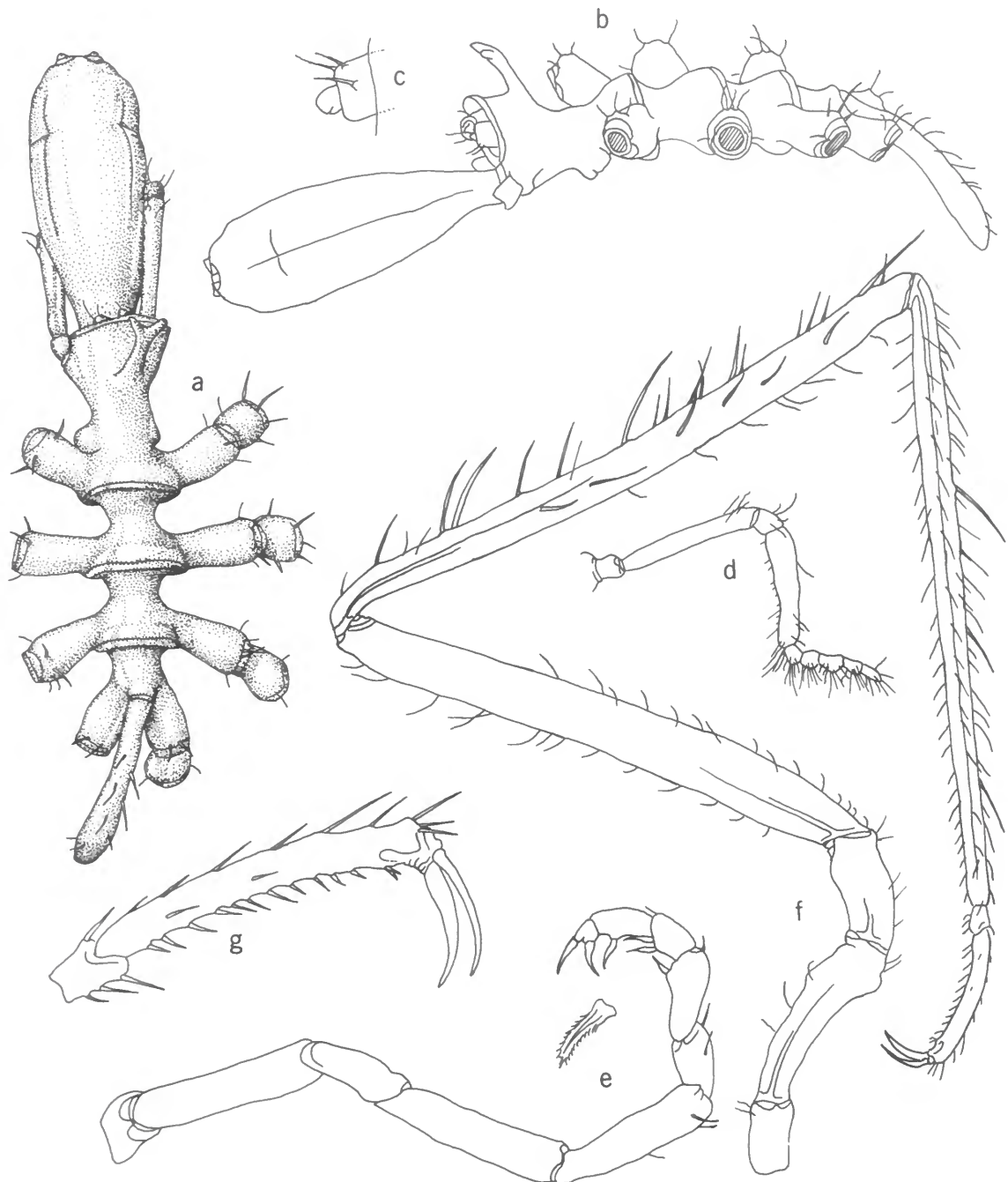


FIGURE 3.—*Cilunculus tubicinis*, new species, holotype, female: *a*, trunk, dorsal view; *b*, trunk, lateral view; *c*, distal tip of chelifore; *d*, palp; *e*, oviger with enlargement of denticulate spine; *f*, 3rd leg; *g*, terminal segments of 3rd leg.

Oviger (female) 10-segmented with 2nd and 4th segments longest. 5th segment shorter, slightly clubbed distally. 4 terminal segments (strigilis) with denticulate spines in the formula 1:2:1:2, each with many lateral serrations.

Legs slender, increasingly setose distally, setae longer than segment diameter on tibiae. Tibia 1 the longest segment, slightly longer than tibia 2. Femur shorter than tibia 2 by 0.1 its length. Tarsus short, armed with 3 endal and 1 ectal setae. Propodus slender, without heel or major heel spines, armed with 14 or 15 sole spines. Main claw slender, auxiliary claws as long as main claw.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (anterior of cephalic hood to tip 4th lateral process), 2.78; trunk width (across 2nd lateral processes), 1.68; proboscis length laterally, 1.93; abdomen length dorsally, 1.18; 3rd leg, coxa 1, 0.5; coxa 2, 1.25; coxa 3, 0.82; femur, 3.62; tibia 1, 4.32; tibia 2, 3.88; tarsus, 0.21; propodus, 0.94; claw, 0.34.

DISTRIBUTION.—Known only from the type-locality, the West European Basin off Ireland, in 2868 to 2890 meters.

ETYMOLOGY.—The proposed specific name is derived from the Latin *tubicina* (trumpeter), in reference to the trumpet-like anterior cephalic hood enclosing the chelifores.

REMARKS.—There are three species that share several characters present in the new species. These are *Cilunculus europaeus*, *C. antillensis*, and *Scipiolus bifidus*. The latter species I propose to move to the genus *Cilunculus* because, unlike *Scipiolus*, it has a small cephalic hood over the chelifores, long auxiliary claws, a long slender appearance, and very reduced chelifores and lacks eyes on the bifurcate ocular tubercle. These three species share the following characters with the new species: long auxiliary claws, lack of median trunk tubercles, and a one-segmented scape. The proposed new species differs from *C. europaeus* in its much longer bifid ocular tubercle, the shorter and fewer setae on each of the four proximal leg segments, several differences in the shorter chelifores in the new species, and differences in pro-

portional ratios of palps, ovigers, and leg segments. It differs from *C. antillensis* in chelifore size, lateral process, and coxal setae and in having a more slender proboscis, tibiae with more setae, a longer abdomen, and a straighter and more slender propodus. *Cilunculus bifidus* has a smaller cephalic hood, larger chelae, smaller inflated posteriors on the first three trunk segments, and many less setae on the legs.

All of these species have been captured in depths of over 100 meters to less than 2000 meters, but the capture depth of almost 2900 meters for this new species marks it as the deepest-living member known of the genus *Cilunculus*.

Elassorhis, new genus

DIAGNOSIS.—Ammonotheidae: trunk unsegmented, circular in outline. Ocular tubercle tiny, without eyes, situated in middle of neck behind 2 tiny tubercles. Proboscis very small, short, slender. Chelifores 2-segmented, massive; chela vestigial in adult. Palps 2-segmented, very small, carried ventrally. Oviger 10-segmented, with denticulate spines on strigilis, without terminal claw. Legs slender, with few setae, without tubercles. Femoral cement gland a long dorsodistal tube. Tarsus short, propodus slender, without heel, claw large, with single median auxiliary claw.

ETYMOLOGY.—From the Greek *ellasso* (smaller or less) and *rhis* (a nose or snout), pertaining to the very small proboscis of the new genus. Gender feminine.

TYPE-SPECIES.—*Elassorhis laterospina*, new species.

REMARKS.—This new genus is assigned to the Ammonotheidae because of the vestigial chelae and presence of palps. If it is found eventually that the female lacks palps, then the genus would be placed more properly among the Callipallenidae, next to the genus *Propallene*. *Propallene* has regular 10-segmented ovigers having denticulate spines, and the strigilis is without a terminal claw. It also has two-segmented palps but has well-developed and functional chelae, along with a much more robust proboscis and other differences that sepa-

rate it immediately from this new genus. The callipallenid femoral cement glands, where known, are with some exceptions found on the ventral femur, whereas that of *Elassorhis* is placed dorsodistally, in keeping with many ammotheid genera. The terminal leg segments are similar to many among the Ammotheidae, except for the single centrally placed auxiliary claw, which is, as far as I can determine, unique among the many pycnogonid genera.

***Elassorhis laterospina*, new species**

FIGURE 4

MATERIAL EXAMINED.—Brazil Slope, off Recife: *Atlantis II* cruise 31, sta 167, 07°58'S, 34°17'W, epibenthic sled, 943–1007 m, 20 Feb 1967 (1♂ holotype, USNM 181095; 1♂ paratype, USNM 181096).

DESCRIPTION.—*Male* (female unknown): With the characters of the genus. Trunk relatively compact, circular in outline, unsegmented. Lateral processes long, separated by slightly more than their diameter distally, armed with 1 to 6 long spine-shaped lateral tubercles; 1st lateral processes with 4 posterior, 2nd with 5 anterior and 6 posterior, 3rd with 5 anterior and 4 or 5 posterior, 4th with 2 anterior and 1 posterior tubercles. Cephalic segment with short neck to which ovigers are attached lateroventrally, just touching 1st lateral processes. Ocular tubercle very small, a truncated cone as tall as wide, with 2 tiny lateral papillae, without eyes, situated at narrowest part of neck. Anterior to ocular tubercle and laterally are 2 low rounded tubercles.

Proboscis extremely small, a curved cylinder upturned from base, of less diameter than chelifore scape and shorter than chelifore length, with rounded lips but a triangular mouth.

Abdomen almost cylindrical, reaching to distal tip of 1st coxae of 4th lateral processes, armed with 3 or 4 dorsodistal setae.

Anterior rim of cephalic segment forming slight hood into which chelifores insert. Chelifores massive, scape 1-segmented, almost as wide as long.

Chelae large, about half scape diameter. Fingers vestigial, movable member represented by small tubercle. A small constriction present between what might be palm and fingers.

Palps very small, 2-segmented, carried ventrally, perpendicular to trunk. 1st segment longest, 5 times longer than 2nd, with a median lateral bulge. 2nd segment little longer than wide, armed with 2 distal setae.

Oviger 10-segmented, with 5th segment longest, slightly longer than 4th. Strigilis weak, terminal 3 segments each with 2 slightly denticulate spines having 1 or 2 serrations distally. Terminal segment as wide as long, with 2 tiny tubercles lateral to the 2 terminal spines.

Leg moderately slender, long, almost glabrous except for 1 or 2 dorsodistal long setae and 3 or 4 very short ventrodial spines on 2nd tibia. 1st tibia longest with femur shorter than both tibiae. Coxae 1 and 2 with long lateral tubercles of same size as those of lateral processes, with 1 or 2 on anterior and posterior surfaces. Single femoral cement gland a distally pointing tube almost twice femur diameter in length, arising dorsodistally from femur surface. Tarsus short, 0.3 propodus length. Propodus moderately curved, without heel or large heel spines, sole armed with 5 or 6 short spines. Claw long, over half propodal length, only slightly curved. Single auxiliary claw less than half main claw length, situated on median line of propodus and claw.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (cephalic segment anterior rim to tip 4th lateral processes), 1.48; trunk width (across 2nd lateral processes), 1.21; proboscis length ventrally, 0.33; abdomen length, 0.42; 4th leg, coxa 1, 0.22; coxa 2, 0.41; coxa 3, 0.37; femur, 1.01; tibia 1, 1.43; tibia 2, 1.31; tarsus, 0.14; propodus, 0.41; claw, 0.24; auxiliary claw, 0.09.

ETYMOLOGY.—The specific name is proposed for the spinelike tubercles of the lateral processes, coxae 1 and 2.

DISTRIBUTION.—Known only from the type-locality, the Brazil Slope, off Recife, in 943 to 1007 meters.

REMARKS.—As far as I can find in the litera-

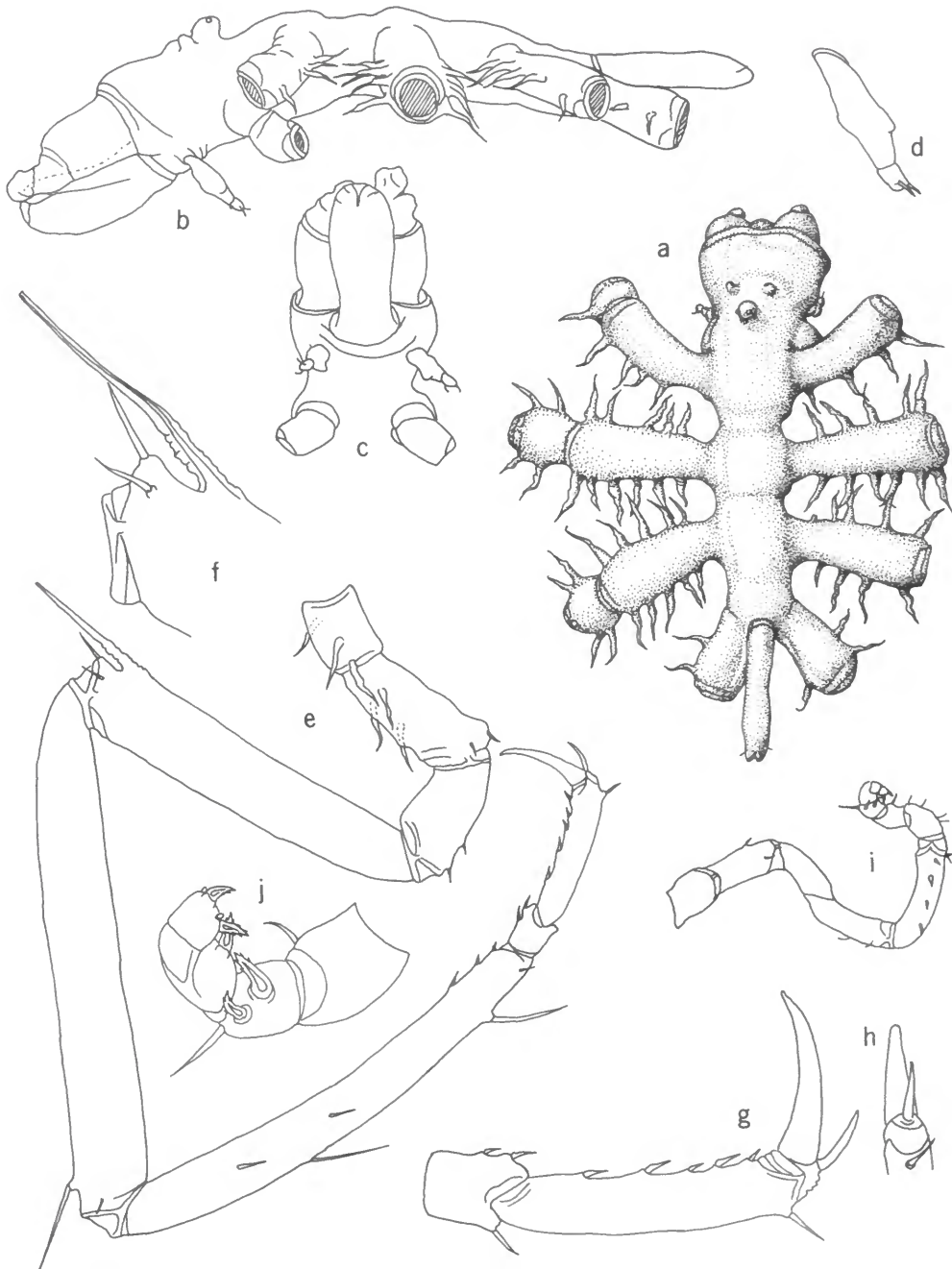


FIGURE 4.—*Elassorhis laterospina*, new genus, new species, holotype, male: *a*, trunk, dorsal view; *b*, trunk, lateral view; *c*, anterior of trunk, ventral view; *d*, palp; *e*, 3rd leg; *f*, enlargement of distal femur with cement gland tube; *g*, terminal segments of 3rd leg; *h*, dorsal view of distal propodus and claws; *i*, oviger; *j*, terminal segments of oviger.

ture, no known pycnogonid has a single auxiliary claw placed directly in the median line of the main claw. Examination of all eight legs available with propodi on these two specimens confirms that each has the single small claw, and each lacks any trace of a second claw or claw socket laterally. Auxiliary claw presence or absence is not usually a good diagnostic character, but the presence of a single claw must serve as a primary character for this species and possibly the genus.

The proboscis of this new species is as small as or smaller in relation to the trunk length than that of almost any other pycnogonid known, slightly more than 0.2 of the trunk length. The proboscis of *Paranympyon spinosum* is one of the shortest known and is about 0.25 of the trunk length. The only species with shorter ratios in proboscis-trunk length are some of the "long-necked" species of several genera among the callipallenids.

A two-segmented palp is not unique, as mentioned before, but, taken with other characters in this species, such as the tiny proboscis, massive chelifores, the long lateral processes with many spiny lateral tubercles, and the tiny blind ocular tubercle, serves to make this a unique pycnogonid.

***Megarhethus*, new genus**

DIAGNOSIS.—Ammonotheidae: *Achelia*-like, trunk fully segmented, elongate, lateral processes well separated. Anterior of cephalic segment very broadened to carry massive chelifores with large vestigial chelae. Ocular tubercle a cone without eyes, placed at anterior of neck. Proboscis a long oval. Ovigera inserted ventral to narrowest part of neck and well anterior to 1st lateral processes. Abdomen long. Palps 9-segmented. Ovigera 10-segmented, with few denticulate spines, without claw. Legs long, slender. Cement gland located at 0.6 of dorsal femur length. Terminal leg segments *Achelia*-like, claw and auxiliaries long.

ETYMOLOGY.—From the Greek *mega* (large or great) and *rhethos* (limb [arm]), pertaining to the

massive anterior cephalic segment and scapes of the new genus. Gender masculine.

TYPE-SPECIES.—*Achelia brevichelifera* Hedgpeth, 1948.

REMARKS.—This genus is proposed to receive a species previously assigned to the genus *Achelia* by Hedgpeth (1948:245). The species agrees in many ways with the diagnosis of *Achelia*, but the different characters of the cephalic segment, including the neck, oviger placement, ocular tubercle placement, and the massive broadening of the anterior of this segment, offer sufficient justification, I believe, to place this species in a new genus. Stock (1968:15) proposed to place this same species in the genus *Scipiolus*, stating that it resembles another species under discussion by its slender habitus and nine-segmented palps. In many ways, this species does resemble Stock's species *Scipiolus bifidus* (= *Cilunculus bifidus*: see under "*Cilunculus tubicinus*," this report), except for the differing cephalic segment characters. Among the three known species of *Scipiolus*, the cephalic segment of each appears similar to that of *Anoplodactylus* with its slender neck extension and the 1st lateral processes immediately posterior to the neck and the slender chelifores and ovigera placed under the 1st lateral processes instead of ventrally on the cephalic segment. Species of the genus *Scipiolus* have no neck as characterized by that of *Megarhethus*. The neck and oviger placement in *Megarhethus* is similar to some species in the genus *Callipallene*, but this genus is without palps and has other nonammonotheid characters.

This new genus has massive chelifores similar to *Elassorhis*, proposed elsewhere in this report. It represents possibly another transitional genus such as *Decachela*, *Pigrogromitus*, *Paranympyon*, *Oorhynchus* (*Dorhynchus* [sic]: Hedgpeth, 1947:4, table 1; Fry and Hedgpeth, 1969:66, table 6), *Mimipallene*, and *Pallenopsis*, among others.

***Megarhethus brevicheliferus* (Hedgpeth), new combination**

FIGURE 2*f-i*

Achelia brevichelifera Hedgpeth, 1948:245, 246, fig. 38h-l.
Scipiolus brevicheliferus.—Stock, 1968:15 [text].

MATERIAL EXAMINED.—North American Slope: *Fish Hawk*, sta 1028, 39°57'N, 69°17'W, trawl, 750 m, 14 Sep 1881 (1♀ holotype, USNM 81097). *Albatross*, sta 2212, 39°59.5'N, 70°30.7'W, trawl, 783 m, 22 Aug 1884 (1♀ paratype, USNM 81098).

OTHER MATERIAL.—North American Slope: *Chain* cruise 88, sta 207, 39°51.3'N, 70°54.3, epibenthic sled, 805–811 m, 21 Feb 1969 (12♂, 5♀, 8 juveniles). *Knorr* cruise 35, sta 346, 39°54.1'N, 70°10.7'W, epibenthic sled, 457 m, 3 Dec 1973 (1♂).

North American Basin: *Atlantis II* cruise 12, sta 62, 39°26'N, 70°33'W, epibenthic sled, 2496 m, 21 Aug 1964 (2♂, 3♀, 2 juveniles). *Atlantis I* cruise 273, sta GH-1, 39°25.5'N, 70°35'W, 2500 m, 27 Sep 1961 (1 juvenile).

TYPE-LOCALITY.—North American Slope in 750 to 783 meters.

DISTRIBUTION.—Known only from the North American Slope and Basin in 750 to 2500 meters.

DESCRIPTION OF MALE.—Lateral processes each with a distal anterior and posterior seta. Ovigera implanted anterior to and not touching 1st lateral processes. Eye tubercle at posterior of broad chelifore bases on anterior part of neck, conical, without eyes but with large distinctive lateral papillae. Oviger 2nd, 4th, and 5th segments equal, with several ectal setae. 6th segment with several long ectal setae and 1 small endal spine. Strigilis weak, armed with 2:1:2 denticulate spines having 4 to 7 serrations per side. Terminal segment slightly longer than wide, armed with 2 short setae lateral to denticulate spines. Femoral cement gland a slender tube placed 0.6 the distance toward the distal end of the femur and arising from a low swelling. Other characters as with the female.

REMARKS.—Hedgpeth (1948) has given an adequate description of this species, except for an error with the eye tubercle, which is not placed at the anterior of the cephalic segment and does not have eyes. There are two lateral papillae on the ocular tubercle, which could be confused with eyes. Hedgpeth lacked a male specimen with which to describe the sexual differences and the femoral cement gland. A set of figures of the male

is presented herein to illustrate these differences. The palp, oviger, and leg are very much like some species of *Achelia*, except for the cement gland, which is placed more proximally instead of at or near the femur tip as in most *Achelia* species. Also, the exposed tube from the gland is longer than that of *Achelia* species.

This species is now known to occur at much greater depths than most species of *Achelia*, except, perhaps, *A. borealis* and some Antarctic species.

***Dromedopycnon*, new genus**

DIAGNOSIS.—Ammonoidea: ascorhynchomorph with 2 median trunk tubercles on very elongated cephalic segment, in both sexes. Trunk slender, elongate, cephalic segment longer than 3 posterior segments combined. Ocular tubercle at anterior and 1st lateral processes at extreme posterior of cephalic segment. Proboscis with 3 anteriolateral and posterior swellings at midlength. Chelifore very short, scape of 2 segments, chela tiny, vestigial in adults. Palp 6-segmented. Oviger 10-segmented, with denticulate spines on weak strigilis, without terminal claw. Legs slender, tarsus short, propodus with heel spines, large main and auxiliary claws.

ETYMOLOGY.—From the Latin *dromedarius* (dromedary or Arabian camel), pertaining to the unique hump or tubercle on the cephalic segment, and from the prefix of "Pycnogonida." Gender masculine.

TYPE-SPECIES.—*Dromedopycnon acanthus*, new species.

REMARKS.—This genus bears some resemblance to the genus *Ascorhynchus*, although it has characters resembling also the genera *Hedgpethius* and *Cilunculus*. It is long, slender, and bears median trunk tubercles like many species of *Ascorhynchus*, with the proboscis, chelifores, and palps situated in much the same places as in *Ascorhynchus*. It has the very long cephalic segment with appendages arranged like *Hedgpethius*, including the swellings of the proboscis. It has the leg and femoral cement gland characters of *Cilunculus*. It

is, on the other hand, separate from each of these genera by the unique cephalic segment second tubercle placed between the ocular tubercle and the posterior median tubercle and by the palps with six segments. No other known pycnogonid genus has such a trunk tubercle separate from or in addition to the tubercle on the median posterior line of the segment.

***Dromedopycnon acanthus*, new species**

FIGURE 5

MATERIAL EXAMINED.—Brazil Slope, off Recife: *Atlantis II* cruise 31, sta 169A, 08°03'S, 34°23'W, epibenthic sled, 587 m, 21 Feb 1967 (1 juvenile paratype, USNM 181079).

Tierra del Fuego–Burdwood Bank area: *Eltanin* cruise 9, sta 740, 56°06'S, 66°19'W, trawl, 384–494 m, 18 Sep 1963 (1♂ with eggs, holotype, USNM 181072; 11♂, 7♀, 7 juveniles, 1 larva, paratypes, USNM 181073). *Eltanin* cruise 22, sta 1521, 54°10'S, 52°08'W, midwater trawl (touched bottom), 419–483 m, 30 Jan 1966 (2♂ with eggs, 6♂, 5♀, paratypes, USNM 181074). *Eltanin* cruise 22, sta 1595, 54°40'S, 57°05'W, trawl, 124–128 m, 14 Mar 1966 (1♀, paratype, USNM 181075). *Eltanin* cruise 22, sta 1596, 54°39'S, 57°09'W, trawl, 124 m, 14 Mar 1966 (1♂ with eggs, 2♂, 2♀, 2 juveniles, paratypes, USNM 181076). *Hero* cruise 715, sta 874, 54°39'S, 63°50'W, 135–137 m, 26 Oct 1971 (1♂, paratype, USNM 181077). *Hero* cruise 715, sta 875, 54°55'S, 64°00'W, 771–903 m, 27 Oct 1971 (1 juvenile, paratype, USNM 181078).

DESCRIPTION.—With the characters of the genus.

Male Holotype: Trunk long, slender, 1st 2 segments articulated, posterior 2 segments fused. Cephalic segment with tall median tubercle at flaring posterior articulation and another tall tubercle at approximately 0.3 the distance along middorsal line toward anterior tip. 2nd segment with median tubercle on posterior articulation matching that of 1st segment, and, where 3rd and 4th segments fuse, another tiny tubercle is placed

on median line. Lateral processes separated by their diameter or slightly more. 1st lateral processes armed with tall posterior dorsodistal tubercle with long seta at tip. 2nd and 3rd lateral processes armed with tall anterior and posterior dorsodistal tubercles with setae at tips, 4th lateral processes armed with only anterior dorsodistal tubercle, smaller than others, armed with seta. Ocular tubercle a low truncated cone at extreme anterior of cephalic segment, eyes large, slightly pigmented. Proboscis not so long as cephalic segment, ovoid, tapering to rounded point at tip, with median posterior and anteriolateral swellings at half-length and distally. Ovigera implanted at bases of and slightly anterior to 1st lateral processes.

Chelifores small, downcurved, nonfunctional. Scape 2-segmented, 1st little longer than wide, 2nd slightly longer than twice its diameter, each armed with dorsodistal seta. Chela tiny, with anterior fold denoting vestigial fingers.

Palps articulated at extreme anterior of cephalic segment, of 6 segments. 1st 2 segments short, 3rd 3 times longer than its diameter, 4th very long, 9 times its maximum diameter, with a vestigial constriction marking fused segmentation at 0.12 its length proximally. 4th segment with swelling at 0.3 its length and a distally pointing tubercle on endal surface bearing a stout spine. 5th segment no longer than wide. 6th segment 3 times its length, armed with many ventral and lateral setae, some longer than segment diameter.

Oviger 10-segmented, strigilis weak, 2nd and 4th segments longest, subequal in length, 5th slightly shorter. Terminal 4 segments articulated anaxially on short 6th segment, each segment of strigilis armed with 2 denticulate spines having many serrations per side. Terminal segment tiny, shorter than its diameter, without claw. Eggs massive, few.

Legs moderately long, slender. 1st coxae armed with dorsodistal tubercles as on lateral processes. Coxa 2 armed with 2 tubercles on anterior and posterior surfaces, smaller than coxa 1 tubercles, armed with 3 or 4 ventrodorsal setae. Coxa 3 with single ventral seta. Femur the longest segment,

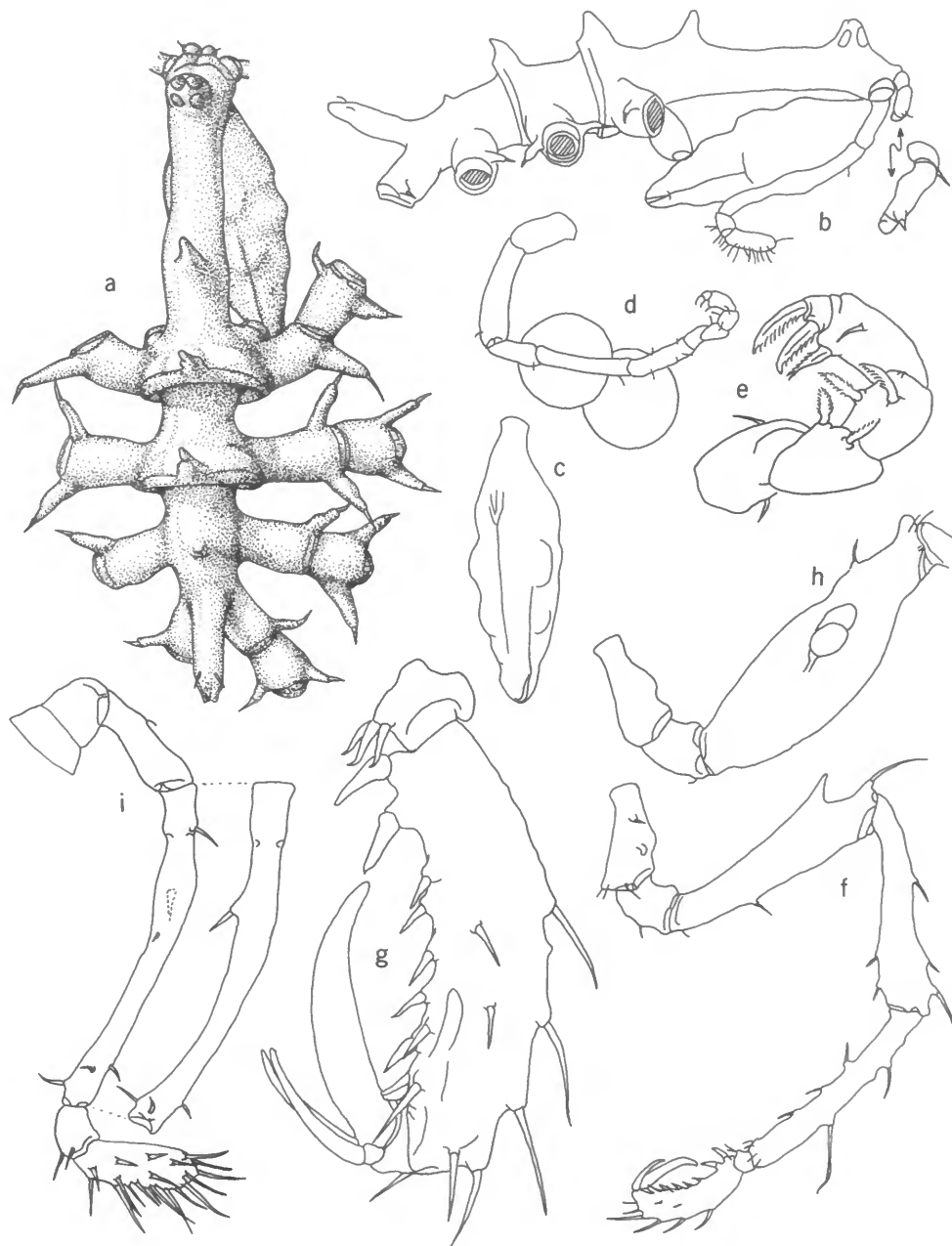


FIGURE 5.—*Dromedopycnon acanthus*, new genus, new species, holotype, male: *a*, trunk, dorsal view; *b*, trunk, lateral view, with enlargement of chelifore; *c*, proboscis, ventral view; *d*, oviger, with 2 eggs; *e*, terminal segments of oviger; *f*, 3rd leg; *g*, terminal segments of 3rd leg. Paratype, female: *h*, proximal leg segments; *i*, palp, lateral view, with 4th segment also in ventral view.

armed with 2 ventral setae and 1 long seta on dorsodistal tubercle. Cement gland a distally pointing cone as tall as minimum diameter of segment, situated dorsally at 0.75 the length of femur. Tibiae equal in length, armed with several dorsal and ventral setae on small tubercles and 2 long setae on dorsodistal tubercles. Tarsus very short, with 3 endal spines. Propodus without heel, robust, slightly curved, armed with 2 heel spines and from 8 to 10 smaller sole spines. Claw long, over 0.6 propodal length, auxiliary claws slender, slightly over half main claw length.

Female Paratype: Slightly larger than male. Median trunk tubercles usually more slender. Lateral processes and coxae tubercles absent, armed with dorsodistal setae in their place. Ovipiger similar in length ratios to that of male but slightly smaller in size. Femur of ovigerous female greatly swollen except distally with 1 or more (to several) large eggs.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk, 1st segment, 0.93; trunk, posterior 3 segments, 0.68; trunk width (across 2nd lateral process tubercles), 0.83; proboscis length laterally, 0.77; abdomen length laterally, 0.27; 3rd leg, coxa 1, 0.2; coxa 2, 0.32; coxa 3, 0.21; femur, 0.76; tibia 1, 0.68; tibia 2, 0.66; tarsus, 0.06; propodus, 0.36; claw, 0.21.

ETYMOLOGY.—This species name is from the Latin *acanthus* (thorny or prickly plant), in reference to the thorny appearance presented by the setose tubercles on the lateral processes and coxae of the male.

DISTRIBUTION.—Known from the type-locality, southeast of Cape Horn, and from the Tierra del Fuego–Burdwood Bank areas and the Brazil Slope off Recife in 124 to 903 meters.

REMARKS.—This new species appeared at first to be another species of the genus *Hedgpethius*, with its very long cephalic segment and nodose proboscis, or another species of *Ascorhynchus*, with its median trunk tubercles, proboscis placement, and general trunk configuration shared by many species of the latter genus. Further examination revealed a “misplaced” median trunk tubercle anterior to the usual trunk segmentation tuber-

cles. It appears as if the three tubercles usually found on the dorsal rims of trunk segments have been moved anteriorly by one segment, making the anterior tubercle reside in the middle of the neck. The posterior trunk segmentation line is entirely lacking, and a tiny, almost residual tubercle is placed where the segmentation line would usually encircle the trunk.

The long lateral process and coxal tubercles of the male are reminiscent of those on *Eurycyde raphiaster* but without the long setae associated with its tubercles. There are other characters in this new species that are similar to those of other ammotheid genera. The terminal leg segments are very similar to species of the genus *Ammothella*, and, as mentioned under generic remarks above, the cement gland is very much like that of some species in the genus *Cilunculus*. This new species has a palp of six segments and a median neck tubercle, which make it very characteristic and separate it from all other known species and genera of the family Ammotheidae.

Genus *Paranympyon* Caullery, 1896

Paranympyon spinosum Caullery

Paranympyon spinosum Caullery, 1896:361, 362, pl. xii: figs. 1–6.—Stock, 1978a:204, 205, fig. 5d–g [literature].

MATERIAL EXAMINED.—North American Continental Slope, S of New England: *Atlantis I* cruise 283, sta Slope 4, 39°56.5'N, 70°39.9'W, 400 m, 28 Aug 1962 (2 specimens). *Atlantis II* cruise 12, sta 73, 39°46.5'N, 70°43.3'W, epibenthic sled, 1470–1330 m, 25 Aug 1964 (34 specimens). *Chain* cruise 50, sta 87, 39°48.7'N, 70°40.8'W, epibenthic sled, 1102 m, 6 Jul 1965 (54 specimens). *Chain* cruise 58, sta 96, 39°55.2'N, 70°39.5'W, epibenthic sled, 498 m, 27 Apr 1966 (7 specimens). *Chain* cruise 58, sta 105B, 39°56.6'N, 71°03.6'W, epibenthic sled, 530 m, 5 May 1966 (1♂). *Chain* cruise 88, sta 207, 39°51.3'N, 70°54.3'W, epibenthic sled, 805–811 m, 21 Feb 1969 (62 specimens, mostly juveniles). *Chain* cruise 88, sta 209A, 39°47.6'N, 70°49.9'W, epi-

benthic sled, 1501–1693 m, 22 Feb 1969 (9 specimens). *Chain* cruise 88, sta 209B, same collecting data (4 specimens). *Knorr* cruise 6, sta unknown, 24 Jul 1970 (1♀). *Knorr* cruise 35, sta 346, 39°54.1'N, 70°10.7'W, epibenthic sled, 457 m, 3 Dec 1973 (15 specimens). *Vema*, sta V-15-164, 37°39.5'N, 74°08.0'W, small biological trawl, 853–855 m, 11 Jul 1959 (1♀).

West European Basin, SW of Ireland: *Chain* cruise 106, sta 313, 51°32.2'N, 12°35.9'W, epibenthic sled, 1500–1491 m, 17 Aug 1972 (4♂, 1♀, 8 juveniles).

Guiana Basin, N of Surinam: *Knorr* cruise 25, sta 293, 08°58.0'N, 54°04.3'W, epibenthic sled, 1456–1518 m, 27 Feb 1972 (2♂, 1♀).

REMARKS.—The Guiana Basin specimens mark the farthest south that this species has been captured. It is more common in the colder basins and slopes of the North Atlantic and is known from 385 to 2300 meters.

Less than half the adult specimens here have the setose lateral outgrowths of the lateral processes mentioned by most authors, but the outgrowths are quite conspicuous on those specimens having them.

As far as I can find in the literature, the cement gland has not been described, although its description is not critical to recognition of this distinctive species. The gland surfaces as a small truncated cone with apical pore at the dorsodistal tip of the male femur. The subcuticular part of the gland appears as a tube extending the entire dorsal length of the femur and has its origin in the third coxa.

Genus *Sericosura* Fry and Hedgpeth, 1969

Sericosura mitrata (Gordon)

FIGURE 6

Achelia mitrata Gordon, 1944:54–57, figs. 19a–c, 22b.

Sericosura mitrata.—Fry and Hedgpeth, 1969:112, 113, figs. 152, 153, 173, tpls. 13, 14.

MATERIAL EXAMINED.—Walvis Ridge, off SW Africa: *Atlantis II* cruise 42, sta 192, 23°02'S,

12°19'E, epibenthic sled, 2117–2154 m, 17 May 1968 (2♂).

REMARKS.—A new set of figures is included herein to indicate the several differences between these two males and the female holotype. Some of these differences will, of course, be due to sexual dimorphism, but other differences with the two males include a narrower proboscis, a completely different arrangement of the leg setae, and apparently longer auxiliary claws. The male is smaller than the female, as would be expected, and the lateral processes are separated by about half their diameter rather than almost touching as in the female. Segment lengths of the male oviger are virtually the same as those of the female, but the entire male appendage is larger. The broad 6th segment is very setose, with a field of short and long setae ectally and laterally. The strigilis 7th segment appears to have lost its denticulate spines, although they are present in the female, but the other terminal segments have two, one, and two denticulate spines respectively. The male chelae have rudiments of fingers in the form of tiny papillae, and the movable finger has retained what appears to be a faint circle of articulation around it.

The male legs are quite different in setae arrangement and density. There is no ventral field of setae as in the female, and almost no setae at all on the femur and 1st tibia. The two tibiae have long and short setae laterally and dorsally and a few setae, increasing in numbers distally on the ventral surface of the 2nd tibia. The auxiliary claws are more than half the length of the main claw instead of shorter as in the female.

The single femoral cement gland, previously unknown for this species, is in an atypical position from most genera in the Ammotheidae. It faintly resembles the gland of *Eurycyde raphiaster* in shape and placement. It appears on the posterodorsal surface of each femur almost at the proximal end of the segment and consists of a swollen mound from which projects a tube almost as long as the segment diameter. The tube points obliquely toward the proximal segments of the leg and tapers to a fine syringe-like constriction distally. The

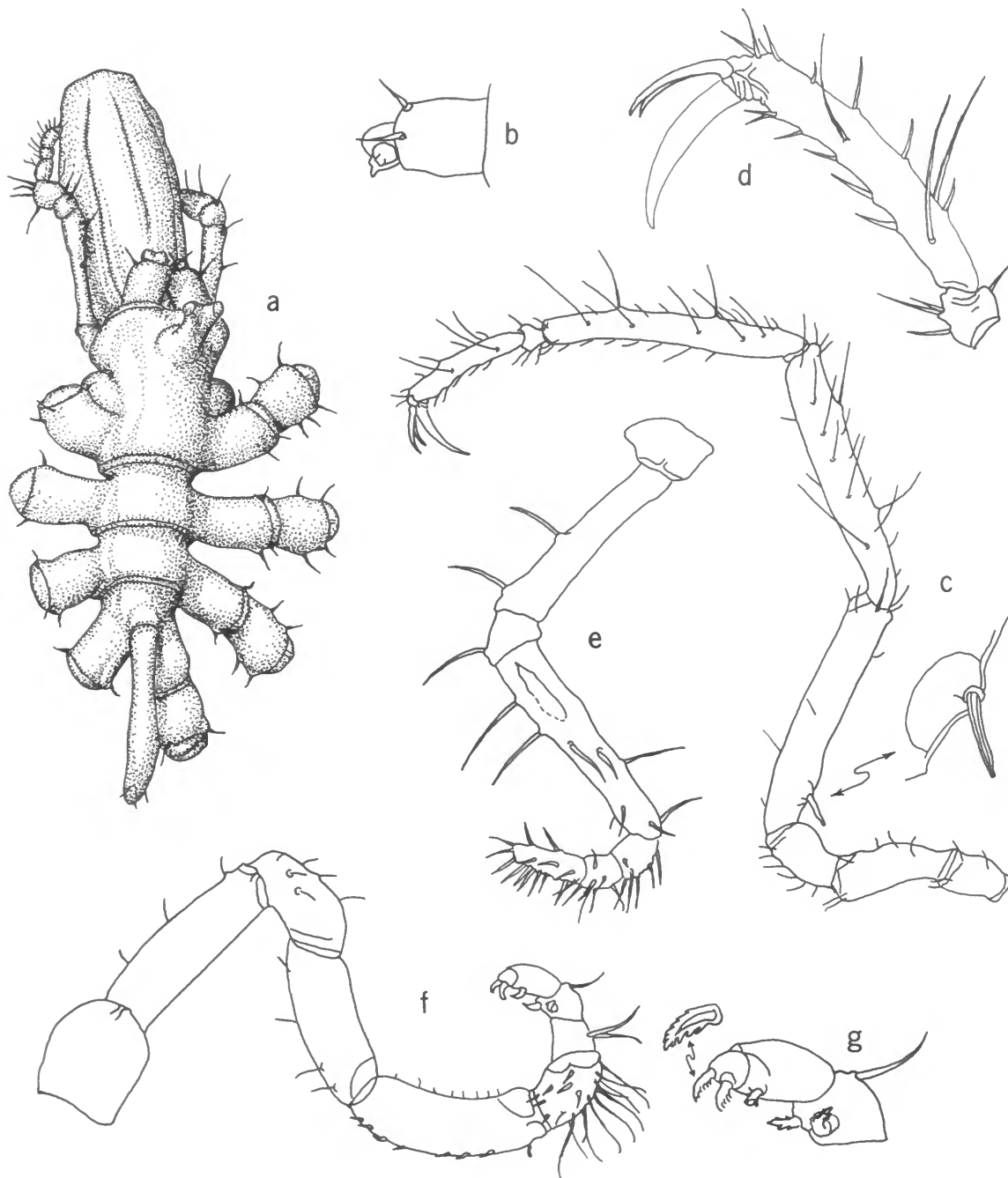


FIGURE 6.—*Sericosura mitrata*, male: *a*, trunk, dorsal view; *b*, chelifere, enlarged; *c*, 3rd leg, with enlargement of cement gland; *d*, terminal segments of 3rd leg; *e*, palp; *f*, oviger; *g*, oviger terminal segments with enlarged denticulate spine.

gland itself is centered under the swelling and does not extend beyond the mound.

This species was originally known from waters off the MacRobertson Coast in the African quadrant of Antarctica, in 219 meters. These two specimens extend the known range considerably to the north and into very much deeper waters.

Family PHOXICHILIDIIDAE Sars, 1891

Genus *Anoplodactylus* Wilson, 1878

Anoplodactylus petiolatus (Krøyer)

Phoxichilidium petiolatum Krøyer, 1844:123.

Anoplodactylus petiolatus.—Hedgpeth, 1948:222, fig. 27a-d [literature].

MATERIAL EXAMINED.—North American Slope and Basin: *Atlantis I* cruise 283, sta Slope 2, 40°01.8'N, 70°42.0'W, 200 m, 28 Aug 1962 (1♂ with eggs, 2♀). *Chain* cruise 50, sta 89, 40°01.6'N, 70°40.7'W, epibenthic sled, 196 m, 6 Jul 1965 (about 60 specimens). *Atlantis II* cruise 24, sta 125, 37°24'N, 65°54'W, epibenthic sled, 4825 m, 23 Aug 1966 (1♀, 1 larva).

REMARKS.—The specimens from *Atlantis II* cruise 24 are probably the result of net contamination from *Sargassum* on or near the surface. The depths for the other two records are well within the known range for this species, to almost 1200 meters, but the last depth of 4825 meters is far beyond its known range. There are several other species recorded in this report from abyssal depths, where their known depth range is far shallower. They probably all represent net contamination at shallow depths.

Anoplodactylus maritimus Hodgson

Anoplodactylus maritimus Hodgson, 1914:164.—Hedgpeth, 1948:230, fig. 29d-e [literature].

Anoplodactylus parvus Giltay, 1934:1-3, figs. 1-5.—Hedgpeth, 1948:223, 224, fig. 27e-f [literature].—Stock, 1975:1069-1075 [text].

MATERIAL EXAMINED.—Bermuda Basin: *Atlantis II* cruise 23, sta 108, 36°24'N, 68°04.8'W,

epibenthic sled, 4739 m, 7 Aug 1966 (1♀).

REMARKS.—This capture probably represents another example of net contamination from pelagic *Sargassum* weed. The species is known only from relatively shallow depths (0 to 65 meters).

Anoplodactylus typhlops Sars

Anoplodactylus typhlops Sars, 1888:29-31, pl. 2: fig. 3a-c.—Hedgpeth, 1948:228, 229, fig. 29a-c [literature].

MATERIAL EXAMINED.—Bermuda Slope: *Atlantis II* cruise 24, sta 118A, 32°19.4'N, 64°34.9'W, epibenthic sled, 1135-1153 m, 18 Aug 1966 (1♂, 1♀, 2 juveniles).

Brazil Slope: *Atlantis II* cruise 31, sta 169A, 08°03'S, 34°23'W, epibenthic sled, 587 m, 21 Feb 1967 (3♂).

REMARKS.—This blind species is the deepest known member of a large group of species that live usually in much shallower waters. To my knowledge, there are only nine known species of *Anoplodactylus* living in waters deeper than 500 meters, in a genus of over 70 described species (see under *A. vema*). The maximum depth at which *A. typhlops* has been captured is 3620 meters. It is widely distributed in the deep waters of the North and South Atlantic and has been found in the Gulf of Alaska. This is the first record of the species from the area of Brazil.

Anoplodactylus vema, new species

FIGURE 7a-g

MATERIAL EXAMINED.—Argentine Slope, E of Bahía Samborombon: *Vema* cruise 18, sta 9, 36°17'S, 53°21'W, trawl, 676 m, 4 Feb 1962 (1♂ holotype, USNM 181038; 2♂ paratypes, USNM 181039).

DESCRIPTION.—Trunk moderately slender, unsegmented. Lateral processes separated by slightly more than their diameter, without tubercles or setae. Anterior 2 lateral processes 3 times as long as their maximum diameter, those posterior of increasingly shorter lengths. Ocular tubercle a cone, twice as tall as wide, constricted above the

eyes, which are large, unpigmented. Abdomen slender, carried almost erect, with 2 distal setae.

Proboscis almost cylindrical, slightly inflated at midpoint and distally. Lips inflated. Without trace of palp buds.

Chelifere scape slender, cylindrical, armed with 2 dorsolateral setae. Chela fingers longer than palm, overlap when closed, both armed with several lateral setae, without teeth.

Ovigers very long, slender, 2nd segment 7 times longer than its diameter, 3rd segment 14 times longer. Strigilis segments increasingly setose distally, with terminal segment having many recurved setae.

Leg lightly setose dorsally and ventrally, with 1 long dorsodistal seta on each leg segment. 2nd coxa long, 4 times longer than its maximum diameter. Femur curved slightly ventrally at its midpoint where cement gland originates. Conical cement gland points distally and contains a short tube that opens out internally into the gland just below the cone surface. Femur the longest segment. Tibiae of equal length. Tarsus very short, armed with 1 ectal and 2 endal setae. Propodus long, slightly curved, with low heel bearing 2 stout spines of unequal size. Sole with 8 or 9 spines and several setae flanking a long lamina almost half sole length. Claw very long and thin, auxiliaries small.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (chelifere insertion to tip 4th lateral processes), 2.12; trunk width (across 1st lateral processes), 1.2; proboscis length laterally, 1.02; abdomen length laterally, 0.4; 3rd leg, coxa 1, 0.31; coxa 2, 1.08; coxa 3, 0.48; femur, 1.32; tibia 1, 1.2; tibia 2, 1.21; tarsus, 0.12; propodus, 0.71; claw, 0.53.

DISTRIBUTION.—Known only from the type-locality, the Argentine Slope, east of Bahía Samborombon in 676 meters.

ETYMOLOGY.—Named for the research vessel *Vema* of the Lamont-Doherty Geological Observatory, Columbia University, New York, from which many pycnogonids and other marine fauna have been collected.

REMARKS.—This new species is closely related

to *Anoplodactylus petiolatus*, except for the much longer 2nd oviger segment (only about five times as long as its diameter in *A. petiolatus*), and the characteristically different femoral cement gland. In *A. petiolatus*, the gland emerges from an almost flat femoral surface in the form of an erect tube usually about half as long as the segment diameter. In the new species, it arises from a slanted cone as a very short tube.

There are some similarities between the new species and *A. pharus* and *A. arnaudae*. All possess an ocular tubercle with a peaked cap or cone, a long propodal lamina and main claw, chela fingers without teeth, and relatively setose legs. The cement gland of *A. arnaudae* is similar but larger than that of the new species. That of *A. pharus* is a very large anterior-pointing cone and tube placed toward the distal end of the femur and as long as or longer than the diameter of that segment (based on an unreported male in the National Museum of Natural History collections). The differences between these species are a single heel spine, a much taller ocular tubercle cone, bigger and more distal cement gland, and much longer and more setose chela fingers for *A. pharus*. For *A. arnaudae*, the differences are lateral process and coxa 1 tubercles, many more setae on the strigilis, a shorter coxa 2, and differences in the trunk shape.

There are, to my knowledge, nine species of the genus *Anoplodactylus* known from waters deeper than 500 meters. These are: *A. arnaudae* (to 860 m), *A. australis* (to 549 m), *A. mamillosus* (to 732 m), *A. neglectus* (to 2926 m), *A. oculatus* (to 850 m), *A. pelagicus* (to 549 m), *A. petiolatus* (to 1180 m), and *A. typhlops* (to 3620 m). Arnaud (1974:174) records a questionable *A. digitatus* specimen from waters off the Azores in 600 meters. If this is actually Böhm's species, then a tenth deep-sea species of *Anoplodactylus* is known, including the new species reported here. Of the nine species above, *A. neglectus* and *A. typhlops* are extremely tenuous and without eyes or ocular tubercle. They may be possibly the same species, as *A. neglectus* is known only from a female specimen. Fage's *A. pelagicus* is quite similar to these, although it has

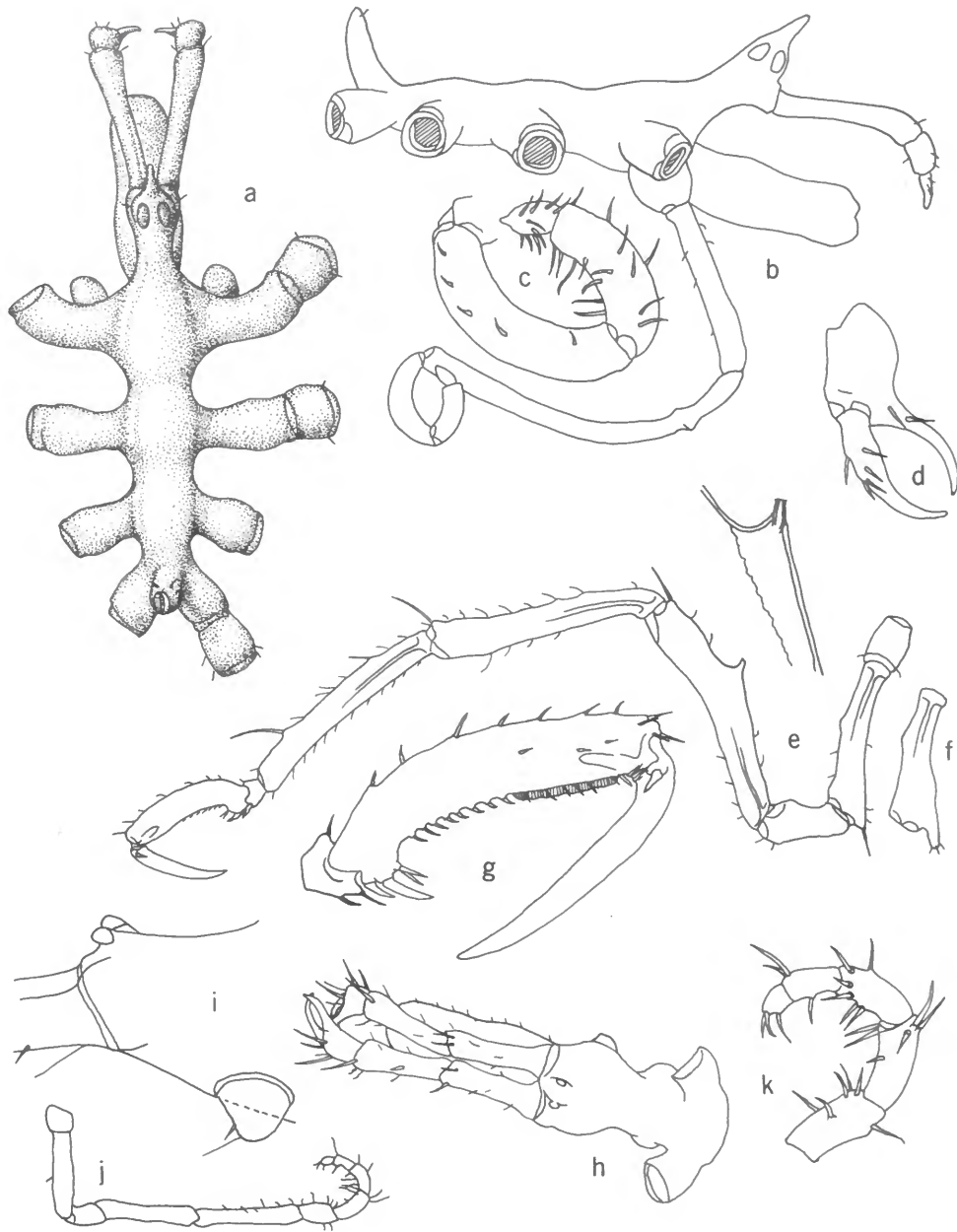


FIGURE 7.—*Anoplodactylus vema*, new species, holotype, male: *a*, trunk, dorsal view; *b*, trunk, lateral view; *c*, oviger terminal segments; *d*, chela; *e*, 3rd leg, with enlargement of cement gland; *f*, 2nd coxa of 4th leg showing ventrodistal apophysis; *g*, terminal segments of 3rd leg. *Pallenopsis* (*Bathypallenopsis*) *tydemani caraibica*, juvenile: *h*, trunk, anterior, dorsal view; *i*, trunk, lateral view of ocular segment area; *j*, oviger; *k*, terminal segments of oviger.

a low ocular tubercle and small eyes. All three species are very different from *A. vema*, principally in appendage length ratios and the ocular tubercles. *Anoplodactylus oculatus* has five cement glands per femur and a taller ocular tubercle but is otherwise similar to *A. vema*. Femoral cement glands are almost always very uniform in each species and thus serve as excellent diagnostic characters for the males of species of this genus.

Anoplodactylus mamillosus is a short, compact species with many tubercles on trunk and appendages and is otherwise very different from the new species. The low ocular tubercle and short proboscis with ventrodiscal tubercles are sufficient characters, among the many, to separate *A. australis* from *A. vema*.

Family ENDEIDAE Norman, 1908

Genus *Endeis* Philippi, 1843

Endeis spinosa (Montagu)

Phallangium spinosum Montagu, 1808:100, pl. 5: fig. 7.

Endeis spinosa.—Hedgpeth, 1948:238–240, fig. 37 [literature].

MATERIAL EXAMINED.—North American Basin:
Chain cruise 50, sta 83(MM), 34°46.5'N,

66°30'W, epibenthic sled, 5000 m, 3 Jul 1965 (1♀, without legs).

REMARKS.—This species is another frequent inhabitant of floating *Sargassum* weed (see *Anoplodactylus petiolatus* and *A. maritimus*), and this capture undoubtedly represents another case of net contamination near the surface. The depth attained at this station is far too deep for any known member of this genus, one usually considered to occur in relatively shallow water. This distribution record is well within the known geographic range of the species.

Family CALLIPALLENIDAE Hilton, 1942

Most genera in this family have well-developed chelifores or at least chelate chelifores, but one genus, the *Pycnogonum*-like *Quebus* (South African), is without chelifores entirely.

There are a bewildering variety of 22 genera now known in this broad-based family, and I have included a key here to aid in sorting them out. It should be kept in mind when using the following key that all genera in this family have 10-segmented ovigers in both sexes. The genus *Pallenella* is excluded from this key because only a single female specimen of the monotypic species, *Pallenella laevis*, is known, and any critical male diagnostic characters remain unknown.

Key to Genera of Family Callipallenidae

- | | | |
|-------|--|---------------------|
| 1. | With segmented palps or palp tubercles | 2 |
| | Without trace of palps | 10 |
| 2(1). | Ovigers with compound (denticulate) spines | 3 |
| | Ovigers with simple or spatulate spines | 7 |
| 3(2). | Ovigers with terminal claw; auxiliary claws present | 4 |
| | Ovigers without terminal claw; auxiliary claws absent (except in
<i>Anoropallene valida</i> and <i>A. laysani</i>) | 5 |
| 4(3). | Palps 4-segmented, in ♂ only | Oropallene |
| | Palps 1-segmented, in ♂ only | Neopallene |
| 5(3). | Palps 4-segmented, in ♂ only | Anoropallene |
| | Palps less than 4-segmented | 6 |
| 6(5). | Palps 2-segmented, in ♂ only | Propallene |
| | Palps 1-segmented, in ♂ only? | Metapallene |

- 7(2). Ovigers without terminal claw; auxiliary claws present 8
 Ovigers with terminal claw; auxiliary claws absent 9
- 8(7). Oviger terminal segment with setae only; chelifores of 2 or 3 segments,
 chelae well developed **Pallenopsis**
 Oviger terminal segment with a spatulate spine; chelifores tiny, 1-
 segmented, without chelae **Mimipallene**
- 9(7). Trunk and legs very spinose; lateral processes separated by less than
 their own diameter; tarsus much shorter than propodus. **Hannonia**
 Trunk and legs glabrous; lateral processes widely separated; tarsus
 equal to or longer than propodus; *Pycnogonum*-like, but with
 chelifores **Pycnopallene**
- 10(1). Without trace of chelifores; *Pycnogonum*-like **Queubus**
 Chelifores well developed 11
- 11(10). Scape 2-segmented; chela fingers smooth; oviger with terminal claw;
 auxiliary claws absent **Pigrogromitus**
 Scape 1-segmented 12
- 12(11). Oviger with terminal claw 13
 Oviger without terminal claw 18
- 13(12). Chela fingers with 1 or more median tubercles or nodes giving
 denticulate appearance; proboscis with 3 prominent petal-shaped
 lips **Cheilopallene**
 Chela fingers smooth or with regular teeth 14
- 14(13). Chela fingers with regular serrate teeth **Seguapallene**
 Chela fingers smooth, without teeth 15
- 15(14). Long or intermediate neck with "collar"; lips usually project from
 truncated proboscis; auxiliary claws absent (but present in *P.*
bermudensis and *P. challengerii*) **Parapallene**
 Neck very short; auxiliary claws absent 16
- 16(15). Proboscis conical distally **Pseudopallene**
 Proboscis reduced to tube distally 17
- 17(16). Chelae and proboscis carried anteriorly; distal proboscis a tube with
 tiny triangular lips **Stylopallene**
 Proboscis and chelifores carried under trunk; chela carried
 anaxially **Spasmopallene**
- 18(12). Chelae with serrate or denticulate fingers 19
 Chelae fingers smooth, without teeth 20
- 19(18). Auxiliary claws present, usually long **Callipallene**
 Auxiliary claws absent or very short **Pallenoides**
- 20(18). Auxiliary claws present **Pycnothea**
 Auxiliary claws absent 21
- 21(20). Propodus with 1 large basal spine giving chelate appearance with
 claw; *Achelia*-like **Decachela**
 Propodus without large spine; proboscis styliiform; tubercles on cheli-
 fores and lateral processes **Austropallene**

Genus *Callipallene* Flynn, 1929

Callipallene acus (Meinert)

Pallene acus Meinert, 1899:48,49, pl. 4: figs. 8-13.

Callipallene acus.—Hedgpeth, 1948:204, 205, fig. 18c-e [literature].—Stock, 1964:46, fig. 1; 1978a:215.

MATERIAL EXAMINED.—Labrador Basin: *Vema* cruise 16, sta 55, 55°48'N, 56°00'W, trawl, 2452 m, 30 Aug 1960 (1♂).

REMARKS.—This specimen is without legs, and I place it under this species tentatively, based on the characters of the long pointed ocular tubercle without eyes and the chelifore, which generally agrees with published figures.

This species is uncommonly collected from the North Atlantic Basin in 900 to 2600 meters.

Callipallene brevirostris (Johnston)

Pallene brevirostris Johnston, 1837:380, pl. 12: figs. 7, 8.

Callipallene brevirostris.—Hedgpeth, 1948:202, 203, fig. 18a [literature].

MATERIAL EXAMINED.—French Guiana, NNW of Cayenne: *Chain* "Equalant" cruise 35, sta 25, 05°39'N, 52°39'W, anchor dredge, 36.6 m, 22 Apr 1963 (1♂ with eggs).

REMARKS.—Stock (1975:1010) records a female captured in almost the same area off the French Guiana coast in 44 meters. This frequently collected species has a very wide distribution in the North Atlantic: from Norway to the Mediterranean in Europe and from Cape Cod, Massachusetts, to the Guianas in the western Atlantic. It inhabits relatively shallow waters throughout its range.

Callipallene margarita (Gordon)

Pallene margarita Gordon, 1932b:82-85, figs. 40, 41.

Callipallene margarita.—Correa, 1948:6 [key].

?*Callipallene margarita*.—Hedgpeth, 1961:3,4, fig. 1.

MATERIAL EXAMINED.—Argentine Slope, off Rio de la Plata: *Vema* cruise 17, sta 101, 38°13'S, 55°19'W, small trawl, 454 m, 19 Jun 1961 (7♂ with eggs, 3 ovigerous ♀, 2♀, 6 juveniles). *Atlantis*

II cruise 60, sta 240, 36°53.4'S, 53°10.2'W, epibenthic sled, 2195-2323 m, 12 Mar 1971 (1♀).

REMARKS.—Gordon's specimens were all taken along the Argentine Shelf, Burdwood Bank, and in the South Georgia area in 120 to 320 meters. The furthest north capture in her records is off the Golfo San Jorge, Argentina, at 46°S. The *Atlantis II* capture extends this distribution to 37°S and to much deeper water. Hedgpeth (1961:3, 4) described a female captured at 42°S, in southern Chile, and he provisionally called it *Callipallene margarita*. I believe his specimen is this species, based on the 19 specimens examined herein.

The chelae finger teeth are not always discernible and may be absent in some specimens. The ocular tubercle of these specimens is usually pointed as shown in Hedgpeth's figure 1b (1961:4). The neck length is variable as in many *Callipallene* species.

The high incidence of males here with eggs and larvae agrees with the groups of specimens listed by Gordon, which were taken in May, June, and July, with a high incidence of males carrying eggs and larvae.

The *Atlantis II* specimen differs little from the females collected by the *Vema*, except that the scapes have more setae distally, and this specimen does not have the dark brown bands adjacent to the segmentation lines as have most of the *Vema* specimens. The depth of this capture extends greatly the known depth range for this species and places it a little further north than the *Vema* specimens.

Callipallene phantoma (Dohrn)

Pallene phantoma Dohrn, 1881:196, pl. 14: figs. 1-9.

Callipallene phantoma.—Hedgpeth, 1948:204, fig. 18b.

Callipallene phantoma phantoma [sic].—Stock, 1952:4, figs. 12-14, 20, 25-27 [literature].

MATERIAL EXAMINED.—North American Slope, S of Cape Cod: *Knorr* cruise 35, sta 346, 39°54.1'N, 70°10.7'W, epibenthic sled, 457 m, 3 Dec 1973 (1♂ with eggs, 3 juveniles).

REMARKS.—The adult male is typical of the

species except for the coxae, which are longer than usual. When the anterior pair of legs are extended forward, the distal coxa ends reach well beyond the chelifore insertion and appear as figured by Dohrn (1881, fig. 1).

The above depth is perplexing because this capture extends the known range by almost double the previously recorded depths. This species has a wide, if spotty, distribution from the Mediterranean to New England, Florida, and the Bahamas and has also been taken in Japan.

Callipallene species indeterminate

MATERIAL EXAMINED.—Labrador Sea, off Greenland: *Vema* cruise 16, sta 48, 60°10'N, 47°08'W, trawl, 300 m, 21 Aug 1960 (1 specimen).

REMARKS.—This specimen lacks legs and is otherwise incomplete. It has a low ocular tubercle with eyes and a relatively short neck. Species of this genus are difficult to identify, even with a complete adult specimen, and, therefore, I will leave this damaged specimen unnamed.

Mimipallene, new genus

DIAGNOSIS.—Trunk robust, unsegmented. Lateral processes tuberculate. Proboscis large, club shaped, pseudorectangular distally. Chelifores reduced to short 1-segmented buds, palps to tiny conical buds. Ovigiers 10-segmented, strigilis weak, with 1 or 2 spatulate spines on each segment, without terminal claw. Legs moderately robust. Cement gland at dorsodistal tip of femur. Tarsus short, propodus inflated, sole straight, unarmed. Claw with auxiliaries.

ETYMOLOGY.—From the Latin *mimus* (imitator) and from *Pallene*, the old generic name introduced by G. Johnston (1837) for pycnogonids of the current genus *Callipallene* (Flynn, 1929). Gender masculine.

TYPE-SPECIES.—*Mimipallene atlantis*, new species.

REMARKS.—Because the palp is reduced to a tiny cone, this new genus corresponds with the

diagnosis of the family Callipallenidae and joins the South African genus *Hannonia* in the character of the palp. The two genera have large bulbous proboscides but otherwise are very different. Some species of the genus *Pallenopsis* also have tiny palp buds.

Mimipallene atlantis, new species

FIGURE 8

MATERIAL EXAMINED.—Argentine Basin, off Rio de la Plata: *Atlantis II* cruise 60, sta 240, 36°53.4'S, 53°10.2'W, epibenthic sled, 2195–2323 m, 12 Mar 1971 (1♂ with eggs, holotype, USNM 181029; 1♂ with eggs, 1♂, 1♀, 9 juveniles, paratypes, USNM 181030). *Atlantis II* cruise 60 sta 237, 36°32.6'S, 53°23.0'W, epibenthic sled, 993–1011 m, 11 Mar 1971 (2♂, 1 juvenile, paratypes, USNM 181031).

DESCRIPTION.—With the characters of the genus.

Male: Trunk compact, unsegmented, without tubercles. Lateral processes separated by half their diameter or less, less than twice as long as their maximum diameter, each armed with large nodose tubercle dorsodistally. Tubercles twice as tall as wide, incurved toward trunk, armed with 2 or 3 lateral setae. Anterior of cephalic segment broad, with swellings laterally and ventral to 1st lateral processes where ovigiers insert. Ocular tubercle like lateral process tubercles, large, incurved, without setae. Eyes entirely lacking. Abdomen long, inflated, reaching to midlength of 2nd coxae of 4th legs, armed with several dorso-lateral setae.

Proboscis large, club shaped, expanded from base outward to large rounded lips. Distal 0.6 of length pseudorectangular in dorsal view. Oral surface compressed within lip bulges.

Chelifores reduced to small slender cones of 1 segment, partly obscured dorsally by projecting cephalic segment, without setae.

Palps represented by tiny low cones lateral and ventral to chelifores, 1-segmented, without setae.

Ovigiers 10-segmented, with few scattered setae

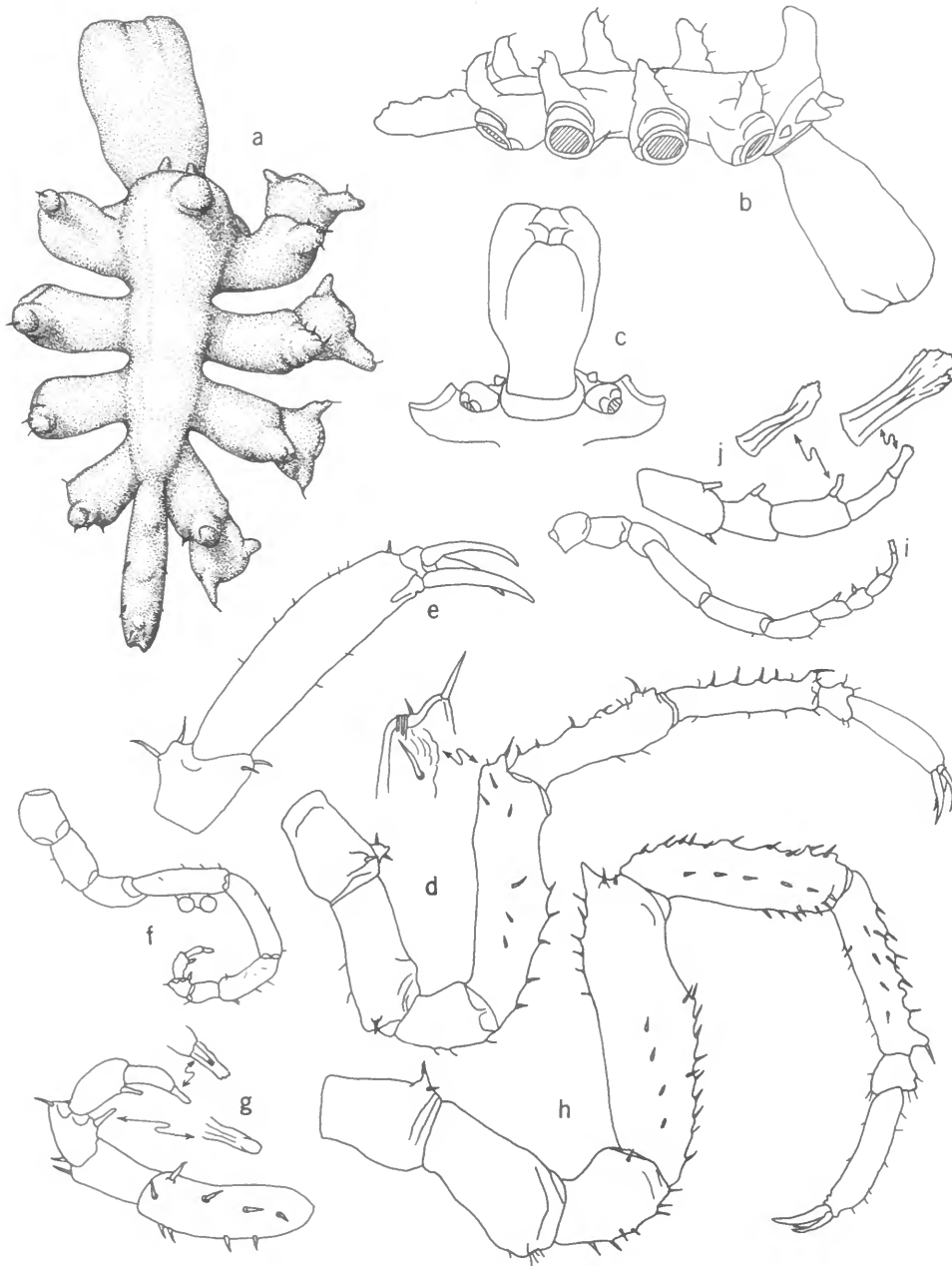


FIGURE 8.—*Mimipallene atlantis*, new genus, new species, holotype, male: *a*, trunk, dorsal view; *b*, trunk, lateral view; *c*, trunk, anterior, ventral view; *d*, 3rd leg, with enlargement of cement gland; *e*, terminal segments of 3rd leg; *f*, oviger; *g*, terminal segments of oviger, with enlargement of spines. Paratype, female: *h*, 3rd leg; *i*, oviger; *j*, terminal segments of oviger, with enlargement of spines.

on proximal segments. 1st 3 segments almost equal in length, 4th and 5th longest, almost equal in length. Terminal 3 segments of strigilis each smaller than next proximal segment, armed with 1 endal spatulate spine. Terminal segment slender, 3 times longer than its diameter, with apical spatulate spine, without claw. Eggs smaller in diameter than proximal oviger segments.

Leg short, robust, femur the longest segment. Coxa 1 with dorsolateral tubercles, anterior tubercle half size of posterior tubercle, armed with 1 or 2 lateral setae. 2nd coxa twice length of 3rd, both with several ventral setae. Femur with several lateral and ventral setae on low tubercles and 1 distal tubercle with seta. Tibia 1 longer than tibia 2, both rather short, armed with several dorsal setae on low tubercles and 2 to 4 short ventral setae. Tarsus short, with 2 ventral and 2 dorsal short setae. Propodus 2.5 times longer than tarsus, slightly inflated, without heel or heel spines, armed with few scattered tiny setae. Claw slender, equal to tarsus length, auxiliary claws slender, almost as long as main claw.

Female: Lateral process tubercles smaller than those of male, coxae tubercles only half as large. Chelifores more slender, longer, armed with 2 or 3 tiny lateral setae. Oviger smaller but similar. Femur larger in diameter, with more dorsal and ventral setae and a single conical dorsodistal tubercle.

Juvenile: Chelae lost at late larval stage. Juveniles with broad 1-segmented chelifore stumps, without trace of chelae.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (anterior of cephalic segment to tip 4th lateral processes), 3.2; trunk width (across 2nd lateral processes), 2.54; proboscis, 1.85; abdomen, 1.5; 3rd leg, coxa 1, 0.76; coxa 2, 1.08; coxa 3, 0.71; femur, 1.88; tibia 1, 1.24; tibia 2, 1.08; tarsus, 0.28; propodus, 0.8; claw, 0.29.

DISTRIBUTION.—Known only from the type-locality, the Argentine Basin and Slope, off Rio de la Plata, in 993 to 2323 meters.

ETYMOLOGY.—Named for the research vessel *Atlantis II* of the Woods Hole Oceanographic

Institution, from which this new genus and species and other species of this report were collected.

REMARKS.—The combination of characters displayed by this new genus and species bears little similarity to any other known pycnogonid but adds to the continuum of character combinations that is the hallmark of the Pycnogonida. Several characters, when taken individually, are quite similar to corresponding characters in other genera and species. The short 1-segmented chelifore stumps are like those in many species of the genus *Tanystylum*. The tiny palp buds are like those of *Hannonia typica*. The large lateral process tubercles are similar to those in several species of *Ascorhynchus*, and the femoral cement gland placement and pore are similar to several species of *Ammonothea*. The ovigers, except for the spatulate spines, are much like those in several genera of the family Ammonotheidae, but when all of these characters are considered together, there are no corresponding genera or species among the Pycnogonida.

Genus *Pallenopsis* Wilson, 1881

Pallenopsis (Pallenopsis) meinerti Schimkewitsch

Pallenopsis meinerti Schimkewitsch, 1930:237.

Pallenopsis (Pallenopsis) meinerti.—Stock, 1975:1018 [key], 1021–1024, figs. 26, 27 [literature].

MATERIAL EXAMINED.—Brazil Slope, off Recife: *Atlantis II* cruise 31, sta 169A, 08°03'S, 34°23'W to 08°02'S, 34°25'W, epibenthic sled, 587 m, 21 Feb 1967 (1♂).

Argentine Slope, off Rio de la Plata: *Atlantis II* cruise 60, sta 236, 36°27'S, 53°31'W to 36°28.1'S, 53°32.3'W, epibenthic sled, 497–518 m, 11 Mar 1971 (1♂, 2♀). *Atlantis II* cruise 60, sta 237, 36°32.6'S, 53°23'W, epibenthic sled, 993–1011 m, 11 Mar 1971 (2♂, 1 juvenile).

REMARKS.—The trunk of the Brazil male has more median and lateral process setae, and the 6th oviger segment does not have the small tuft of setae as illustrated by Stock (1975, fig. 27b). Otherwise this male is like Stock's figures, including the long 2nd coxa. Stock's (1975) fine review

of the Atlantic species of this genus leaves little doubt in making determinations of many of these seldom-figured species.

The Argentine juvenile has many long setae on the legs, longer than those figured for adults. Both male and female ovigers have characteristic 2nd and 4th segments approximately equal in length, and tibia 2 is slightly longer than the femur.

***Pallenopsis (Bathypallenopsis) tritonis* Hoek**

Pallenopsis tritonis Hoek, 1883:7-10, pl. I: figs. 1-6.

Pallenopsis (Bathypallenopsis) tritonis.—Stock, 1975:1032 [text].

MATERIAL EXAMINED.—Newfoundland Channel, W of Grand Banks: *Albatross*, sta 2470, 44°47'00"N, 56°33'45"W, trawl, 410 m, 4 Jul 1885 (1♂ with eggs).

North American Slope, S of New England: *Albatross*, sta 2581 or 2591, 39°43'N, 71°34'W or 38°53'N, 72°52'W, trawl, 720 or 344 m, 18 or 25 Sep 1885 (1♂ with eggs).

REMARKS.—These two specimens were recorded previously by Hedgpeth (1948:210) as *Pallenopsis longirostris*. I do not agree with Stock that Carpenter's (1905:4, pl. 1: figs. 1-6) *Pallenopsis holti* is Hoek's species. They are similar, but, unfortunately for purposes of comparison, Hoek's specimen is male, and Carpenter's is a female. There appear to be too many nonsexual differences for these two species to agree. Carpenter's figures of the dorsal trunk and anteriolateral trunk are somewhat stylized, but the proboscis of his specimen is much larger in diameter in relation to its length than that of Hoek's specimen. The propodal heel spines are longer and narrower than those of Hoek's specimen, and the main claw of Carpenter's specimen is much longer than that of Hoek's male. The fingers appear to be shorter in relation to the palm in Carpenter's figure (3) than the fingers of Hoek's specimen (1883, fig. 2).

The ocular tubercle of the *Albatross* specimens is different and less rounded than Carpenter's figure 2 of *P. holti* and agrees more with Hoek's

small figure 1. The strigilis, chela, and terminal leg segments of the *Albatross* specimens agree very well with Hoek's figures of these segments, and the longer styliform proboscis is nearly alike in both specimens and Hoek's figure (1). The appendage length ratios for each segment are nearly the same for the *Albatross* males and Hoek's figured male.

The distribution of this species is extended west from the Faroe Channel north of Scotland in 944 meters to waters off the Grand Banks and the North American Slope in 344 to 720 meters.

***Pallenopsis (Bathypallenopsis) tydemani*
caraibica Stock**

FIGURE 7h-k

Pallenopsis (Bathypallenopsis) tydemani Loman, 1908, *caraibica* Stock, 1975:1033-1036, figs. 31d, 32.

MATERIAL EXAMINED.—North American Basin: *Chain* cruise 50, sta 76(HH), 39°38.3'N, 67°57.8'W, epibenthic sled, 2862 m, 29 Jun 1965 (1♂ without legs).

West European Basin, SW of Ireland: *Chain* cruise 106, sta 313, 51°32.2'N, 12°35.9'W, epibenthic sled, 1500-1491 m, 17 Aug 1972 (1♀). *Chain* cruise 106, sta 323, 50°08.3'N, 13°53.7'W to 50°08.3'N, 13°50.9'W, epibenthic sled, 3356-3338 m, 21 Aug 1972 (1 juvenile).

REMARKS.—This is a very distinctive subspecies, and I find little difference between this female (from sta 313) and that figured by Stock. The setae on the tibiae are shorter in this specimen, and the 4th oviger segment is slightly longer and more inflated. The ocular tubercle is only a tiny flat bump with two lateral papillae and no eyes.

The male has remained unknown until this *Chain* record. The specimen is without legs, and so the femoral cement gland and other differences between it and the female leg cannot be discussed. I have included figures herein of the male trunk anterior and the oviger to emphasize the differences between it and the female. The main dif-

ferences in the trunk appear to be in the ocular tubercle, which in the male consists of two raised bulbous projections on which the sensory (?) papillae are placed. The 2nd scape segment is longer than that of the female and almost equal in length to the 1st segment. Both are more setose than those of the female.

The male oviger is larger and quite different in segment length ratios and resembles that of *Palenopsis* (*B.*) *tydemani tydemani*, as figured by Stock (1975:1033, fig. 31c). The 4th segment is not inflated like Loman's syntype, and the 2nd segment appears longer in Stock's subspecies. The strigilis has more setae, many of which are longer than Stock figured for Loman's syntype.

The juvenile specimen from *Chain* 323 is placed in this subspecies with some reservation. It is generally quite like the adult female but has a definite ocular tubercle, which is almost as tall as wide. This juvenile has larger propodal heel spines (2) but has ovigers of only two or three segments and of juvenile length, besides having no other sexual characters yet developed. The leg segments, in lengths and setae, resemble those of the adult female.

The subspecies was described from three females taken from waters off Florida and the Bahamas in 672 to 897 meters. The *Chain* specimens extend this geographic and depth range considerably to the north and into much deeper water. One can not help considering what part, if any, the Gulf Stream plays in the distribution of a large amount of fauna, including this pycnogonid. The deep countercurrents beneath parts of the Gulf Stream could refute the idea of transport of these deep-water specimens from Florida to New England and Ireland, but benthic invertebrate transport is a subject of such pure speculation, for the most part, that most reasonable conjectures are to be considered among the possibilities. Loman's species was captured off Japan and in Indonesia.

Family NYMPHONIDAE Wilson, 1878

Genus *Heteronymphon* Gordon, 1932

Heteronymphon ponsitor, new species

FIGURE 9

Nymphon sp. 1.—Stock, 1978a:212-214, fig. 9e-j.

MATERIAL EXAMINED.—North American Basin: *Chain* cruise 50, sta 76(HH), 39°38.3'N, 67°57.8'W, epibenthic sled, 2868 m, 29 Jun 1965 (1 legless ♂, 1 legless ♀, paratypes, USNM 181003). *Chain* cruise 58, sta 103G, 39°43.6'N, 70°37.4'W, epibenthic sled, 2022 m, 4 May 1966 (1♂ with eggs, holotype, USNM 181000; 1♂ with eggs, 1♂, paratypes, USNM 181001). *Atlantis II* cruise 30, sta 131, 39°38.5'N, 70°36.5'W, epibenthic sled, 2178 m, 18 Dec 1966 (2♀, 1 juvenile, paratypes, USNM 181002).

DESCRIPTION.—*Male*: Trunk fully segmented, without tubercles or setae. Lateral processes separated by 3 times their diameter distally, over twice as long as their diameter. Neck long, ovigers implanted anterior to and not touching 1st lateral processes. Ocular tubercle a low mound placed at anterior of neck, with 2 tiny lateral papillae and 2 large unpigmented eyes anteriorly. Posterior eyes lacking. Abdomen short, carried semi-erect, armed with 2 distal setae.

Proboscis a long slender oval tapering gradually to lips.

Chelifore scape slender, longer than proboscis, armed with few setae. Chela moderately short, palm as long as fingers, armed with several proximal setae and a fringe of longer setae around finger insertion. Fingers robust, not curved endally, each armed with 13 or 14 low serrate teeth of almost equal size.

Palp not as long as chelifore, 2nd and 3rd segments almost equal in length, terminal 2 segments armed with many setae equal to or longer than segment diameter. Terminal segment twice length of penultimate segment.

Oviger 5th segment longest, without distal apo-

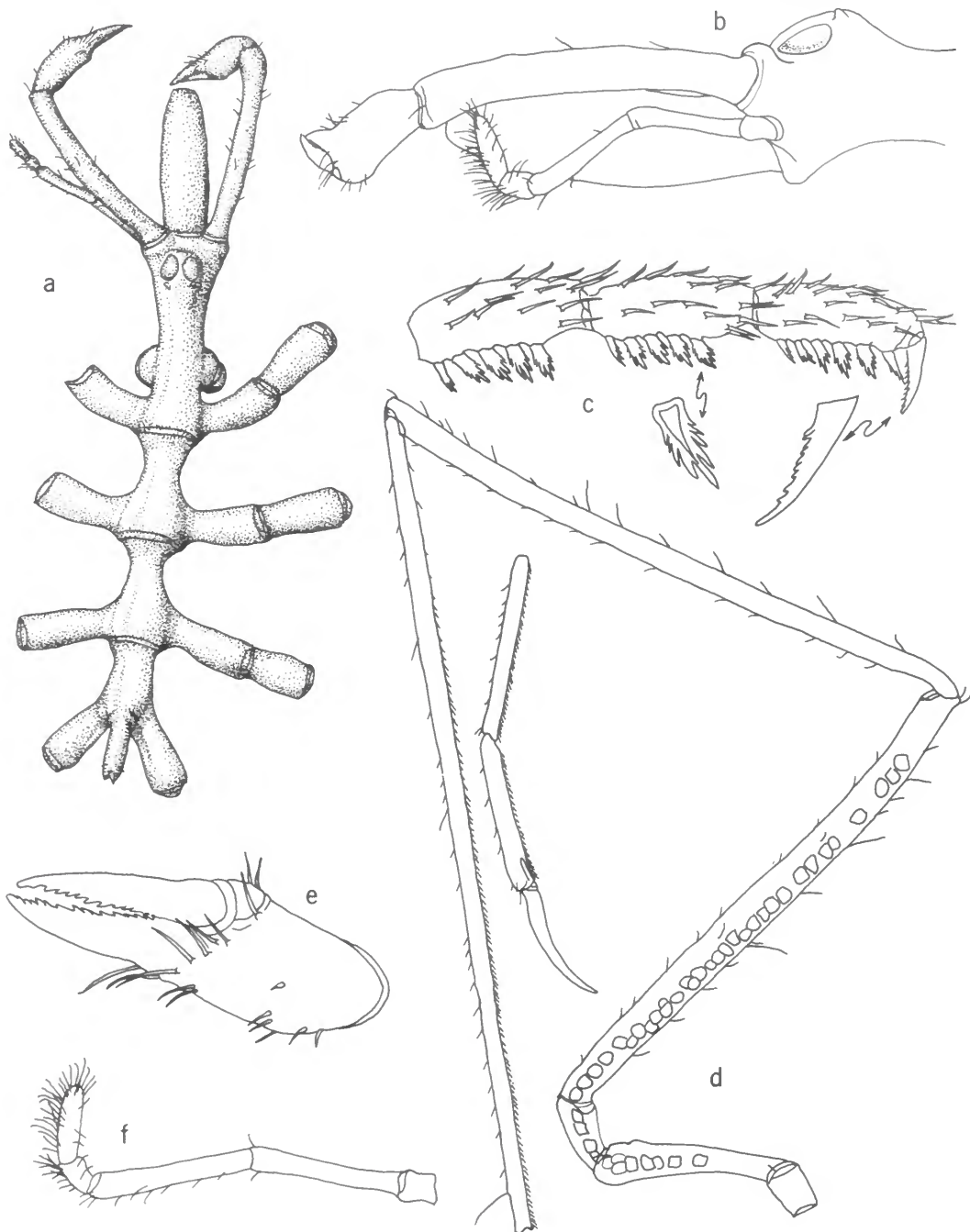


FIGURE 9.—*Heteronymphon ponsitor*, new species, holotype, male: *a*, trunk, dorsal view; *b*, trunk, anterior, lateral view; *c*, terminal segments of oviger, with enlargement of spine and claw; *e*, chela; *f*, palp. Paratype, female: *d*, 3rd leg.

physis. 4th segment 0.75 as long as 5th, with a small ectal apophysis toward proximal end. Strigilis heavily setose laterally and ectally, armed endally with denticulate spines in the formula 7:5:5:6. Denticulate spines broad, with 4 lateral serrations except proximal spine of each segment, which has 1 lateral serration. Terminal claw with 7 small endal serrations, the proximal one of which is largest and bifid. Claw short, only half as long as terminal segment.

Legs extremely long and slender, maximum leg span over 30 mm, armed with a row of tiny ventral setae increasing in number distally, and several longer dorsal setae per segment. 2nd tibia the longest segment with femur slightly shorter than tibia 1. Tarsus slightly longer than propodus, both straight, armed with row of tiny endal spines. Claw slender, 0.6 as long as propodus. Without auxiliary claws.

Female: With the characters of the male except for larger size, femur slightly larger in diameter when swollen with eggs from proximal end of coxa 2 to distal end of femur. Female oviger 5th segment shorter, and strigilis denticulate spine count is 7:6:6:6. Female propodal claw longer, and chela finger teeth reduced to low uneven bumps.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 2.82; trunk width (across 2nd lateral processes), 1.22; proboscis length, 0.88; abdomen length, 0.36; 3rd leg, coxa 1, 0.42; coxa 2, 1.51; coxa 3, 0.44; femur, 3.11; tibia 1, 3.84; tibia 2, 5.4; tarsus, 1.16; propodus, 0.98; claw, 0.6.

DISTRIBUTION.—Known from the type-locality, the North American Basin, in 2022 to 2862 meters and also from the West European Basin in 2360 meters.

ETYMOLOGY.—The species name is from the Latin *pons* (bridge) and the Latin suffix *-tor* (an agent or maker), meaning a bridge maker and pertaining to the characters of this species, which appear to bridge or reduce the differences between the genera *Heteronymphon* and *Nymphon*.

REMARKS.—Stock (1978a:212–214) pointed out the similarities and differences between this spe-

cies, which he did not name due to damaged material, and *Heteronymphon bioculatum*. He stated that the new species tended to bridge the gap between it and the genus *Nymphon*. The anterior placement of the ocular tubercle in front of the oviger insertion is the principal character used to differentiate *Nymphon* and *Heteronymphon*. The ocular tubercle of *Nymphon* species is at the posterior of the neck, whereas that of this new species is more in keeping with *Heteronymphon*. The other characters used to separate the genera are the 2nd palp segment length, short for *Heteronymphon* and long for *Nymphon*, and the reduction of strigilis claw size and teeth in *Heteronymphon*. The 2nd palp segment is equal to the 3rd in the new species, more like *Nymphon*, and the strigilis claw, although somewhat small, is nowhere near vestigial or absent as is found with some species of *Heteronymphon*. The latter two characters do tend to unite the two genera, but the forward placement of the ocular tubercle appears to me to be sufficient justification for maintaining the genus *Heteronymphon* separate from the great number of species in the genus *Nymphon* having posteriorly placed ocular tubercles.

Genus *Nymphon* Fabricius, 1794

Nymphon chainae, new species

FIGURE 10

Nymphon sp. 2.—Stock, 1978a:214.

MATERIAL EXAMINED.—West European Basin, SW of Ireland: *Chain* cruise 106, sta 313, 51°32.2'N, 12°35.9'W, epibenthic sled, 1500–1491 m, 17 Aug 1972 (1♂ holotype, USNM 181082; 47♂, ♀, juveniles, paratypes, USNM 181083).

Brazil Slope, off Recife: *Atlantis II* cruise 31, sta 169A, 08°03'S, 34°23'W, epibenthic sled, 587 m, 21 Feb 1967 (1♂, 2♀, 5 juveniles, paratypes, USNM 181084).

DESCRIPTION.—*Male:* Trunk very slender, tiny, fully segmented, without tubercles or large setae. Lateral processes glabrous, separated by at

least twice their diameter or more. Neck very long, almost 5 times longer than median diameter. Abdomen carried almost horizontally, reaching to distal end of coxa 1 of 4th legs. Ocular tubercle a low swelling anterior to oviger implantations, which touch 1st lateral processes. Ocular swelling with 2 small lateral papillae, without eyes.

Proboscis short, little more than twice its maximum diameter, slightly swollen at midlength, clothed in short tiny setae.

Chelifore scape slender, longer than proboscis, with many short ectal setae. Chela longer than scape, fingers longer than palm. Palm with many tiny double setae and several longer setae distally. Immobile finger with ectal swelling for 0.3 of its length, armed with increasingly longer setae distally on swelling, and from 15 to 17 long slender teeth. Movable finger without setae, armed with 18 to 21 slender curved teeth. Fingers cross at tips.

Palp slender, 2nd segment longest, 0.3 longer than 3rd, both armed with tiny short setae dorsally and longer setae ventrally. Terminal 2 segments of equal length, their combined length equal to 2nd segment, armed ventrally with setae longer than segment diameter.

Oviger 5th segment longest, slightly curved, clubbed distally, armed with row of short ectal setae. Strigilis segments armed with 1 distal seta each and endal denticulate spines, each with 4 lateral serrations, in the formula 6:4:4:5. Terminal claw as long as terminal segment, armed with 6 slender endal serrations.

Legs extremely slender, increasingly setose distally with setae mostly shorter than their segments. Coxa 2 4 times longer than coxa 1. Tibia 2 the longest segment, tibia 1 only slightly longer than femur. Cement gland or glands not found. Tarsus almost 0.2 longer than propodus, which is without major heel or sole spines. Both segments slightly curved, armed with row of short endal setae. Claw slender, moderately curved, almost as long as propodus. Auxiliary claws lacking.

Female: Larger in size. 5th oviger segment shorter, not clubbed distally. Femur as long or

longer than tibia 1, swollen proximally into large oval shape if ovigerous.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 2.47; cephalic segment length, 1.06; trunk width (across 2nd lateral processes), 0.86; proboscis length, 0.52; abdomen length, 0.26; 3rd leg, coxa 1, 0.26; coxa 2, 1.06; coxa 3, 0.3; femur, 1.9; tibia 1, 2.1; tibia 2, 2.81; tarsus, 0.82; propodus, 0.64; claw, 0.55.

DISTRIBUTION.—Known from the type-locality, the West European Basin, SW of Ireland in 1491 to 1500 meters, from the entrance to the English Channel in 1300 to 1550 meters, and from the Brazil Slope, off Recife, in 587 meters.

ETYMOLOGY.—This species is named for the Research Vessel *Chain* of the Woods Hole Oceanographic Institution, from which many of the specimens in this report were captured.

REMARKS.—Stock found what is apparently this species among the Centob collections and did not name the species, because all of his specimens lacked legs. Although Stock did not illustrate this species, his short description is sufficient to characterize it. The specimens described herein from the West European Basin are from slightly north and west of Stock's capture records, and like his specimens, all lack parts and appendages to some degree. The figures given herein for the holotype are of that specimen, except for the distal leg segments, which are from paratypes.

This new species is closely related to *Nymphon hedgpethi*, *N. profundum*, and *N. procerum*. It differs from *N. hedgpethi*, perhaps its closest relation, by not having extremely long lateral process setae and by having a shorter abdomen, longer tarsus and claw, a longer oviger 5th segment, and different denticulate spines. It differs from *N. procerum* by having oviger implantation at the posterior of a long neck, many less teeth on the chela fingers, longer tarsus and claw, and longer trunk segments. The palp segment ratios of the new species, tarsus and claw lengths, and chela finger teeth counts are different from *N. profundum*. The most distinguishing character of this new species

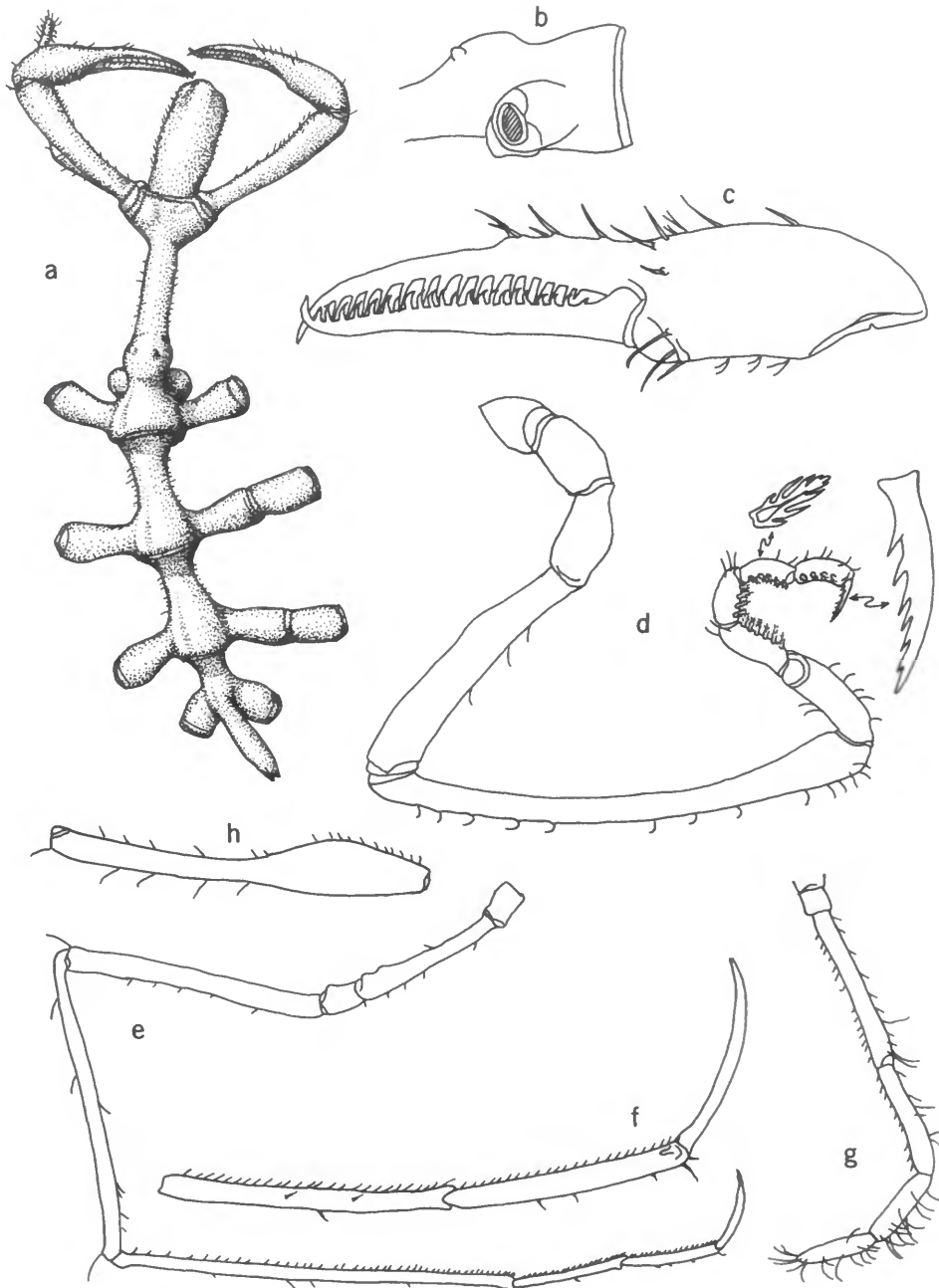


FIGURE 10.—*Nymphon chainae*, new species, holotype, male: *a*, trunk, dorsal view; *b*, trunk, posterior of ocular segment; *c*, chela; *d*, oviger, with enlargement of spine and claw; *e*, 3rd leg; *f*, terminal segments of 3rd leg; *g*, palp. Paratype, female: *h*, femur.

is the eyeless ocular swelling placed anterior to the large oviger implant bulges.

The Brazil Slope capture presents a distribution and depth anomaly. The specimens from European basins range from 1300 to 1500 meters, whereas the Brazil Slope specimens, almost identical to the others, were taken in 587 meters. This gap in distribution probably represents only our great lack of knowledge concerning small deep-water pycnogonids. Although there are new species appearing in most deep-water papers, the only genus that has a distribution at all well known is *Colossendeis*, with its very large and easily captured specimens. Many species even in this genus are known only from one or two records.

Nymphon discorsicoxae, new species

FIGURE 11

MATERIAL EXAMINED.—Brazil Slope, off Recife: *Atlantis II* cruise 31, sta 169A, 08°03'S, 34°23'W, epibenthic sled, 587 m, 21 Feb 1967 (1♂ holotype, USNM 181091; 1♂, 8 juveniles and larvae, paratypes, USNM 181092). *Atlantis II* cruise 31, sta 167, 07°58'S, 34°17'W, epibenthic sled, 943–1007 m, 20 Feb 1967 (1♀, 2 juveniles, paratypes, USNM 181093). *Atlantis II* cruise 31, sta 162A, 08°02'S, 34°03'W, epibenthic sled, 1493 m, 19 Feb 1967 (1♀, 1 larva, paratypes, USNM 181094).

DESCRIPTION.—*Male*: Animal slender, trunk fully segmented. Lateral processes glabrous, short, only slightly longer than their diameter, separated by twice their diameter or more. Neck of medium length. Ocular tubercle low, wider than tall, implanted over oviger bases, which touch 1st lateral processes. Eyes lacking, lateral papillae prominent. Abdomen rather short, carried obliquely, glabrous. Proboscis cylindrical, without swellings, tapering to flat lips.

Chelifores long, scape as long as proboscis, cylindrical, slightly curved inward. Chela as long as scape, curved. Palm rectangular, not so long as fingers, which are slender, cross at tips, and are armed with slender spinelike teeth: 27 on fixed

finger, 31 on movable finger. Palm with several short distal setae.

Palp with short distal segments having many distal setae, some longer than segment diameter. Length ratios of palp from base segment to tip: 1:5.8:2.6:1.4:1.8.

Oviger quite long, 5th segment longest, gently curved, slightly clubbed distally, armed with endal row of short setae. 4th segment 0.7 as long as 5th, with a conical hump proximally on endal surface. Strigilis strong, segments diminishing in size distally, armed with denticulate spines, proximally with 3 or 5 denticulations and distally with 7, arranged in a single row numbering 5:4:2:3, and with a serrate claw as long as the terminal segment having 5 slender serrations endally.

Legs slender, with few setae except some increasing in numbers distally on tibia 2 dorsal and ventral surfaces. 2nd tibia the longest segment, 0.3 longer than tibia 1. Femur slightly shorter than tibia 1, with 3 ventral cement glands on anterior 4 legs, 3 or 4 glands on 3rd pair of legs, and 4 glands on posterior pair. Cement glands open pores on low truncated cones or flat-topped bumps. Coxa 2 varies in length from anterior to posterior legs. Length on 1st pair of legs only 0.7 length of coxa 2 on 4 posterior legs. Coxa 2 of 2nd pair of legs slightly longer than those of 1st pair. Tarsus short, slightly conical, truncated. Propodus almost straight, without heel, with 3 heel spines, the 1st half as large as distal pair. Sole with 4 short swollen spines, 2 distal setae and several lateral setae. Claw robust, strongly curved proximally, with auxiliary claws 0.4 of main claw length.

Female: Slightly larger in all measurements. Oviger much shorter, only 0.6 the length of male oviger. 2nd coxae on all legs approximately equal in length. Denticulate spines of strigilis numbering 6:4:3:4, with 6 serrations on claw. Propodus slightly longer, armed with 6 or 7 simple sole spines.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 2.43; trunk width (across 2nd lateral pro-

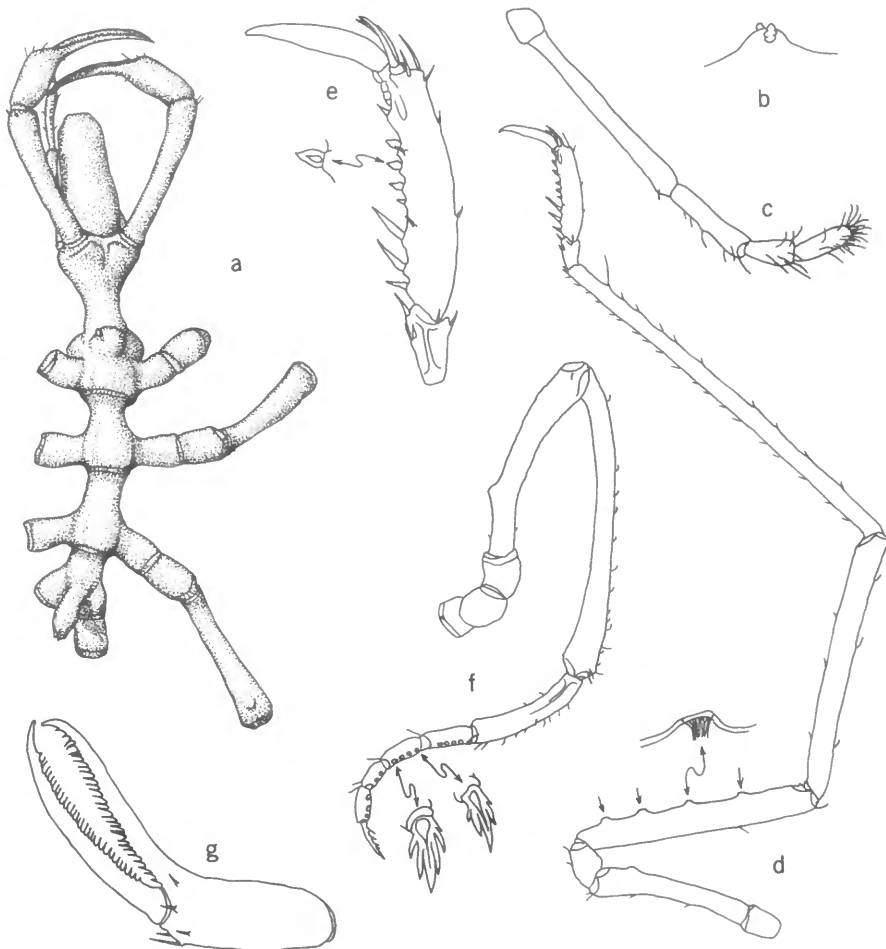


FIGURE 11.—*Nymphon discorsicoxae*, new species, holotype, male: *a*, trunk, dorsal view; *b*, ocular tubercle, lateral view from right; *c*, palp; *d*, 3rd leg, with enlargement of cement gland; *e*, terminal segments of 3rd leg, with enlargement of spine; *f*, oviger, with 2 spines enlarged; *g*, chela.

esses), 0.86; proboscis length, 0.92; abdomen length, 0.32; 1st leg, coxa 2, 0.75; 4th leg, coxa 1, 0.28; coxa 2, 1.1; coxa 3, 0.33; femur, 1.67; tibia 1, 1.91; tibia 2, 2.81; tarsus, 0.24; propodus, 0.69; claw, 0.42.

DISTRIBUTION.—Known only from the type-locality, the Brazilian Slope off Recife, in 587 to 1493 meters.

ETYMOLOGY.—From the Latin *discors* (unlike or different) and *coxae*, pertaining to the unequal lengths of the 2nd coxae of the male.

REMARKS.—The increasing lengths of the 2nd coxae and the additional cement glands on the posterior four legs of the male suggest an increase in “maleness” for the posterior half of this new species. As far as I can ascertain from the literature, this posterior “gain” is not recorded for any known species of *Nymphon*. The cement glands of most species of *Nymphon* are not known, or at least are not recorded, but for those that are, the glands are usually multiple small pores without tubercles on the ventral femur. Several exceptions exist,

however, and some have a single tube of varying length, the most spectacular of which is probably *N. tubiferum*. This species has a very long ventrodistal tube over half as long as the femur. I can find no reference to a species with glands opening through several low mounds along the length of the femur.

Most of the other characters of this new species, except for the lack of eyes, are fairly common among approximately 180 known species. The coxa length variability, blindness, and cement gland mounds characters appear sufficient to separate this species from all others among the *Nymphon* hordes.

Nymphon hadale, new species

FIGURE 12

MATERIAL EXAMINED.—Argentine Basin: *Atlantis II* cruise 60, sta 252, 38°29.8'S, 52°09.1'W, epibenthic sled, 4435 m, 22 Mar 1971 (1♂, holotype, USNM 181080; 1♀, 1 juvenile, 1 larva, paratypes, USNM 181081). *Vema* cruise 17, sta 80, 43°58'S, 52°09.1'W, trawl, 5781 m, 26 May 1961 (1♀, paratype, USNM 184021).

DESCRIPTION.—*Male*: Trunk completely segmented, without tubercles, glabrous. Lateral processes separated by their own diameter or less, less than twice as long as their diameters. Neck moderately long with ovigers implanted slightly posterior to midpoint, well anterior to 1st lateral processes. Ocular tubercle a slight swelling between oviger implantation and 1st lateral processes. Eyes lacking. Lateral papillae present, small, difficult to distinguish. Abdomen short, reaching only slightly beyond 4th lateral processes, glabrous.

Proboscis cylindrical, rounded distally.

Chelifores large, almost glabrous. Scape cylindrical, as long as proboscis. Chela large, fingers slender, longer than palm, placed anaxially, armed with more than 50 slender teeth on immovable finger (tip broken off) and about 80 similar teeth on movable finger. Fingers moderately curved, tips do not overlap.

Palps fairly short, first 3 segments only slightly longer than proboscis length. 2nd and 3rd segments equal, 5th slightly longer than 4th, both terminal segments with many short setae.

Oviger with 5th segment longest, slightly clubbed distally. 4th segment curved, with endal swelling at 0.3 of its length. Strigilis strong, armed with denticulate spines having 3 or 4 lateral serrations, in the formula 9:8:8:?, with the terminal segment and claw missing.

Legs long, slender, increasingly setose distally. 2nd tibia the longest segment, with 1st tibia slightly shorter, and the femur the shortest of the major segments. Femoral cement glands circular groupings of tiny pores on 2 or more areas of ventral femur. Tarsus slightly less than half propodal length. Propodus curved, without heel or large heel spines, armed with single row of 15 to 17 sole spines. Claw robust, curved, slightly shorter than tarsus. Auxiliary claws absent.

Female: Larger in all measurements except oviger. Neck slightly shorter. Oviger smaller, 4th segment almost straight, with large endal tubercle at 0.25 its length proximally. Strigilis armed with denticulate spines in the formula 10:6:7:6, with terminal claw longer than terminal segment, armed with 12 serrate endal teeth. Genital pores on all 4 2nd coxae ventrally.

MEASUREMENTS OF HOLOTYPE (unless otherwise specified) (mm).—Cephalic segment, 3.28; posterior 3 trunk segments, 3.24; trunk width (across 2nd lateral processes), 2.76; proboscis length, 2.94; abdomen length, 0.9; 1st leg, coxa 1, 0.88; coxa 2, 1.64; coxa 3, 1.04; femur, 4.68; tibia 1, 5.57; tibia 2, 5.88; distal leg segments of female paratype: tarsus, 0.78; propodus, 1.64; claw, 0.68.

DISTRIBUTION.—Known only from the Argentine Basin in 4435 to 5781 meters.

ETYMOLOGY.—This proposed species is named for the deepest zones of the ocean, called "hadal," a name coined by Dr. Anton Bruun. This species was taken at almost the upper limit of this zone, which begins at 6000 meters.

REMARKS.—This species belongs to a small group of blind deep-sea *Nymphon* specimens that lack auxiliary claws. Some of these species are

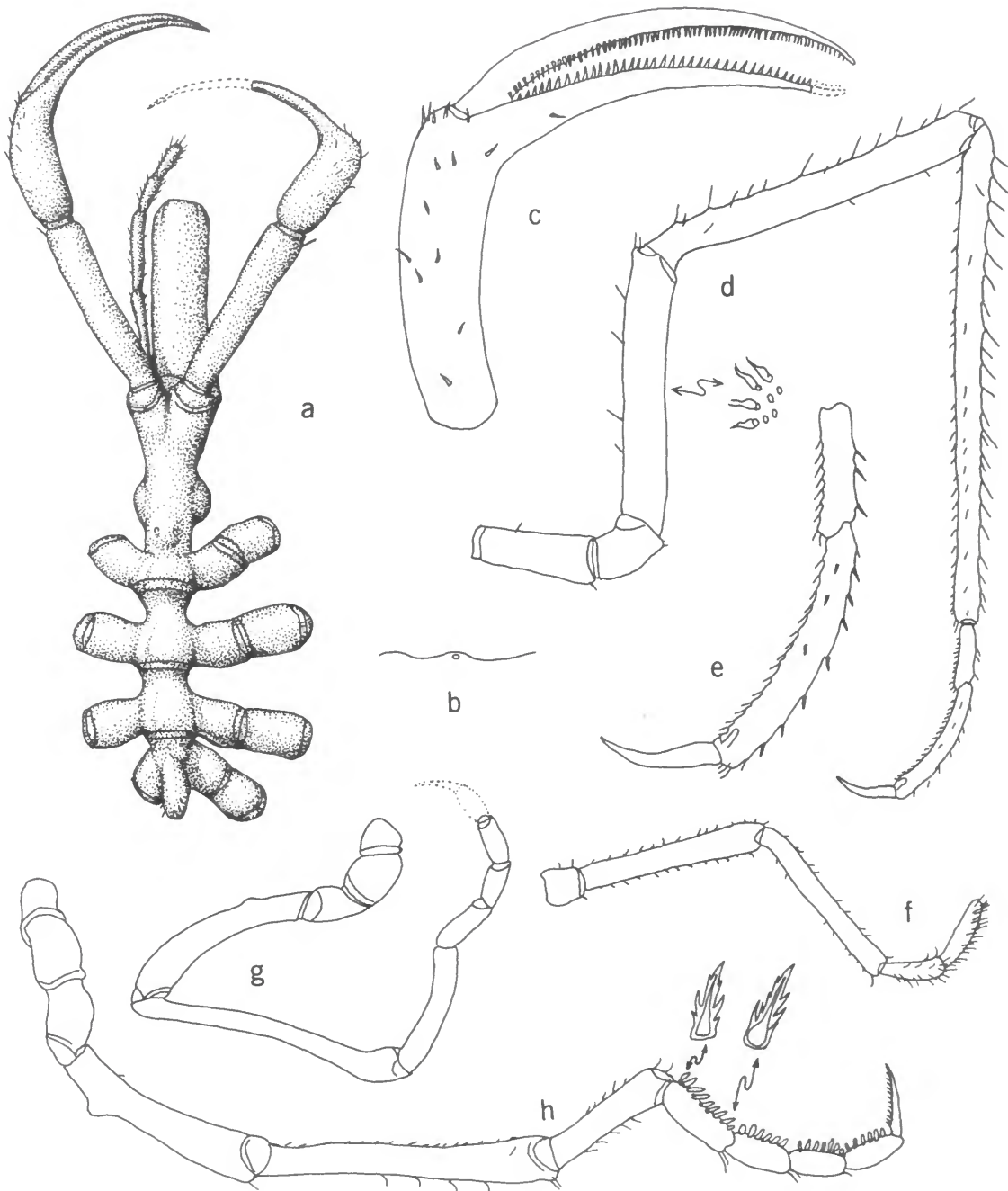


FIGURE 12.—*Nymphon hadale*, new species, holotype, male: *a*, trunk, dorsal view; *b*, ocular tubercle, lateral view from right; *c*, chela; *d*, 3rd leg, with enlargement of cement glands; *e*, terminal segments of 3rd leg; *f*, palp; *g*, oviger. Paratype, female: *h*, oviger, with enlargement of 2 denticulate spines.

discussed elsewhere in this report. The blind abyssal species without auxiliaries are: *N. chainae*, *N. hamatum*, *N. procerum*, *N. profundum*, *N. galathea*, *N. femorale*, *N. laterospinum*, *N. abyssale*, *N. tenuimanum*, *N. primacoxa*, *N. residuum*, *N. tubiferum*, *N. hedgpethi*, *N. compactum*, *N. spicatum*, *N. typhlops*, and *N. hadale*. All but the last four species have lateral processes separated by distances greater than their diameters. Of the last four species, all have very different tarsus-propodus-claw length ratios. For *N. compactum*, the ratio is 1:0.6:0.6, for *N. typhlops*, the ratios are approximately 1:0.7:0.7, for *N. spicatum*, they are 1:1:0.4, and for *N. hadale*, they are 1:2:0.9. The new species differs from these last three species also in having a much longer neck and an almost glabrous trunk and in lacking an ocular tubercle except as evidenced by a slight swelling. No other blind uninguiculate species has relatively compactly placed lateral processes in combination with a long neck and oviger implanted at midpoint along its length.

Nymphon hamptoni, new species

FIGURE 13

MATERIAL EXAMINED.—Argentine Basin, off Rio de la Plata: *Atlantis II* cruise 60, sta 237, 36°32.6'S, 53°23.0'W, epibenthic sled, 993–1011 m, 11 Mar 1971 (1♂, holotype, USNM 181986; 13♂, 12♀, 131 juveniles and larvae, paratypes, USNM 181987). *Atlantis II* cruise 60, sta 240, 36°53.4'S, 53°10.2'W, epibenthic sled, 2195–2323 m, 12 Mar 1971 (8♂, 26♀, 43 juveniles and larvae, paratypes, USNM 181988).

DESCRIPTION.—*Male*: Trunk completely segmented, without tubercles. Lateral processes separated by distances greater than their diameters distally, shorter than twice their diameters, armed with 2 dorsodistal spines, each slightly longer than segment diameter. Neck very short with oviger implantations touching 1st lateral processes. Ocular tubercle a low truncated cone with 2 anteriolateral papillae, without trace of eyes. Abdomen long, extending 0.5 length of coxae 2 of 4th lateral processes, armed with 4 lateral setae.

Proboscis cylindrical, slightly narrowed proximally, with constriction just posterior to tip.

Chelifore scape cylindrical, as long as proboscis, armed dorsally with 5 spines longer than segment diameter and 2 or 3 short lateral setae. Chela long, slender, fingers longer than palm, curved to overlap at tips, armed with 35 teeth on immovable finger and 37 teeth on movable finger. Teeth slender, sharply pointed, of 2 distinct sizes.

Palps moderately short. 1st segment not so long as wide, 2nd segment slightly longer than 3rd, 4th barely longer than 5th. First 3 segments equal to proboscis length. All but 1st segment armed with setae increasingly dense distally.

Oviger first 4 segments cylindrical, 5th and 6th segments inflated, 5th the longest segment. The longest segments armed with lateral and ventral setae. Strigilis reduced in size in relation to proximal segments, armed with dorsal and lateral setae and ventral denticulate spines with 4 or 5 serrations per edge, in the formula 7:5:5:7. Terminal claw slightly over half length of terminal segment, very slightly curved, armed with 8 teeth.

Legs long, slender, increasingly setose distally. 1st and 2nd coxae with 2 or 3 dorsolateral spines equal in length to segment diameter. 3rd coxae with ventrodorsal fringe of setae. 1st tibia the longest segment with tibia 2 only slightly shorter. Most major dorsal and lateral leg spines longer than diameter of leg segments. Femur with 5 cement glands, each on slight ventral bulge. Propodus only 0.75 as long as tarsus. Both slender, straight, armed with short dorsal and lateral setae and row of short sole spines of equal size. Terminal claw slender, approximately 0.6 as long as propodus, slightly curved. Auxiliary claws minute, only as long as basal diameter of main claw.

Female: Larger in all measurements than male except oviger, which is shorter, with 5th and 6th segments curved but not inflated. 1 or 2 more denticulate spines per segment on strigilis. Genital pores on all 2nd coxae ventrally.

MEASUREMENTS OF HOLOTYPE (mm).—Cephalic segment, 1.31; posterior 3 trunk segments, 1.8; trunk width (across 2nd lateral processes), 1.7; proboscis length, 1.38; abdomen length, 0.94;

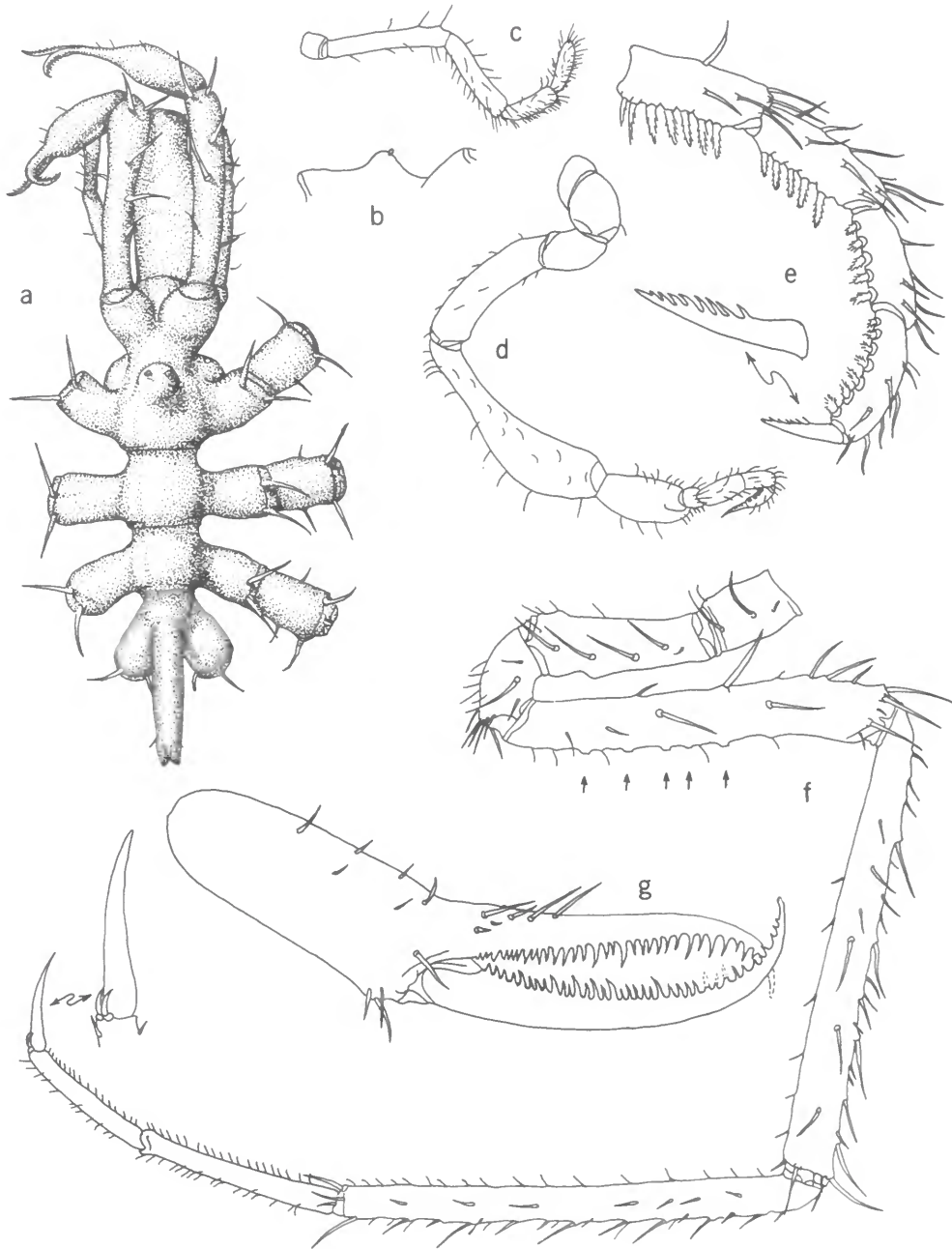


FIGURE 13.—*Nymphon hampsoni*, new species, holotype, male: *a*, trunk, dorsal view; *b*, ocular tubercle, lateral view from right; *c*, palp; *d*, oviger; *e*, oviger, terminal segments, with enlargement of claw; *f*, 3rd leg, with arrows pointing to cement glands, and, distally, an enlargement of terminal claws; *g*, chela.

3rd leg, coxa 1, 0.61; coxa 2, 1.09; coxa 3, 0.7; femur, 2.36; tibia 1, 2.99; tibia 2, 2.88; tarsus, 1.28; propodus, 0.95; claw, 0.6.

DISTRIBUTION.—Known only from the Argentine Basin, off the Rio de la Plata, in 993 to 2323 meters.

ETYMOLOGY.—The proposed name for this new species recognizes the efforts of George R. Hampson of the Woods Hole Oceanographic Institution in assembling and depositing this large collection of pycnogonids with the National Museum of Natural History and for a pleasant correspondence concerning details of the collection.

REMARKS.—This species belongs to Gordon's (1932b:27; 1944:18) group II of the genus *Nymphon*, in which the 5th oviger segment is expanded or inflated. Sometimes the 6th segment shows the same characteristic. Of the relatively compact species in this group, the characters of the new species are closest to *N. australe*. It agrees with *N. australe* in having oviger segments 5 and 6 inflated, vestigial auxiliary claws, distal lateral process spines, reduced strigilis size, and palp segments of approximately the same lengths. It differs from *N. australe* in the ocular tubercle, which is very short or low and without eyes, in lack of a conspicuous proximal pad on the immovable chela finger, legs with notably fewer long setae, a shorter strigilis claw, and the presence of only five cement gland pores instead of the 16 to 18 encountered on the femorae of *N. australe*. Hodgson's species has been shown in numerous cases to be variable, and at least two subspecies have been described (Hodgson, 1907:35, 36, pl. 4: fig. 4, pl. 10: fig. 15; Gordon, 1944:25–27, fig. 5a–d). There is great variation in the relative lengths of leg and palp segments and number of setae on these appendages, but the critical difference between this new species and *N. australe* is the diagnostic character (when available) of cement gland numbers. This character varies little in most pycnogonids where these glands are discernible, and the five glands of the new species are well short of the known range of 16 to 18 glands for *N. australe*.

Nymphon inerme Fage

Nymphon inerme Fage, 1956:163, 164, figs. 8–10.—Stock, 1971: 25, 26, tbl. 1, figs. 2–9.

MATERIAL EXAMINED.—Argentine Basin, off Rio de la Plata: *Atlantis II* cruise 60, sta 243, 37°36.8'S, 52°23.6'W, epibenthic sled, 3815–3822 m, 14 Mar 1971 (1♂, 2♀, 6 juveniles).

REMARKS.—Fage described this species from a single female, and Stock added figures of the male. The appendages have several characters that are not typical of the usual *Nymphon*. The palp is very distinctive with two very short terminal segments, together measuring less than the length of the 3rd segment. The simple strigilis spines are almost unique in a genus where these spines are almost always denticulate with variously serrated edges. The 5th oviger segment is quite long and distally club shaped.

There are differences between the Argentine male specimen and the male figured by Stock. The chela fingers of the Argentine male have 12 teeth on the immovable finger and 19 on the movable finger, whereas the count for Stock's male is 10 and 13 respectively. The auxiliary claws of the above specimens, both male and female, are about half as long as those figured by Stock (1971, fig. 4) and slightly shorter than those of the type (Fage, 1956:164, fig. 10). The strigilis spine count differs from both of those in the literature. With the above male, it is 3:3:2:3, with six slender teeth on the claw.

This rarely reported species is possibly just rarely captured, rather than rare in its range, due to the scarcity of deep-sea collections. It has been taken in the Kermadec Trench of the Pacific at 4410 meters (Fage's type), in the Labrador Sea in 3610 meters, and south of the Azores in 3663 meters in the Atlantic (Stock's specimens). These *Atlantis II* specimens place it in the South Atlantic for the first time but well within its known depth range.

Nymphon laterospinum Stock

Nymphon laterospinum Stock, 1963:322, 323, fig. 1; 1978a:211, 212, fig. 9a–d.

MATERIAL EXAMINED.—North American Basin: *Chain* cruise 50, sta 85(II), 37°59.2'N, 69°26.2'W,

epibenthic sled, 3834 m, 5 Jul 1965 (20 specimens).

Newfoundland Basin: *Chain* cruise 106, sta 334, 40°44.0'N, 46°14.6'W, epibenthic sled, 4400 m, 30 Aug 1972 (1 juvenile).

West European Basin, SW of Ireland: *Chain* cruise 106, sta 330c, 50°43.5'N, 17°51.7'W, epibenthic sled, 4632 m, 24 Aug 1972 (1 juvenile).

Argentine Basin, off Rio de la Plata: *Atlantis II* cruise 60, sta 246, 37°15.1'S, 52°45.0'W, epibenthic sled, 3343 m, 15 Mar 1971 (6♂, 12♀, 16 juveniles and larvae).

REMARKS.—This species appears to be rather common in North and South Atlantic basins, on both sides of the Mid-Atlantic Ridge. Stock's records are for captures in the Cape Basin off South Africa and in the West European Basin in the Bay of Biscay, from 1894 to 4715 meters.

This species is quite characteristic in an often difficult genus with over 175 described species. There are minor variations in the size of the lateral process tubercles, but the spikelike appearance of these tubercles, plus the low ocular mound without eyes and the lack of auxiliary claws, serve to distinguish this species from all others known of the genus.

Nymphon longicoxa Hoek

Nymphon longicoxa Hoek, 1881:38, 39, pl. 2: figs. 1–5, pl. 15: figs. 8, 9.—Gordon, 1932a:106–109, figs. 7a–c, 8a.—Turpaeva, 1974:281, 282 [literature].—Zharkova, 1976:241–243, fig. 1.

MATERIAL EXAMINED.—Argentine Basin, off Rio de la Plata: *Atlantis II* cruise 60, sta 240, 36°53.4'S, 53°10.2'W, epibenthic sled, 2195–2323 m, 12 Mar 1971 (4♂ with eggs, 12♂, 29♀, 135 juveniles and larvae). *Atlantis II* cruise 60, sta 262A, 36°05.2'S, 52°17.9'W, epibenthic sled, 2440–2480 m, 27 Mar 1971 (1♀, 1 juvenile). *Atlantis II* cruise 60, sta 264A, 36°12.7'S, 52°42.7'W, epibenthic sled, 2041–2048 m, 28 Mar 1971 (1♀).

REMARKS.—Almost all of the adult specimens are missing most or all legs, and there are few complete legs among the 47 adults. The 2nd tibia and coxa 2 of this species are characteristically

long and slender. The movable finger of the chela has an extended tip, which lacks teeth, and in some of the adults above, it assumes the curled shape of a pig's tail.

The oviger is also characteristic with a long 5th segment in the male, which distally "describes an elegant curve" (Hoek, 1881:38).

This species is another denizen of cold southern oceans. It has been captured southeast of New Zealand, off the Antarctic coasts, and in the Scotia Sea in depths as shallow as 318 meters to depths of 2578 meters. The *Atlantis II* records extend this distribution further north into the Argentine Basin but fall well within the known depth range for the species.

Nymphon longitarse Krøyer

Nymphon longitarse Krøyer, 1844:112.—Hedgpeth, 1948:190, fig. 13b [literature].

MATERIAL EXAMINED.—North American Slope: *Knorr* cruise 35, sta 346, 39°54.1'N, 70°10.7'W, epibenthic sled, 457 m, 3 Dec 1973 (3♂, 3♀, 23 juveniles).

REMARKS.—This record is very near the *Albatross* record cited by Hedgpeth (1948:190), south of Cape Cod, Massachusetts. Its usual distribution is further north, where it has a circumpolar boreal distribution.

Nymphon macrum Wilson

Nymphon macrum Wilson, 1880:487–489, pl. 4: figs. 21–23.—Hedgpeth, 1948:193–195, figs. 13d, 15 [early literature]; 1949:248.—Nesis, 1960:145, 146.—Hedgpeth, 1963:1332.

MATERIAL EXAMINED.—Labrador Sea, off Greenland: *Vema* cruise 16, sta 48, 60°10'N, 47°08'W, trawl, 300 m, 21 Aug 1960 (3♀).

North American Basin: *Atlantis II* cruise 12, sta 73, 39°46.5'N, 70°43.3'W, epibenthic sled, 1470–1330 m, 25 Aug 1964 (10 specimens).

Murray Basin, Gulf of Maine: *Verrill* cruise 67–53, sta 5, 42°29.5'N, 69°48.9'W, epibenthic sled, 239 m, 31 Jul 1967 (1 juvenile).

REMARKS.—Hedgpeth (1948:193, 194, fig. 15h–

k) records a Florida form of this species that differs sufficiently from the type to warrant separation as a new species, but greater numbers of specimens from northern and southern localities should be examined before these differences can be called something besides variation. Hedgpeth's "northern form" is distributed from Cape Hatteras to Greenland and northern Europe and is also found in the Bering Sea of the North Pacific. Its depth records are from less than 100 meters to almost 1700 meters.

Nymphon procerum Hoek

Nymphon procerum Hoek, 1881:39, pl. 2: figs. 9-12.—Bouvier, 1913:72 [key].—Loman, 1923:14 [key].—Gordon, 1932a:112, 113, fig. 9a; 1932b:34 [key]; 1944:19 [key].—Fage, 1951:95-97, figs. 1, 2.—Stock, 1965:22 [list].—Turpaeva, 1971:276, 277, fig. 2; 1973:178; 1974:281.

MATERIAL EXAMINED.—West European Basin, SW of Ireland: *Chain* cruise 106, sta 328, 50°04.7'N, 15°44.8'W, epibenthic sled, 4426-4435 m, 23 Aug 1972 (1♀ ovigerous, 1 juvenile).

REMARKS.—I do not agree with Turpaeva (1973:178) in placing *Nymphon profundum* (= *N. noctum*) in synonymy with Hoek's species. Hedgpeth (1949:270, fig. 33a-f) figured the characters of *N. profundum* quite well, and there are differences between every character he figured and the corresponding characters of Hoek's type and this female. In *N. profundum*, the terminal palp segment is longer than the 4th segment, whereas it is shorter in the *Chain* female. The tarsus is almost as long as the propodus, but it is much shorter in the above female. The chela fingers are less curved, the strigilis claw has only eight teeth, and the denticulate spines have only two lateral serrations, whereas in *N. procerum*, the fingers are curved distally to almost 90 degrees, the strigilis claw has about 20 teeth, and the denticulate spines have three serrations per side. These differences are not quite as marked in Hoek's figures, except for the many strigilis claw teeth and the serrations of the denticulate spines. Hoek's female specimen shows marked curvature of the finger tips, but not as much as the *Chain* female, and the tarsus is slightly longer with Hoek's specimen.

This species has been taken from the North and South Pacific and the North and South Atlantic in 2450 to 6135 meters.

Nymphon sandersi, new species

FIGURE 14

MATERIAL EXAMINED.—Argentine Basin, off Rio de la Plata: *Atlantis II* cruise 60, sta 243, 37°36.8'S, 52°23.6'W, epibenthic sled, 3815-3822 m, 14 Mar 1971 (1♀, holotype, USNM 181989; 1♀, paratype, USNM 181990). *Atlantis II* cruise 60, sta 252, 38°29.8'S, 52°09.1'W, epibenthic sled, 4435 m, 22 Mar 1971 (1♀, paratype, USNM 181991).

DESCRIPTION.—*Female* (male unknown): Trunk fully articulated, glabrous. Lateral processes separated by distances slightly greater than their diameters, as long as 1.5 times their diameters, without tubercles or setae. Neck moderately long, ovigers implanted at its posterior, touching 1st lateral processes. Ocular tubercle a slender cone as tall as neck diameter over which it is placed, without visible lateral papillae, with 2 small tubercles at apex of cone. Eyes lacking. Abdomen short, reaching to distal ends of 4th lateral processes, without setae.

Proboscis cylindrical, as long as cephalic segment, lips rounded.

Cheliferes large, scape as long as proboscis, slightly curved, with few distal setae. Chela slender, palm with lateral and dorsal setae and a fringe of setae at base of immovable finger. Fingers slightly curved, armed with 18 slender teeth on immovable finger, 17 teeth on movable finger. Teeth of equal size. Fingertips overlap when closed.

Palp fairly short, 2nd and 3rd segments equal in length, their combined length less than length of proboscis. 4th segment little shorter than 5th, both armed with many short setae.

Oviger moderately long, 4th and 5th segments almost equal in length, 5th with few ventrodiscal setae. 6th segment 0.6 as long as 5th, armed with row of short ventral setae. Strigilis with few setae,

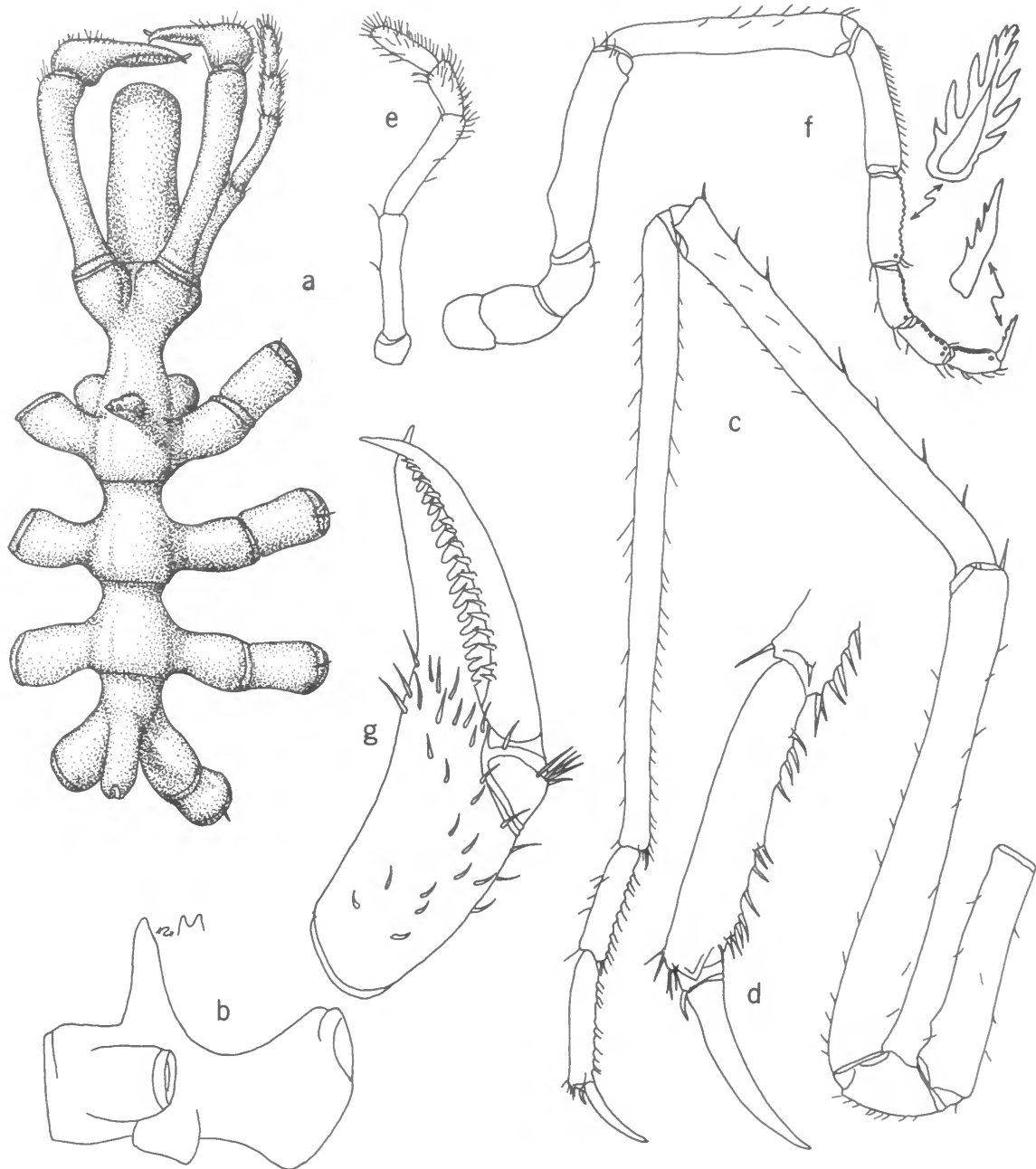


FIGURE 14.—*Nymphon sandersi*, new species, holotype, female: *a*, trunk, dorsal view; *b*, ocular segment, lateral view from right, with ocular tubercle tip in anterior view; *c*, 3rd leg; *d*, terminal segments of 3rd leg; *e*, palp; *f*, oviger, with enlargements of denticulate spine and claw; *g*, chela.

with denticulate spines having 5 serrations per edge, in the formula 13:7:7:8, with terminal claw shorter than terminal segment, armed with 3 endal teeth.

3rd leg slender, moderately long, tibia 2 the longest segment, slightly longer than tibia 1. Major leg segments armed with few short dorsal and ventral setae. Tarsus almost 0.75 as long as propodus, armed with few dorsal setae and row of short ventral spines. Propodus armed with row of short ventral spines and several dorsodistal setae. Claw robust, slightly over half propodal length. Auxiliary claws tiny, not so long as basal diameter of main claw.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 4.46; trunk width (across 2nd lateral processes), 1.97; ocular tubercle length, 0.68; proboscis length, 1.76; abdomen length, 0.85; 3rd leg, coxa 1, 0.69; coxa 2, 1.92; coxa 3, 0.78; femur, 3.64; tibia 1, 3.74; tibia 2, 4.03; tarsus, 0.9; propodus, 1.24; claw, 0.68.

DISTRIBUTION.—Known only from the type-locality, the Argentine Basin, off Rio de la Plata, in 3815 to 4435 meters.

ETYMOLOGY.—This proposed species is named for Dr. Howard L. Sanders, principal investigator for the Woods Hole Deep-Sea Project, who graciously provided me with the opportunity to examine the pycnogonids collected by vessels used for the project.

REMARKS.—This large blind species has a combination of characters unlike any other known *Nymphon* species, although it is perhaps closest to *N. longicollum*. The ratio of leg segments, with the 2nd tibia being the longest leg segment, the tiny auxiliary claws, the shorter neck, and the very different palp segment length ratios separate this new species readily from *N. longicollum* and all other blind species. The tall ocular tubercle is a very good diagnostic character for this species, as its length, shape, and lack of eyes are present in no other known species to my knowledge.

Nymphon spicatum, new species

FIGURE 15

MATERIAL EXAMINED.—Argentine Basin, off Rio de la Plata: *Atlantis II* cruise 60, sta 243, 37°36.8'S, 52°23.6'W, epibenthic sled, 3815–3822 m, 14 Mar 1971 (1 ♀, holotype, USNM 181047).

DESCRIPTION.—Trunk compact, robust, 1st through 3rd segments articulated, 3rd and 4th fused. 1st and 2nd trunk segments with 2 stout median dorsal spines or spikes, 3rd trunk segment with 2 tiny papillae in same place. Lateral processes separated by less than half their diameter to almost touching, little longer than their diameter, armed with 2 dorsodistal spines and 1 anteriolateral seta. Neck very short with oviger implantation below and partly anterior to 1st lateral processes. Cephalic segment armed with 2 short spines dorsally at chelifore insertions. Ocular tubercle a short truncated cone placed at anterior line of 1st lateral processes, without eyes or visible papillae. Abdomen long, inflated, reaching well beyond 1st coxae of 4th lateral processes, armed with distal setae.

Proboscis fairly short, swollen, lips rounded, without constrictions.

Chelifores robust, scape curved, slightly longer than 3 times its maximum diameter, armed with 3 or 4 dorsal short spikes. Chela as long as scape, palm rectangular, armed with many tiny double setae. Fingers curved, overlap at tips, armed with many double setae, several larger single setae, 16 curved teeth on immovable finger and 18 straight teeth on the movable finger.

Palp short, 2nd segment almost twice length of 3rd, 4th and 5th segments only 0.6 length of 3rd segment. All segments armed with many tiny double setae and several dorsal and ventral setae longer than segment diameter. Terminal 2 segments with distal tufts of setae.

Oviger short, 4th and 5th segments equal in length, all segments armed with tiny double setae and several longer setae. Strigilis with denticulate spines having 2 lobes per side, arranged in the single row formula 3:2:2:3, with a claw longer

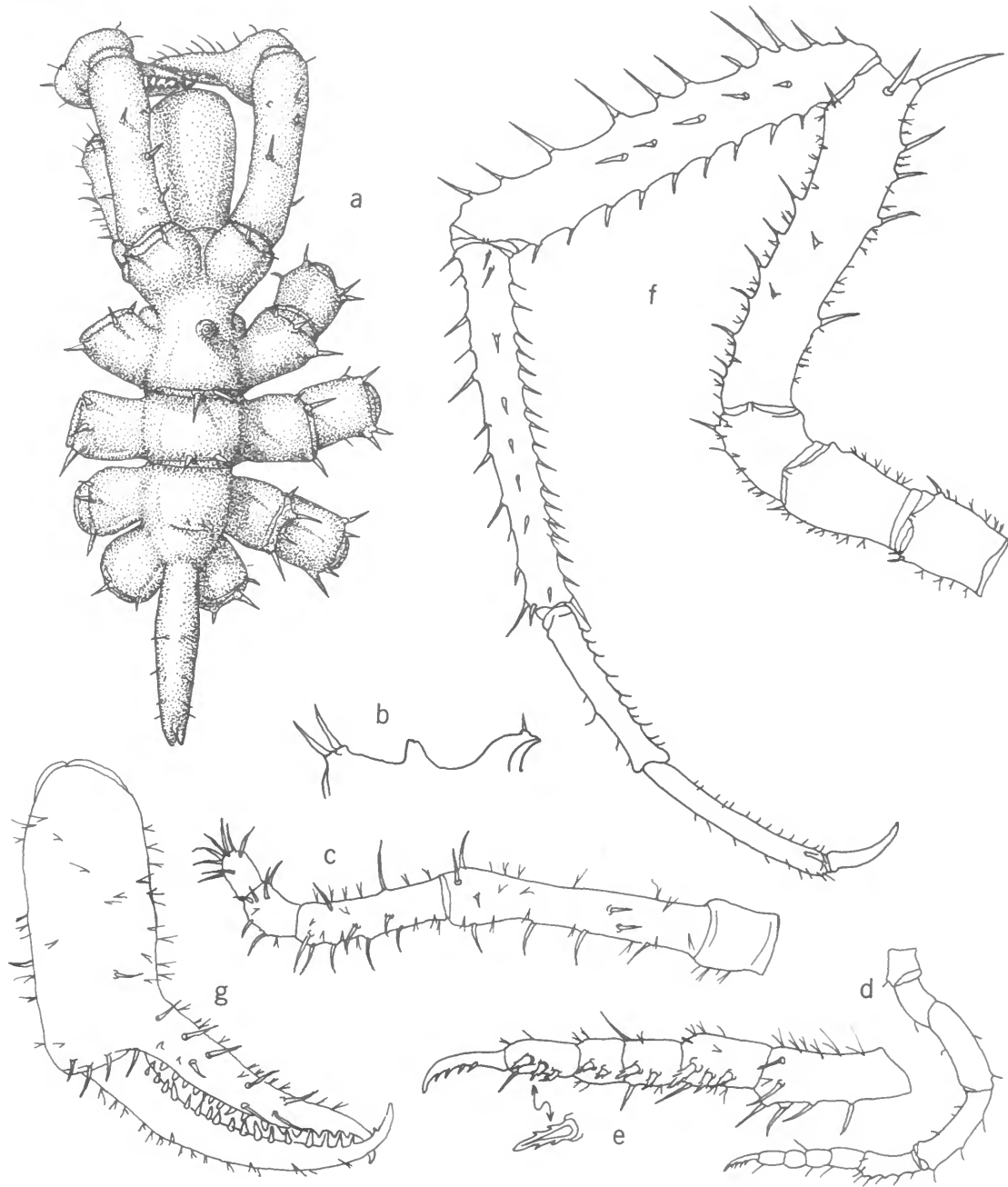


FIGURE 15.—*Nymphon spicatum*, new species, holotype, female: *a*, trunk, dorsal view; *b*, ocular segment, lateral view from right; *c*, palp; *d*, oviger; *e*, oviger terminal segments, with enlargements of denticulate spine and terminal claw; *f*, 3rd leg; *g*, chela.

than the terminal segment and armed with 4 slender serrations.

Legs moderately short, very setose, tibia 1 the longest segment. Coxae and femur with many tiny double setae and coxae with several larger ventrodistal setae. Major leg segments with ventral, lateral, and dorsal row of stout spines arising from low tubercles. Femur with 1 longer dorso-distal spine arising from taller tubercle. Femur and tibia 2 equal in length. Tarsus almost as long as propodus, both armed with row of short ventral setae. Propodus without heel or major heel spines. Claw well curved, less than half propodal length, without auxiliary claws.

MEASUREMENTS OF HOLOTYPE (mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 3.12; trunk width (across 2nd lateral processes), 2.1; proboscis length, 1.69; abdomen length, 1.38; 3rd leg, coxa 1, 0.62; coxa 2, 0.85; coxa 3, 0.6; femur, 2.49; tibia 1, 2.96; tibia 2, 2.46; tarsus, 1.2; propodus, 1.26; claw, 0.48.

DISTRIBUTION.—Known only from this single specimen taken in the Argentine Basin, off Rio de la Plata, the type-locality, in 3815 to 3822 meters.

ETYMOLOGY.—This proposed species is named for its cactus-spike appearance created by the numerous stout spines on the trunk and appendages.

REMARKS.—This blind uniungiculate species is related to very few known members of the diverse and large genus *Nymphon*. As stated in remarks under *N. hadale*, there are only four species known, including this one, with such a compact trunk having the lateral processes separated by less than their own diameter. The other three are *N. hadale*, *N. compactum*, and *N. typhlops*. The new species is perhaps more closely related to other compact species with spinose trunks, such as *N. bouvieri*, *N. proximum*, or *N. mendosum*, but these species have eyes and auxiliary claws. It appears to be closely related to *N. typhlops*, but in this species, the tarsus is notably longer than the propodus, the legs and chelifore scapes are more setose, and palp segments two and three are

longer. The other two species show similar differences.

The presence of very shortened terminal palp segments, the reduced number of strigilis denticulate spines, the placement and number of trunk and appendage spines, the small, blind, and truncated ocular tubercle, the lack of auxiliary claws, and the compact lateral processes, when taken in combination, characterize this new species of *Nymphon*.

Nymphon spinosissimum (Norman)

Chaetonymphon spinosissimum Norman, 1894:154.

Nymphon spinosissimum.—Hedgpeth, 1948:183, figs. 10a, 11a [literature].

MATERIAL EXAMINED.—Labrador Sea, off Greenland: *Vema* cruise 16, sta 48, 60°10'N, 47°08'W, trawl, 300 m, 21 Aug 1960 (1♂, 3♀).

REMARKS.—These specimens are larger than either *Nymphon hirtipes* or *N. tenellum*, with which they can be confused. The *Vema* specimens have longer auxiliary claws and are more setose than the other two species.

This species is distributed from Norway to western Greenland in fairly deep water.

Nymphon stromi Krøyer

Nymphon stromi Krøyer, 1844:111.

Nymphon stromi.—Hedgpeth, 1948:190–192, fig. 13c [literature].

MATERIAL EXAMINED.—North American Slope: *Knorr* cruise 35, sta 346, 39°54.1'N, 70°10.7'W, epibenthic sled, 457 m, 3 Dec 1973 (1♂ with eggs, 1♂, 4♀).

REMARKS.—These specimens conform to the description of *N. stromi* in most characters except for the following: the lateral processes of these specimens are further apart and not quite as long, there are less teeth on the chela fingers, the auxiliary claws are slightly shorter, and the chelae are not quite so large or robust.

These specimens were taken well within the known geographic and depth distribution for this species. It is known from the North Atlantic

boreal-arctic waters to as far south as Florida, in 15 to over 1000 meters. It is evidently fairly common in the more northerly parts of its range.

Nymphon tenellum (Sars)

Chaetonymphon tenellum Sars, 1888:353; 1891:109–111, pl. 12: fig. 1a–h.

Nymphon tenellum.—Hedgpeth, 1948:185, figs. 9, 10c [literature].

MATERIAL EXAMINED.—North American Basin: *Chain* cruise 88, sta 209A and B, 39°47.6'N, 70°49.9'W, epibenthic sled, 1501–1693 m, 22 Feb 1969 (1♂ with eggs, 1♂, 2 juveniles [209A], 1♀ [209B]).

Labrador Basin: *Vema* cruise 16, sta 55, 55°48'N, 56°00'W, trawl, 2452 m, 30 Aug 1960 (2♂, 3♀ ovigerous).

REMARKS.—These specimens are tentatively assigned to this species, based on the tarsus, which is over half the propodal length. The tarsus and propodus of *Nymphon hirtipes* are more robust, and the tarsus is shorter than half the propodus, according to Hedgpeth (1948:185). Except for the tarsus, this species is quite similar to *N. hirtipes*, a more commonly collected species.

Nymphon tenellum is distributed on both sides of the North Atlantic in deep water.

Nymphon species indeterminate

MATERIAL EXAMINED.—North American Basin, E of Little Bahama Bank: *Vema* cruise 15, sta 4, 27°17'N, 77°08'W, trawl, 1316 m, 1 Feb 1958 (1 specimen).

North American Slope: *Knorr* cruise 35, sta 346, 39°54.1'N, 70°10.7'W, epibenthic sled, 457 m, 3 Dec 1973 (several juveniles and larvae). *Chain* cruise 88, sta 209A, 39°47.6'N, 70°49.9'W, epibenthic sled, 1501–1693 m, 22 Feb 1969 (several larvae).

French Guiana, NNW of Cayenne: *Chain* "Equalant" cruise 35, sta 25, 05°39'N, 52°39'W, dredge, 36.6 m, 22 Apr 1963 (1 damaged juvenile).

Argentine Basin, off Rio de la Plata: *Atlantis II*

cruise 60, sta 237, 36°32.6'S, 53°23.0'W, epibenthic sled, 993–1011 m, 11 Mar 1971 (several larvae). *Atlantis II* cruise 60, sta 262A, 36°05.2'S, 52°1'.9'W, epibenthic sled, 2440–2480 m, 27 Mar 1971 (several juveniles and larvae). *Vema* cruise 15, sta 131, 40°14.6'S, 55°24.7'W, trawl, 1475 m, 3 Apr 1959 (several larvae). *Vema* cruise 15, sta 132, 39°57.5'S, 54°49.5'W, trawl, 1912 m, 3 Apr 1959 (several larvae). *Vema* cruise 17, sta 14(RD), 38°58'S, 55°17'W, rock dredge, 595 m, 19 Jun 1961 (1♂ lacking appendages).

REMARKS.—The French Guiana specimen is near *Nymphon aemulum* but has bicuspidate chela finger teeth and longer propodal claws. All of the other specimens are either too young or too damaged to allow for determination.

Family AUSTRODECIDAE Stock, 1954

Genus *Pantopipetta* Stock, 1963

Pantopipetta longituberculata (Turpaeva)

Pipetta longituberculata Turpaeva, 1955:324–327, fig. 2.

Pantopipetta longituberculata.—Stock, 1963:336 [key].—Hedgpeth and McCain, 1971:219, fig. 1B, 221, tbl. 1, 223 [key].—Turpaeva, 1971:290; 1974:292–294, figs. 8, 9; 1975:242, fig. 8 [1, 2].

Pantopipetta brevicauda Stock, 1963:336–338, figs. 9, 10a; 1975: 993; 1978a:205, 206.—Hedgpeth and McCain, 1971:219, fig. 1E, 220, tbl. 1, 222 [key], 223–225, figs. 3–4, tbl. 3.

MATERIAL EXAMINED.—Guiana Basin, N of Surinam: *Knorr* cruise 25, sta 291, 10°06.1'N, 55°14.0'W, epibenthic sled, 3859–3868 m, 26 Feb 1972 (2♂, 2♀, 2 juveniles). *Knorr* cruise 25, sta 293, 08°58.0'N, 54°04.3'W, epibenthic sled, 1456–1518 m, 27 Feb 1972 (1♀). *Knorr* cruise 25, sta 301, 08°12.4'N, 55°50.2'W, epibenthic sled, 2487–2500 m, 29 Feb 1972 (4♂, 3♀, 5 juveniles). *Knorr* cruise 25, sta 303, 08°28.8'N, 56°04.5'W, epibenthic sled, 2842–2853 m, 1 Mar 1972 (2♀, 1 juvenile).

Brazil Slope and Basin, off Recife: *Atlantis II* cruise 31, sta 155, 00°03'S, 27°48'W, epibenthic sled, 3730–3783 m, 13 Feb 1967 (1♀, 11 juveniles). *Atlantis II* cruise 31, sta 156, 00°46'S, 29°28'W, epibenthic sled, 3459 m, 14 Feb 1967 (10♂, 6♀, 13

juveniles). *Atlantis II* cruise 31, sta 159, 07°58'S, 34°22'W, epibenthic sled, 834–939 m, 18 Feb 1967 (1♀). *Atlantis II* cruise 31, sta 167, 07°58'S, 34°17'W, epibenthic sled, 943–1007 m, 20 Feb 1967 (2♀). *Atlantis II* cruise 31, sta 169A, 08°03'S, 34°23'W, epibenthic sled, 587 m, 21 Feb 1967 (7♂, 6♀, 2 juveniles).

Argentine Basin, off Rio de la Plata: *Atlantis II* cruise 60, sta 240, 36°53.4'S, 53°10.2'W, epibenthic sled, 2195–2323 m, 12 Mar 1971 (1♀, 1 juvenile). *Atlantis II* cruise 60, sta 243, 37°36.8'S, 52°23.6'W, epibenthic sled, 3815–3822 m, 14 Mar 1971 (7 specimens). *Atlantis II* cruise 60, sta 252, 38°29.8'S, 52°09.1'W, epibenthic sled, 4435 m, 22 Mar 1971 (4 specimens). *Atlantis II* cruise 60, sta 262A, 36°05.2'S, 52°17.9'W, epibenthic sled, 2440–2480 m, 27 Mar 1971 (1♂).

North American Basin: *Atlantis II* cruise 24, sta 119, 32°15.8'N, 64°31.6'W, epibenthic sled, 2095–2223 m, 19 Aug 1966 (1♀).

REMARKS.—These 96 specimens appear to close the gap in measurement differences between *Pantopipetta brevicauda* and *P. longituberculata*. Some of the Guiana Basin specimens have longer abdomens, reaching almost to the distal end of the 2nd coxae, whereas others have shorter abdomens, reaching slightly beyond the 1st coxae. I could find no bulge in the ocular tubercles of any of these specimens to correspond to that shown in Turpaeva's (1955:325, fig. 2 [2]) type figures, but almost all of the abdomen lengths and ocular tubercle configurations except the last one, as detailed by Turpaeva (1974:292, fig. 8), are represented in this collection. The 15 specimens from Brazil Slope station 169A have very long ocular tubercles, longer than any figured before in the literature.

There is some slight variation in the ratio of tarsus to propodus length with these specimens, although it does not vary nearly so much as abdomen and ocular tubercle lengths. Hedgpeth and McCain (1971:226) made an error in their diagnosis of *P. brevicauda* in stating that the "propodus [is] more than 4 times as long as tarsus." Their figure 3d (1971:225) details a propodus only about half again as long as the tarsus. In

some of the specimens of this collection, the propodus is only 1.4 times the tarsus length, and both segments appear more slender than that figured by Hedgpeth and McCain.

The two species have been recorded as being quite close in morphology, and, in fact, Turpaeva combined the two in 1974. The depth range as recorded in the literature for *P. brevicauda* is from 1806 to 5024 meters, and the range for *P. longituberculata* is from 4300 to 6700 meters. Some of the records included here extend this range on the shallow end to 587 meters. This extreme range of depths at which this species has been taken, from the continental slopes to abyssal trenches, would be difficult to believe were it not for other species and genera sharing even more extreme depth ranges. In the Antarctic, *Colossendeis megalonyx* has been taken at depths of only seven meters to over 5000 meters.

The geographic distribution of this species is not significantly extended by the present records. It has been collected in two Pacific trenches, the Scotia Sea, and the basins and continental slopes of both the South and North Atlantic. It appears to be a rather common inhabitant of Atlantic basins, judging from the frequency of capture records in the present collection.

Family COLOSSENDEIDAE Hoek, 1881

Genus *Colossendeis* Jarzynsky, 1870

Colossendeis angusta Sars

Colossendeis angusta Sars, 1877:268, 269.—Hedgpeth, 1948: 269–271, fig. 50a [literature].

MATERIAL EXAMINED.—Argentine Slope, E of Valdez Peninsula: *Vema* cruise 17, sta 79, 42°28'S, 58°31'W, trawl, 251 m, 21 May 1961 (1 specimen).

REMARKS.—This specimen was captured far south of most of the records for this species, but since it is probably a worldwide deep-water species, this record is in keeping with its distribution and depth range of 157 to 5200 meters.

The claws are equal in length to slightly longer

than the propodus, and the 7th palp segment is much shorter than the two terminal segments.

***Colossendeis macerrima* Wilson**

Colossendeis macerrima Wilson, 1881:246, 247, pl. 1: fig. 2, pl. 4: figs. 9-12, pl. 5: fig. 32.—Stock, 1975:985-987, fig. 11a-b [literature].

MATERIAL EXAMINED.—Guiana Basin, N of Surinam: *Knorr* cruise 25, sta 297, 07°45.3'N, 54°24.0'W, epibenthic sled, 508-523 m, 28 Feb 1972 (1 juvenile molt).

REMARKS.—This ecdysis is undoubtedly this species and is a juvenile, although it is without chelifores. It appears to be without sexual pores on the coxae. It has the very long and slender proboscis of this species.

It was taken near the locality where Stock (1975:986) reported specimens from the Luymus Guyana Shelf Expedition and at approximately the same depth.

***Colossendeis* species indeterminate**

MATERIAL EXAMINED.—North American Basin: *Chain* cruise 58, sta 99(MM), 34°43.0'N, 66°23.3'W, epibenthic sled, 4977 m, 31 [sic] Apr 1966 (1 juvenile).

REMARKS.—Although this specimen is without chelifores or even vestigial stumps, it is too young to determine. The claws are shorter than the propodus, and the three terminal palp segments agree with *Colossendeis colossea*, but the proboscis is much too short for it to be this species. The specimen is partly damaged.

Literature Cited

- Arnaud, F.
1974. Pycnogonides recoltés aux Açores par les campagnes 1969 et Biacores 1971. *Bulletin of the Zoological Museum, University of Amsterdam*, 3(21):169-187, 2 tables, 21 figures.
- Bouvier, E. L.
1913. Pycnogonides du Pourquoi Pas?. In *Deuxième Expédition Antarctique Française (1908-1910)*, 6:1-169, 109 figures. Paris.
- Carpenter, G. H.
1905. The Marine Fauna of the Coast of Ireland, Part VI: Pycnogonida. *Scientific Investigations of the Fisheries Branch of Ireland*, 4:1-8, plates I-III.
- Caullery, M.
1896. Pycnogonides: Résultats scientifiques de la campagne du *Caudan* dans le golfe de Gascogne, août-sept. 1895. *Annales de l'Université de Lyon*, 26:361-364, 1 plate.
- Clark, W. C.
1977. The Genus *Ammothea* Leach (Pycnogonida) in New Zealand Waters: New Species and a Review. *Journal of the Royal Society of New Zealand*, 7(2):171-187, 46 figures.
- Corrêa, D. D.
1948. *Callipallene gabriellae*, novo Pantópodo de Santos. *Papéis Avulsos de Departamento de Zoologia, São Paulo*, 9(1):1-12, 6 figures.
- Dohrn, A.
1881. Die Pantopoden des Golfes von Neapel und der angrenzenden Meeresabschnitte. In *Fauna und Flora des Golfes von Neapel*, 3:1-252, 18 plates. Leipzig.
- Fage, L.
1951. Sur un Pycnogonide de l'expédition suédoise des grands fonds, 1947-48. In *Reports of the Swedish Deep-Sea Expedition*, 2(7):93-97, 1 figure.
1956. Les Pycnogonides du genre *Nymphon*. In *Galathea Reports*, 2:159-165, 10 figures.
- Fry, W. G., and J. W. Hedgpeth
1969. Pycnogonida, 1: Colossendeidae, Pycnogonidae, Endeidae, Ammotheidae. In *Fauna of the Ross Sea, 7. Memoirs of the New Zealand Oceanographic Institute*, 49:1-139, 1 plate, 209 figures, 16 tables.
- Giltay, L.
1934. A New Pycnogonid from Bermuda. *Bulletin du Musée Royal d'Histoire Naturelle de Belgique*, 10(42): 1-3, 5 figures.
- Gordon, I.
1932a. Re-description of Some Type-Specimens of Pycnogonida of the Genus *Nymphon*. *Annals and Magazine of Natural History*, series 10, 9:97-120, 12 figures.
1932b. Pycnogonida. In *Discovery Reports*, 6:1-138, 75 figures.
1944. Pycnogonida. In *Reports of the British, Australian and New Zealand Antarctic Research Expedition*, series B, 5(1):1-72, 27 figures.
- Hedgpeth, J. W.
1947. On the Evolutionary Significance of the Pycnogonida. *Smithsonian Miscellaneous Collections*, 106(18):1-54, 16 figures.
1948. The Pycnogonida of the Western North Atlantic and the Caribbean. *Proceedings of the United States National Museum*, 97(3216):157-342, 49 figures, 3 charts.
1949. Report on the Pycnogonida Collected by the *Albatross* in Japanese Waters in 1900 and 1906. *Proceedings of the United States National Museum*, 98(3231):233-321, 50 figures.
1961. Pycnogonida. In *Reports of the Lund University Chile Expedition 1948-49. Lunds Universitets Arsskrift*, new series (2), 57(3):1-18, 11 figures.
1963. Pycnogonida of the North American Arctic. *Journal of the Fisheries Research Board of Canada*, 20(5):1315-1348, 12 figures.
- Hedgpeth, J. W., and J. C. McCain
1971. A Review of the Pycnogonid Genus *Pantopipetta* (Family Austrodecidae, emend.) with the Description of a New Species. In G. Llano and I. E. Wallen, editors, *Biology of the Antarctic Seas*, 4. *Antarctic Research Series*, 17:217-229, 6 figures.
- Hodgson, T. V.
1907. Pycnogonida. In *Reports of the National Antarctic Expedition of 1901-1904, Natural History*, 3:1-72, 10 plates. London.
1914. Preliminary Report on the Pycnogonida of the German Southpolar Expedition, 1901-1903. *Zoologische Anzeiger*, 45(4):158-165.
- Hoek, P.P.C.
1881. Report on the Pycnogonida Dredged by HMS *Challenger* 1873-76. In *Reports of the Scientific Results of the Exploring Voyage of HMS "Challenger,"* 3(10): 1-167, 21 plates, 3 figures.
1883. The Pycnogonida Dredged in the Faroe Channel

- during the Cruise of HMS *Triton* in August 1882. *Transactions of the Royal Society of Edinburgh*, 32(1):1-10, 1 plate.
- Johnston, G.
1837. *Miscellanea Zoologica, I: An Attempt to Ascertain the British Pycnogonida. Magazine of Zoology and Botany*, 1:371-382, 1 plate.
- Kraeuter, J. N.
1973. Pycnogonida from Georgia, U.S.A. *Journal of Natural History*, 7(5):493-498.
- Krapp, F., and J. N. Kraeuter
1976. Additions to the Pycnogonida of Georgia. *Bonner Zoologische Beiträge*, 27(3/4):336-346, 3 figures.
- Krøyer, H.
1844. Bidrag til Kundskab om Pycnogoniderne eller Sospindlerne. *Naturhistorisk Tidsskrift* (Copenhagen), series 2, 1:90-139, 1 plate.
- Loman, J.C.C.
1923. The Pycnogonida. In *Further Zoological Results of the Swedish Antarctic Expedition*, 1(2):1-41, 7 figures.
- McCloskey, L. R.
1967. New and Little Known Benthic Pycnogonids from North Carolina. *Journal of Natural History*, 1:119-134, 27 figures.
- Meinert, F.
1899. Pycnogonida. In *The Danish Ingolf-Expedition*, 3(1):1-71, 5 plates, 2 figures, 1 chart. Copenhagen.
- Montagu, G.
1808. Description of Several Marine Animals Found on the South Coast of Devonshire. *Transactions of the Linnean Society of London*, 9:81-113, 5 plates.
- Nesis, K. N.
1960. [Pantopoda of the Shores of Eastern Murman.] *Trudy Murmanskovo Biologicheskovo Instituta*, 2(6):137-161. [In Russian.]
- Norman, A. M.
1894. A Month on the Trondhjem Fjord. *Annals and Magazine of Natural History*, series 6, 13:151-164.
- Sars, G. O.
1877. Prodrómus descriptionis Crustaceorum et Pycnogonidarum, quae in expeditione norvegica anno 1876 observavit. *Archiv for Matematik og Naturvidenskab* (Kristiania), 2:237-271.
1888. Pycnogonida borealia et arctica enumerat (Prodrómus descriptionis). *Archiv for Matematik og Naturvidenskab* (Oslo), 12:339-356.
1891. Pycnogonidea. In *Norwegian North-Atlantic Expedition, 1876-78*, 6 (20, Zoology):1-163, 15 plates, 1 figure, 1 map. Christiania.
- Schimkewitsch, W.
1930. [Pycnogonida (Pantopoda).] *Fauna SSSR, Izdatel'stvo Akademii Nauk SSSR*, 2:225-555, 5 plates, 156 figures, 1 table. [In Russian and Latin.]
- Stock, J. H.
1952. Revision of the European Representatives of the Genus *Callipallene* Flynn, 1929. *Beaufortia*, 1(13):1-14, 27 figures.
1963. South African Deep-Sea Pycnogonida, with Descriptions of Five New Species. *Annals of the South African Museum*, 46(12):321-340, 10 figures.
1964. Deep-Sea Pycnogonida Collected by the *Cirrus* in the North Atlantic. *Beaufortia*, 11(135):45-52, 2 figures.
1965. Pycnogonida from the Southwestern Indian Ocean. *Beaufortia*, 13(151):13-33, 46 figures.
1968. Pycnogonida Collected by the *Galathea* and *Anton Brunn* in the Indian and Pacific Oceans. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening* (Copenhagen), 131:7-65, 22 figures.
1971. Pycnogonides récoltés durant la campagne *Noratlante en Atlantique Nord. Bulletin Zoologisch Museum, Universiteit van Amsterdam*, 2(4):25-28, 9 figures.
1975. Pycnogonida from the Continental Shelf, Slope, and Deep Sea of the Tropical Atlantic and East Pacific. In *Biological Results of the University of Miami Deep-Sea Expeditions*, 108. *Bulletin of Marine Science*, 24(4):957-1092, 59 figures.
1978a. Abyssal Pycnogonida from the North-eastern Atlantic Basin, part I. *Cahiers de Biologie Marine*, 19:189-219, 10 figures.
1978b. Abyssal Pycnogonida from the North-eastern Atlantic Basin, part II. *Cahiers de Biologie Marine*, 19:397-413, 3 figures.
- Turpaeva, E. P.
1955. [New Species of Sea Spiders (Pantopoda) from the Kurile-Kamchatka Trench]. *Trudy Instituta Okeanologii P. P. Shirshov, Akademiya Nauk SSSR*, 12:323-327, 2 figures. [In Russian.]
1971. [The Deepwater Pantopoda Collected in the Kurile-Kamchatka Trench.] In [Fauna of the Kurile-Kamchatka Trench]. *Trudy Instituta Okeanologii P. P. Shirshov, Akademiya Nauk SSSR*, 92:274-291, 7 figures. [In Russian.]
1973. [Pantopoda from the Northeast Pacific Ocean.] *Trudy Instituta Okeanologii P. P. Shirshov, Akademiya Nauk SSSR*, 91:178-191, 2 figures. [In Russian.]
1974. [The Pycnogonids of the Scotia Sea and Surrounding Waters.] *Trudy Instituta Okeanologii P. P. Shirshov, Akademiya Nauk SSSR*, 98:277-305, 13 figures. [In Russian.]
1975. [On Some Deep-Water Pantopods (Pycnogonida) Collected in the North-western and South-eastern Pacific.] *Trudy Instituta Okeanologii P. P. Shirshov, Akademiya Nauka SSSR*, 103:230-246, 8 figures. [In Russian.]

Wilson, E. B.

1880. Report on the Pycnogonida of New England and Adjacent Waters. *Report of the United States Commissioner of Fisheries, 1878*, 6:463-506, 7 plates.
1881. Reports of the Results of Dredging, under the Supervision of Alexander Agassiz, along the East Coast of the United States, during the Summer of 1880, by the U.S. Coast Survey Steamer "Blake," Commander J. R. Bartlett, U.S.N., Commanding,

13: Report on the Pycnogonida. *Bulletin of the Museum of Comparative Zoology*, Harvard, 8(12):239-256, 5 plates.

Zharkova, I. S.

1976. [Structural Variability of Vision Organs of *Nymphon longicoxa* (Pantopoda).] *Trudy Instituta Okeanologii, Akademiya Nauk SSSR*, 99:241-243, 1 figure. [In Russian.]

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