

Pycnogonida of the
Southeast Pacific Biological
Oceanographic Project (SEPBOB)

C. ALLAN CHILD

SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • NUMBER 526

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ABSTRACT

Child, C. Allan. Pycnogonida of the Southeast Pacific Biological Oceanographic Project (SEPBOB). *Smithsonian Contributions to Zoology*, number 526, 43 pages, 16 figures, 1992.—Pycnogonida from the SEPBOB Expeditions and additional unreported specimens from other collections are described. They contain 30 described species, with an additional 10 newly described and 4 undescribed for lack of suitable specimens. The newly described species are *Ammothea insularis*, *Ascorhynchus comatum*, *A. paxillum*, *Prototrygaeus contrarius*, *Tanystylum cinctum*, *Pallenopsis (P.) notiosa*, *P. (P.) truncatula*, *Nymphon similis*, *Anoplodactylus bruuni*, and *A. vulcanus*. Five additional known species are refigured or figured for the first time to clarify their validity and they are redescribed where necessary. These species are *Ammothea dorsiplicata* (Hilton), *Ammothella heterosetosa* Hilton, *Eurycyde longisetosa* Hilton, *E. spinosa* Hilton, *Pycnothea selkirki* Loman, and *Rhynchothorax barnardi* Child and Hedgpeth. Previous literature on South American Pacific pycnogonids is reviewed and the zoogeography of each species is discussed.

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Pycnogonida of the Southeast Pacific Biological Oceanographic Project (SEPBOP)

C. Allan Child

Introduction

This is the first report to treat pycnogonids of the South American Pacific exclusive of other regions. It enumerates 40 species including 10 new species and excluding 4 unnamed for lack of suitable material. These collections were made primarily by scientific personnel of the R/V *Anton Bruun* while participating in five biological cruises in South American Pacific waters organized under the collective expedition title of the Southeast Pacific Biological Oceanographic Project (SEPBOP). The SEPBOP expeditions took place between October 1965, and September 1966. Unreported specimens from other collectors or expeditions are included to make this report as complete and current as possible.

These 40 species, comprising over 500 specimens in seven families and 16 genera, were collected in the area roughly bounded by Guayaquil, Ecuador, in the north and Concepcion, Chile, in the south, and include specimens from offshore islands; the Galapagos of Ecuador, Islas Lobos de Afuera of Peru, and Islas San Felix and Islas Juan Fernandez of Chile. The majority of the species are from littoral and sublittoral depths but others are from the continental slope and basin while five species were taken from the slopes and bottom of the Milne-Edwards Deep of the Peru-Chile Trench, one species in depths of over 6000 meters.

The coasts and deeps of the South American Pacific have received very little attention in pycnogonid literature due to the lack of collections of their microfauna. The total pycnogonid literature of the entire coast north of the Subantarctic Chilean islands and Magellanic region is scattered among many countries in perhaps as many journals as there are species known from this coast. There are only about 57 species known (with perhaps one or two overlooked in remote literature) along this coast and most of these are also known or were first

described from other areas. Several appear to be southern stragglers from Magellanic localities which have received more extensive collecting effort. Many more are known from the coasts of Middle America and even from California, with their distributions herein extended to South American waters for the first time. When further collections can be made in South American waters, it can safely be predicted that many more Middle American distribution records will be extended to the South American coasts and deeps.

Almost 25% of the species in this report are new, reflecting the lack of previous collections reported from these shores. The new species are: *Ammothea insularis*, *Ascorhynchus comatum*, *A. paxillum*, *Prototrygaeus contrarius*, *Tanystylum cinctum*, *Pallenopsis (P.) notiosa*, *P. (P.) truncatula*, *Nymphon similis*, *Anoplodactylus bruuni*, and *A. vulcanus*. The SEPBOP cruises collected almost 72% of the presently known pycnogonid fauna from the areas covered by this report which attests to the thorough methods used by the collectors and is a reflection of what little was known about pycnogonids from this area before the SEPBOP expeditions took place. Only 16 species known from this area were not collected by SEPBOP, and several of these are only known from the northern or southern limits of the South American waters treated in this report.

HISTORICAL BACKGROUND

Nicolet (in Gay, 1849, 1854) was the first to describe and figure a pycnogonid species from South American waters, listing *Pycnogonum littorale* (possibly *P. panamum* Hilton) from Chile. The *Vettor Pisani* Expedition touched the southern coast of Chile and two pycnogonids, *Tanystylum chierchiae* and *Achelia assimilis* (Haswell) (as *Ammothea Wilsoni*), were described by Schimkewitsch (1887, 1888) from the far south of that country. After these reports, one or two pycnogonids from South American localities were described in many expedition reports, most notably those of the Agassiz expeditions to the eastern tropical Pacific (Schimkewitsch, 1893, Cole, 1909). A

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few additional pycnogonids appeared in reports of expeditions mounted primarily to investigate Antarctic waters, but taken in South American waters while going to or from the Antarctic. Very few university or governmental expeditions have been organized to explore the fauna of South American coasts, either by the countries under discussion or by others, but of those few which brought back pycnogonids, the Swedish efforts (Loman, 1920, Hedgpeth, 1961) have become the benchmarks for recognition of the Chilean pycnogonids. Loman reported on two new species from Islas Juan Fernandez while Hedgpeth treated a collection from southern Chile having suggestions of both northern and New Zealand affinities. Stock (1968, 1975) has reported on a few pycnogonids found along these coasts, but the majority of his specimens originated from Middle American and Caribbean localities.

MATERIALS

The 500+ specimens reported on herein were collected by scientific personnel of the R/V *Anton Bruun* while participating in five expeditions along the coasts and islands of the South American Pacific. The specimens were taken by hand in shallow localities, by using scuba in sublittoral depths, and by various sized trawls in deeper waters. Some of the original data is either missing or was not recorded at the time of collection, particularly the type of trawl used to make some of these collections. In the Material Examined sections under each species, it is to be assumed that all specimens were collected on the R/V *Anton Bruun* and only the station number is listed. For the specimens not collected by the R/V *Anton Bruun*, the person or vessel that did the collecting is given.

The holotypes and most other specimens are deposited in the collections of the National Museum of Natural History, Smithsonian Institution, Washington, D.C. USNM specimen numbers indicate specimens from the United States National Museum, which are housed in the National Museum of Natural History. A few other specimens were loaned to me for description in this report and those were returned to their sender and listed as such in Material Examined sections where pertinent.

CURRENT KNOWLEDGE AND ZOOGEOGRAPHY

It might be best to separate this fauna on the basis of depth and collecting locality in order to portray the ranges of species reported on herein.

TRENCH SPECIES.—A transect was carried across the Milne-Edwards Deep of the Peru-Chile Trench which resulted in the capture of five previously known species. From the Trench bottom, two species, *Ascorhynchus birsteini* Turpaeva and *A. inflatum* Stock were taken in 5986–6220 meters and 4423–5173 meters respectively. *Colossendeis angusta* Sars and *C. leptorhynchus* Hoek were taken in 3117–3177 meters and 2945–2966 meters respectively, while *Pallenopsis comosa*

Stock was also taken at the latter depths. Arnaud and Bamber (1987:72–75, table 14) list 96 abyssal (2000+ m) pycnogonids while that number is reduced to 31 for pycnogonids found in the deep abyssal (4000+ m). The hadal (6000+ m) or trench pycnogonids only number eight, two of which are the *Ascorhynchus* species above. There are a good number of *Colossendeis* species found in the deep abyssal but none has as yet been reported from hadal depths. The *Colossendeis* and *Pallenopsis* species reported on herein occur within their known depth ranges.

SLOPE AND BASIN SPECIES.—The predominant genus of the South American basins, in terms of the areas sampled for this report, is *Colossendeis*, as might be expected. An unexpected discovery among the slope and basin species was *Colossendeis angusta* Sars, which was taken at several very shallow localities off Ecuador and Peru in as little as 27 meters. Perhaps the well known upwelling currents are responsible for these shallow captures. Other species in this genus were taken within their known slope and basin depth ranges: *C. leptorhynchus* Hoek at 950–2966 meters, *C. macerrima* Wilson at 1170–1480 meters, *C. colossea* Wilson at 950–1480 meters, and *C. arcuata* A. Milne-Edwards at 730–750 meters. Two new *Ascorhynchus* species, *A. comatum* and *A. paxillum*, were taken from slopes off Ecuador and on the Cocos Ridge (technically outside the geography of this report, but included for completeness) in 1360+ meters and 1892 meters respectively. *Anoplodactylus typhlops* Sars was also taken at the same Cocos Ridge station as *A. paxillum* and an unnamed juvenile specimen of *Nymphon* was taken at the Ecuador station with *A. comatum*. A very inadequately described species from the Chilean slope, *Ammonothea dorsiplicata* (Hilton), is redescribed and figured from type-specimens taken slightly over 100 years ago by the U.S. Fisheries Steamer R/V *Albatross* in 1238 meters. Two new species of *Pallenopsis*, *P. notiosa* and *P. truncatula*, are the only other slope species taken by the SEPBOPEX expeditions. The former was taken off the Chilean coast in 290–450 meters and the latter was captured in several localities; two off Peru in 80 and 605–735 meters, and one off Chile in 290–450 meters, the latter being the same station at which *P. notiosa* was taken.

SHALLOW SPECIES.—The great majority (29) of species of this report occur from the tide line to the beginning of the bathyl zone (250+ m), as would be expected. They can be divided for distributional purposes into the countries where collected during the SEPBOPEX expeditions.

Ecuador: There are now eleven species known from this coast where none of these same species were known before this report. While one species of *Anoplodactylus* is unnamed for lack of suitable material, four new species described herein, *Nymphon similis*, *Anoplodactylus vulcanus*, *Tanystylum cinctum*, and *Prototrygaeus contrarius*, are now known from the Ecuadorian coast. Six species new to Ecuador were previously known from their more northerly distribution; *Ammonothea spinifera*, *Eurycyde longisetosa* (distribution shared with Colombia and Galapagos), *Tanystylum oculospinosum* (also

distributed in Peru, Galapagos, and Chile), *Anoplodactylus erectus* (distributed in Colombia, Chile, and elsewhere in the Pacific), *A. reimerae*, and *Anoropallene palpida*. One Ecuadorian species, *Anoplodactylus californicus* (= *A. portus*) has a pantropical/pantemperate distribution.

Peru: There is only one species out of the five collected in Peru which has not been found also in Ecuador; *Rhynchothorax barnardi*. There are now known to be four species which share a Peruvian/Ecuadorian distribution. These are *Achelia parvula*, *Tanystylum intermedium*, *T. oculospinosum* (listed above), and *Anoropallene palpida* (also above). The latter species and *Achelia parvula* are the only ones of these five species which have not been found also in the Galapagos.

Galapagos Islands: There were 12 species known to the Galapagos prior to this report with one unnamed for lack of a whole specimen (Child and Hedgpeth, 1971). This report adds six more species, all with previously known Middle American distributions except for the new species *Pallenopsis truncatula*. Four species described or listed by Child and Hedgpeth from the Galapagos were not taken again by collectors of the SEPBOB expeditions. These species are *Ammothella dawsoni*, *Ascorhynchus laterospinum*, *Nymphopsis duodorsospinosa*, and *Anoplodactylus torus*. Three of these species are only known from Galapagan waters while *N. duodorsospinosa* is widely distributed on the Middle American coasts and in Florida. Distribution is extended to the Galapagos for five species previously known only from mainland localities; *Eurycyde spinosa* Hilton, *Tanystylum intermedium* Cole, *T. malpelensis* Child (from Isla Malpelo, Colombia), *Callipallene californiensis* (Hall), and *Rhynchothorax architectus* Child.

Chile: There were no shallow water species taken along the coast of Chile except for *Colossendeis angusta* in 27 meters, as listed above.

Islas Juan Fernandez: These islands, along with the Chilean offshore island of San Felix, were extensively collected during cruise 12 of the SEPBOB expeditions. The distribution of *Tanystylum distinctum* Child and Hedgpeth is now extended to Isla San Felix as are those of *Anoplodactylus erectus* Cole and *Pycnothea selkirki* Loman. The latter species was taken only for the second time on cruise 12, and its distribution is extended to Isla San Felix from its type locality, Islas Juan Fernandez, where it was also collected in two localities.

Specimens which are believed to be *Achelia fernandeziana* Loman are described for the second time from Islas Juan Fernandez and the distribution of *Callipallene californiensis* is extended to these Islands. Two new species, *Ammothea insularis* and *Anoplodactylus bruuni* are described and figured from Islas Juan Fernandez, and an unnamed juvenile *Pallenopsis* is also recorded from here for the first time.

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PYCNOGONIDA

Family AMMOTHEIDAE Dohrn

Genus *Achelia* Hodge, 1864

Achelia fernandeziana (Loman)

Ammothea fernandeziana Loman, 1920:142-144, fig. 2.—Helfer and Schlotke, 1935:285.

Achelia fernandeziana.—Giltay, 1934:5.—Marcus, 1940:79, 81 [key].—Sawaya, 1951:274 [key].

Achelia (*Pigrolavatus*) *fernandeziana*.—Fry and Hedgpeth, 1969:104, fig. 160.

MATERIAL EXAMINED.—CHILE. ISLAS JUAN FERNANDEZ: *Isla Robinson Crusoe*: E of Bahía San Juan Bautista at easternmost point, intertidal, coll. W.L. Schmitt, sta 38, 11 Dec 1926, 2♂, 3♀. *Isla Santa Clara*: Off western point, lobster net, 46 m, coll. W.L. Schmitt, sta 39, 11 Dec 1926, 1 juv.

Isla Alejandro Selkirk: Off Bada de la Colonia, 79-91 m, coll. R/V *Eltanin*, sta 21-203, 26 Nov 1965, 23 specimens.

Isla Robinson Crusoe: Off Puerto Ingles, 33°37'S, 78°50'W, 26-29 m, sta 12-65240, 12 Dec 1965, 2 juv; western Bahía Carvajal, 10-13 m, sta 12-65256, 15 Dec 1965, 4♂, 3♀, 9 juv; locality and coordinates unknown, 28 m, sta 12-65260, 16 Dec 1965, 1♂, 1♀, 1 juv; off Punta San Carlos, 33°37'S, 78°49'W, 135 m, sta 12-MV65-IV-47, 12 Dec 1965, 4♂, 3 juv; off Punta Pescadores, 33°38'S, 78°45'W, depth unknown, sta 12-MV65-IV-54, 13 specimens; off Bahía San Juan Bautista, 33°36'S, 78°47'W, depth unknown, sta 12-MV65-IV-55, 11 specimens; off Punta Norte, 33°34'S, 78°54'W, 160-180 m, sta 12-DRAB 135, 14 Dec 1965, 38 specimens; off Punta Bacalao, 33°38'S, 78°47'W, depth unknown, sta 12-MV65-IV-58, 14 Dec 1965, 2♀; off Punta Chamelo, 33°41'S, 78°52'W, depth unknown, sta 12-MV65-IV-68, 15 Dec 1965, 1♂.

DISTRIBUTION.—This species was known only from the two type-specimens described by Loman from "Masatierra," now called Isla Robinson Crusoe, the major island of the Juan Fernandez group. His specimens came from 30-45 meters and

the many specimens listed above maintain the endemic character of *A. fernandeziana* while extending its known depth to 10–180 meters.

REMARKS.—There are a number of differences among these specimens from the description and rather diagrammatic sketches figured by Loman (1920, fig. 2). The main difference is that none of these specimens have palps with nine segments, but instead their palps have eight segments. I therefore assign these specimens only provisionally to Loman's species. The specimens do agree in many characters including the general trunk habitus with small laterodistal lateral process tubercles, the general shape of the proboscis, the lengths of the ocular tubercle, abdomen, and the chelifores, the second coxae ventrodorsal sex pore tubercles, the dorsodistal femoral cement gland tubercle (although smaller in all males of this collection), and the terminal leg segments.

Besides the difference in palp segment numbers, the first coxae dorsolateral tubercles sometimes number four rather than the two figured by Loman, but several of the specimens in hand have only two coxal tubercles rather than the more common four. The chelifore scape of most but not all specimens has a small dorsodistal tubercle with seta, and the legs have a few small setose lateral tubercles, neither character being figured by Loman. The legs are otherwise very like Loman's figure 2D. Both male and female ovigers have two denticulate spines on the terminal three segments, the spines being typical of those of the genus.

It is difficult to believe that with the intensive collecting carried out in these islands during cruise 12 of SEPBOB, no specimens of *A. fernandeziana* were collected. I therefore have only little hesitation, even with the differences cited, in placing these specimens with Loman's species. It is possible that Loman miscounted the terminal palp segments, making them five instead of the usual four in *Achelia*. These specimens agree in too many characters with Loman's species, even in a genus displaying great intraspecific variation, for them to be a new species. They differ in too many characters with other species of *Achelia* found on the mainland for them to be anything but *A. fernandeziana*.

Achelia parvula (Loman)

Ammonothea (*Achelia*) *parvula* Loman, 1923:2–4, fig. A.—Helfer and Schlotke, 1935:285.

Achelia parvula.—Gordon, 1932:113–114, fig. 62; 1938:22 [key].—Marcus, 1940:80, 81 [key].—Hedgpeth, 1950:153.—Sawaya, 1951:274 [key].—Hedgpeth, 1961:12.

Achelia (*Pigrolavatus*) *parvula*.—Fry and Hedgpeth, 1969:103–104, figs. 157–159.

MATERIAL EXAMINED.—ECUADOR. Bahia de Santa Elena, near La Libertad, 02°11'28"S, 80°56'31"W, 8–9 m, sta 16-6670, 8 May 1966, 1♂, 1♀, 1 juv.

PERU. Bahia Independencia, E of Isla Vieja, 5 fm (9 m), coll. *Velero III*, sta 372-35, 12 Jan 1935, 1♂, 1♀.

DISTRIBUTION.—This species has a known Magellanic distribution, including the Falkland Islands, in depths of 0–20 meters. It is therefore surprising to find it as far north as Peru and Ecuador in what could be called tropical waters. The cold Humboldt Current travels north along this coast and is possibly responsible for this seemingly disparate distribution from nearly Subantarctic to tropical waters.

REMARKS.—These specimens compare favorably with others in the USNM collections identified as *A. parvula*, and with figures of this species presented by various authors. This species emphasizes again the extreme variability of tubercles and their presence or absence in many species of this genus, making it sometimes very difficult to determine when found in localities boasting more than one species.

There is one apparent consistency in the trunk of this species in its complete lack of any segmental sutures, although the general trunk habitus can be from its usual oval outline to round in dorsal aspect. Fry and Hedgpeth (1969:103) emphasize other characters for this species in their key; eight palp segments, large slightly curved propodal heel spines, the longest setae of major leg segments not longer than 1.3 times the segment diameters, and the fact that the leg setae do not originate on tubercles nor are there dense minute setules on the legs. The lateral process and proximal leg tubercles display a typically wide variation in this species with some as small as papillae on various specimens and some as very large cones measuring greater than half the segment diameter on others. Regardless of their size, each apparently always bears a small terminal seta.

Genus *Ammonothea* Leach, 1814

Ammonothea dorsiplicata (Hilton)

FIGURE 1

Leionymphon dorsiplicatum Hilton, 1942:97–98. [New combination.]

MATERIAL EXAMINED.—CHILE. Northwest of Valdivia, 38°08'S, 75°53'W, 1238 m, coll. U.S. Fisheries Steamer *Albatross*, sta 2791, 14 Feb 1888, 1♂ (holotype, USNM 81524), 14 chelate juv (paratypes, USNM 81525).

Other Material: Same locality and station, 1♀, 10 chelate juv [not listed and presumably not seen by Hilton].

DESCRIPTION.—Size large, leg span over 12 cm. Trunk completely segmented, integument covered with closely spaced microsetae. Lateral processes separated by slightly less than their diameters, without adornment. First through third trunk segments with swollen transverse ridges each bearing a tall dorsomedian tubercle, almost as tall as ocular tubercle. Ocular tubercle more than twice as tall as minimum diameter, constricted near base, swollen and rounded distally. Eyes slightly pigmented, anterior pair twice as large as posterior pair. Abdomen long, straight, carried almost horizontally, extending slightly beyond tips of first coxae of posterior leg pair, slightly swollen distally.

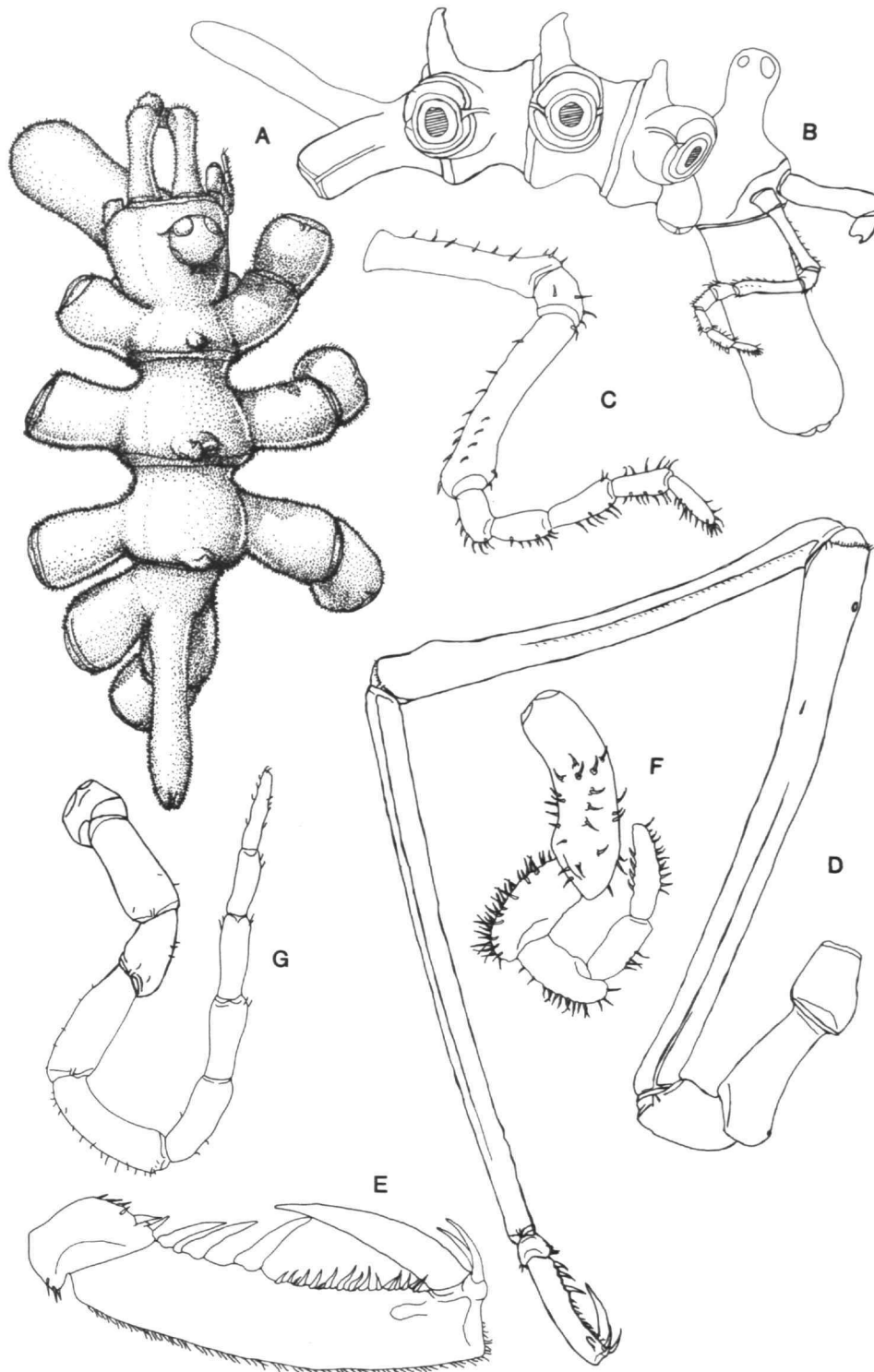


FIGURE 1.—*Ammothea dorsiplicata* (Hilton), holotype: A, trunk, dorsal view; B, trunk, lateral view; C, palp; D, third leg; E, third leg terminal segments, enlarged; F, oviger strigilis. Female paratype; G, oviger.

Proboscis cylindrical, less than half trunk length, rounded distally with slightly protruding lips.

Chelifores small, short scape constricted medially, vestigial chela small, carried at ventral oblique angle.

Palp 9-segmented, longer than proboscis, segments slender, second and fourth slightly less than five times longer than their maximum diameters. Fourth segment subequal to first, terminal five segments of reduced diameter, subequal in their lengths, each armed with few short ventral setae.

Oviger 10-segmented, distal segments increasingly setose to seventh, with terminal three segments palp-like with few short setae. Fifth segment longest, sixth well curved, armed with many distal short setae, seventh shorter, with many ectal short setae. Eighth segment placed anaxially on seventh, ninth anaxial to eighth, tenth very slender, subequal in length to ninth.

Legs very long, slender, major segments armed with longitudinal rows of short lateral setae and fringe of tiny distal setae. Second tibiae the longest, femorae slightly longer than first tibiae. Cement gland dorsodistal on femur with single small oval pore about one segment diameter proximal to femur tip, pore at integument surface, not on raised tubercle or swelling. Tarsus very short, semicircular, armed with few short dorsal and ventral setae and two very small ventral spines. Propodus short, moderately curved, without marked heel, sole with three large heel spines each increasingly larger than one more proximal. Distal sole with row of 15–18 small spines. Claw robust, half propodus length, slightly curved, auxiliaries very slender, only about 0.35 length of main claw. Anterior two pairs of propodi slightly shorter and thicker than posterior two pairs. Sole and heel spines and claws identical on all propodi.

Female: Measurements slightly greater except for oviger which is smaller, shorter, with fewer setae per segment. Each segment decreases in diameter from the next proximal one. Legs with propodi having four heel spines. Propodi of posterior four legs markedly more slender and with more sole spines than anterior four. Genital pores on all eight second coxae.

MEASUREMENTS (holotype, in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 11.0; trunk width (across 2nd lateral processes), 6.2; proboscis length, 5.2; abdomen length, 4.5; third leg, coxa 1, 2.3; coxa 2, 4.3; coxa 3, 2.9; femur, 14.8; tibia 1, 14.6; tibia 2, 15.8; tarsus, 0.8; propodus, 3.6; claw, 1.8.

DISTRIBUTION.—Known only from the type-locality, northwest of Valdivia, Chile, in 1238 meters.

REMARKS.—Hilton's few preliminary words describing this species are full of errors, beginning with the locality. The latitude and longitude as given by Hilton (1942:97) would have placed the species on the shallow continental shelf of America off Virginia. The type is a male and not a female, and Hilton lists another juvenile while the bottle of paratypes with his label contains 14 juveniles. And his trunk measurement is too short, but the holotype specimen is complete and in an excellent state of preservation.

This species is most closely related to *A. depolaris* Stock, a

species from roughly the same latitude on the Atlantic side of South America. The habitus of both species is similar but Stock's species has extreme dimorphism between the anterior and posterior propodi and has a longer first tibia than the second, both characters which do not agree with *A. dorsiplicata*. The dorsal trunk tubercles of *A. dorsiplicata* are taller and more massive, the coxae are longer, the propodal spines are alike on all eight legs, and the gross size of the species is slightly larger than that of *A. depolaris*.

Hilton's species also has some similarities to *A. clausi*, but more toward the "Victoria Land form" rather than the "Magellanic form" of Fry and Hedgpeth (1969:76–77). The similarities are concentrated in the appendages as figured by Fry and Hedgpeth (1969, fig. 113). The male oviger, distal palp segments, and the propodus are very similar to Hilton's male specimen. The two species are, on the other hand, very different when the trunk, lateral processes, proboscis, and proximal palp segments are compared.

Clark (1977:174–176) omitted this species from his list and key to the genus, obviously by reason of its being a species inquirenda. It would reside in his key, rather uncomfortably, in couplet 15 next to *A. calmani*, to which it is not very closely related.

Ammothea insularis, new species

FIGURE 2

MATERIAL EXAMINED.—CHILE. ISLAS JUAN FERNANDEZ: *Isla Robinson Crusoe*: Found in algae on bivalves by fishermen, coll. W.L. Schmitt, sta 53, 17 Dec 1926, 1♀, 1 juv (paratypes, USNM 234559); Bahia San Juan Bautista, 33°38'20"S, 78°48'50"W, 3–12 m, sta 12-65235, 11 Dec 1965, 1♂ (holotype, USNM 234557), 1♂ (paratype, USNM 234558).

DESCRIPTION.—Size similar to others of non-Antarctic species group but small for genus; leg span about 8 mm. Trunk moderately compact, fully segmented, posterior raised rim of first three segments with low broad tubercle, that of third segment very low, all unarmed. Lateral processes short, little longer than their diameters, separated by half their diameters or slightly less, armed with 1–2 short laterodistal spines on low swellings, spines lacking on anterior of first lateral processes. Sides of neck straight in dorsal aspect, not expanded anteriorly, oviger implantation anterior to but touching first lateral processes. Ocular tubercle fairly wide at base, tapering as truncate cone to flat apex bearing low anterior tubercle. Eyes large, well pigmented, anterior pair larger than posterior pair, lateral sensory papillae prominent.

Proboscis fairly small, about half trunk length, cylindrical, tapering at base and distally, lips flat. Abdomen half proboscis length, erect, with small apical tubercle, armed with pair of long dorsodistal setae as long as segment diameter, several shorter lateral and distal setae.

Chelifores long, slender, with tiny atrophied chelae present.

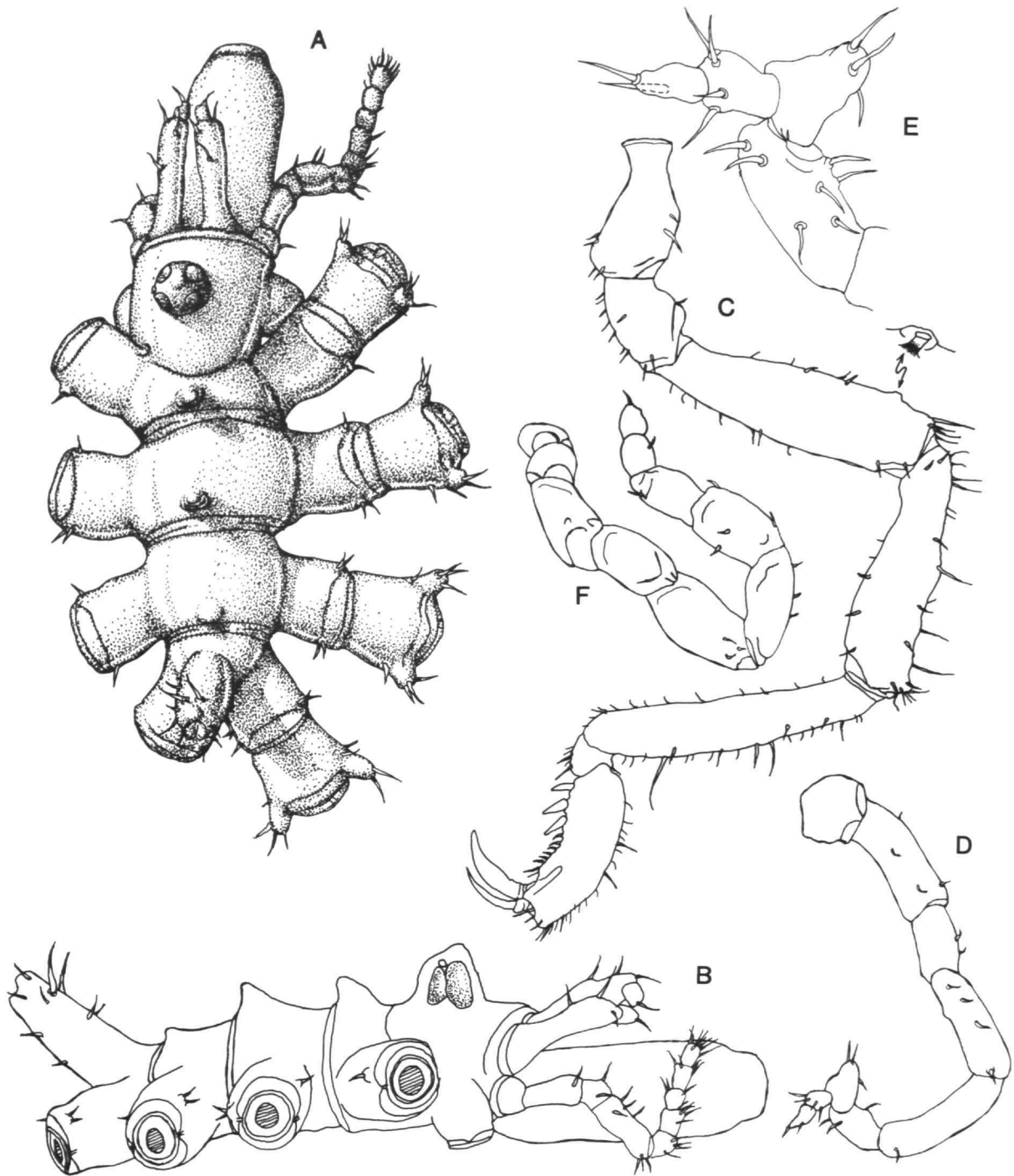


FIGURE 2.—*Ammothea insularis*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, third leg; D, oviger; E, oviger strigilis. Female paratype; F, oviger.

Scape cylindrical, armed with 4–5 distal and laterodistal setae as long as scape diameter. Chelae only knobs, each bearing short distal seta.

Palps short, slender. Fourth segment longest, only about three times longer than its diameter, second segment only 0.6 length of fourth. Terminal five segments only slightly longer than their diameters, armed with few setae as long as segment diameters, increasing in numbers on three distal segments.

Ovigers moderately short, of nine segments. Second, fourth, and fifth segments subequal, armed with few short lateral setae. Sixth segment half length of fifth, armed with 10–11 short setae, seventh segment placed anaxially on sixth, armed with three setae on lateral tubercle or apophysis. Eighth segment placed anaxially on seventh, armed with 5–6 distal setae. Ninth segment coalesced with tenth forming a long slender single segment without hint of segmentation line, armed with single seta at median length and one distally.

Legs moderately long, armed with many very short setae and few longer dorsal and dorsodistal setae. First coxae with low laterodistal tubercles armed with 2–4 short setae. Second tibiae the longest, with femorae slightly shorter and first tibiae the shortest major segments. Cement gland placed dorsodistally, proximal to distal rim of femur, orifice a single low-rimmed pore only slightly elevated above integument. Tarsus very short, armed with several ventral and one dorsal setae. Propodus robust, well curved, armed with three stout heel spines, several tiny sole setae and several short dorsal and distal setae. Claw robust, fairly short, auxiliaries about 0.7 main claw length. Sexual pores ventrodial on second coxae of posterior two pairs of legs. Propodus similarly armed on all legs.

Female: First coxae tubercles smaller or lacking, setae present. Median trunk tubercles entirely lacking but with low swellings anterior to segmentation lines. Oviger with 10 segments, smaller, shorter, no segments carried anaxially, armed with very few lateral and distal setae. Sexual pores on all second coxae.

Juvenile: Chelae atrophy fully before ovigers completely form.

MEASUREMENTS (holotype, in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 1.07; trunk width (across 2nd lateral processes), 0.72; proboscis length, 0.55; abdomen length, 0.27; second leg, coxa 1, 0.19; coxa 2, 0.33; coxa 3, 0.28; femur, 0.73; tibia 1, 0.65; tibia 2, 0.77; tarsus, 0.12; propodus, 0.44; claw, 0.17.

DISTRIBUTION.—Known only from the type-locality, Islas Juan Fernandez, Chile, in 3–12 meters.

ETYMOLOGY.—The name for this species (Latin: *insularis*, of an island, an islander) refers to the type-locality.

REMARKS.—This new species presents an enigma with male ovigers having nine segments (in both specimens examined) and those of the female having ten. The diagnosis of the genus *Ammothea*, in terms of oviger segmentation, is that both sexes have 10-segmented ovigers. The terminal two segments of these males are elongate and have obviously coalesced creating the reduced number. This reduction in segment numbers does

not, I believe, suggest that the new species is something other than a member of the genus *Ammothea*, but only that this species is an exception, something often encountered in the pycnogonids. All other characters agree with the generic diagnosis.

It is becoming more evident, in my opinion, that the genus *Trygaeus* may no longer be tenable. The oviger of this monotypic genus is extremely close to the oviger of this new species and also has nine segments. *Trygaeus* lacks any trace of chelae, having only blunt tipped scapes in the adult, but at least two species of *Ammothea*, *A. hilgendorfi* (Bohm) and *A. ovatoides* Stock, share this character. These two species have, on the other hand, ovigers with 10 segments in both sexes. The palps of *Trygaeus* may have as few as seven segments, but the species usually has eight or nine palp segments, while in the genus *Ammothea*, there are sometimes eight but usually nine palp segments, depending on the species. The only remaining difference between the genera is one less palp segment in some specimens of *Trygaeus communis* Dohrn. Since other specimens of Dohrn's species have as many as nine palp segments, it is possible therefore that his genus should be synonymized under the older generic name of *Ammothea*. The other principal characters are extremely close between the two genera. Perhaps *Trygaeus communis* is a recent sibling species of the *Ammothea hilgendorfi* species-group (the small-sized non-Antarctic *Ammothea* group). This species group includes but is not confined to such long known species as *A. hilgendorfi* (Bohm), *A. magniceps* Thomson, *A. hedgpethi* Utinomi, and *A. australiensis* (Flynn). All of these species have 9-segmented palps and 10-segmented ovigers except for *Trygaeus communis* and this new species, *A. insularis*, which have 9-segmented ovigers (and variable palp segment numbers in *T. communis*, as noted).

This new species is most closely related morphologically to *A. magniceps*. There is controversy (Fry and Hedgpeth, 1969:81–82) concerning possible synonymy between *A. magniceps* and *A. australiensis*, and they are indeed very closely related, if not synonymous. The new species and *A. magniceps* share chelifores with atrophied chelae (as in almost all *Ammothea* species), an oviger seventh segment with a setose lateral bulge or apophysis, very similar trunk habitus, similar ocular tubercles, a dorsodistal tubercle on the abdomen, and very similar leg segments with identical cement gland pores in the male. The differences are found in the nine segments of the male oviger in the new species, much shorter palps, a straight rather than a bulbous proximally constricted proboscis, and distal scape tubercles over the chelae insertions. The female of the new species has a 10-segmented oviger in agreement with other *Ammothea* species, but this oviger is very shortened and has only a few short distal spines or setae rather than the 3–4 sometimes denticulate distal spines of several other non-Antarctic *Ammothea* species. This is another in the continuum of new species which emphasize the seemingly infinite number of new variations to be found among long-recognized genera in the pycnogonids.

Genus *Ammothella* Verrill, 1900

Ammothella heterosetososa Hilton

FIGURE 3

Ammothella heterosetososa Hilton, 1942:299–300, pl. 43; 1943:97.—Stock, 1954:120 [key].—Child and Hedgpeth, 1971:616–617 [text].

MATERIAL EXAMINED.—GALAPAGOS ISLANDS. *Isla Marchena*: Intertidal, coll. *Velero III*, sta 306-35, 2 Dec 1934, 1♂, 1♀ (syntypes, USNM 79435).

Other Material: GALAPAGOS ISLANDS. Same collection as the syntypes (sorted recently from bottom material), 1♂ with eggs. *Isla Fernandina*: Canal Bolivar, 00°15'55"S, 91°26'30"W, 0–3 m, sta 16-66139, 25 May 1966, 1♂ with eggs, 3 juv; same locality, 00°15'43"S, 91°26'38"W, shallow, sta 16-66141, 25 May 1966, 3♂, 4♀, 1 juv.

DISTRIBUTION.—This is a species apparently confined (endemic) to the Galapagos Islands, although with so few collecting records this can not be stated with complete justification at this time. Several species thought to be endemic to the Galapagos have since been taken on the mainland. The collecting depths for this species are from intertidal to 3 meters.

REMARKS.—This species has never been figured adequately and illustrations of a non-type specimen are included here to assist in its identification. The type material is squashed, particularly the male, but other specimens above were compared with the type male, as far as could be accomplished, to reveal any variation present among the specimens.

As expected, there is marked variation among these adults in the proximity of lateral process placement and in the numbers of clubbed and pointed/feathered spines on the appendages. The lateral processes of the syntypes are contiguous over about 0.6 of their length while the males from station 16-66141 have no contiguous areas of their lateral processes although they are separated by very narrow intervals. The large spines of the syntypes are fewer in numbers than more recent material but this probably only reflects loss from breaking off due to age and handling during examination. The clubbed and pointed spines of the chelifores vary in numbers to the greatest extent, but the type male has more clubbed spines, giving the chelifore spines a more crowded appearance than the more recent material examined. There are 2–3 more spines per side on the chelifores of the type male. The spines of the legs agree more closely between older and more recent material except for the spines broken off of the older type material.

This species is closely related to three other compact forms in the large genus *Ammothella*. Its nearest geographic relation is the sympatric *A. dawsoni* Child and Hedgpeth, from the Galapagos. This is a similarly spinose species which differs from Hilton's in having anterodistal tubercles on the cephalic segment, a more oval trunk in dorsal aspect, more widely spaced lateral processes than those of *A. heterosetososa*, a much longer abdomen with very long spines over most of its length, and longer leg segments with many more clubbed spines on the ventral femur and first tibia. There are also length and spination

differences in the palps and ovigers between the two species.

The closest morphological relation to this species is *A. hedgpethi* Fage, described from a male found on the Senegal coast of Africa. The spination of Fage's species is very similar to that of *A. heterosetososa*, including the distal lateral process spines and the clubbed spines of the chelifores. The lateral processes of both species are closely crowded, giving the dorsal habitus a circular aspect. The differences between Hilton's species and *A. hedgpethi* are that the latter species has large anterolateral tubercles on the cephalic segment, much longer palps, most prominent in the distal segments, a longer abdomen with a dorsal curve, and many more clubbed spines on the ventral surface of the femorae and first tibiae. The chelifores are as long as the trunk in *A. hedgpethi*, while they are markedly shorter than the trunk in Hilton's species.

Another species to which *A. heterosetososa* is closely related is *A. rotundata* Child, described from a juvenile specimen found in the northern Philippine Islands shallows. It is difficult to compare a juvenile of one species with the adult of another, but on the assumption that the adult of *A. rotundata* will retain at least the general habitus of the juvenile, the comparison will be generally valid. The similarities occur in the crowded and partly touching lateral processes of both species, the low ocular tubercle of both, the short abdomen with relatively short clubbed and pointed spines, the robust chelifores bearing both forms of spines, and the relatively short leg segments with particular close similarities in the propodus with its sole spines and claws which are the same in both species.

The differences may be partly due to the age of the Philippine specimen. It has small lateral process tubercles, short distal palp segments, an expanded cephalic segment with the ocular tubercle situated on a raised or swollen hump, and fewer spines on the chelifores. Most of these characters will probably be retained by the adult of *A. rotundata*, and each differs from the same character in *A. heterosetososa*.

The single male with eggs from the same station as the syntypes came from residue material kept among USNM collections and was sorted from this material many years after the date in which Hilton published his preliminary (and only) description. The specimen does not therefore constitute a type-specimen as it was never seen by Hilton.

Ammothella spinifera Cole

Ammothella spinifera Cole, 1904:275–277, pl. 12: fig. 8, pl. 20: figs. 7–9, pl. 21: figs. 1–6.—Child, 1979:8 [key, literature], 11–12, figs. 3f–h.—Salazar-Vallejo and Stock, 1987:269–275, figs. 1–5.

MATERIAL EXAMINED.—ECUADOR. Salinas coast, shallow, sta 16-HA-3, 3 May 1966, 1♂; Bahia de Santa Elena, E of La Libertad, 02°13'09"S, 80°54'38"W, 3 m, sta 16-6671, 8 May 1966, 100+ specimens.

DISTRIBUTION.—Cole's species has been taken in many places from California south to the Pacific coast of Panama and has successfully crossed the Isthmus where it was taken in several places at the Caribbean side of the Canal. It is known

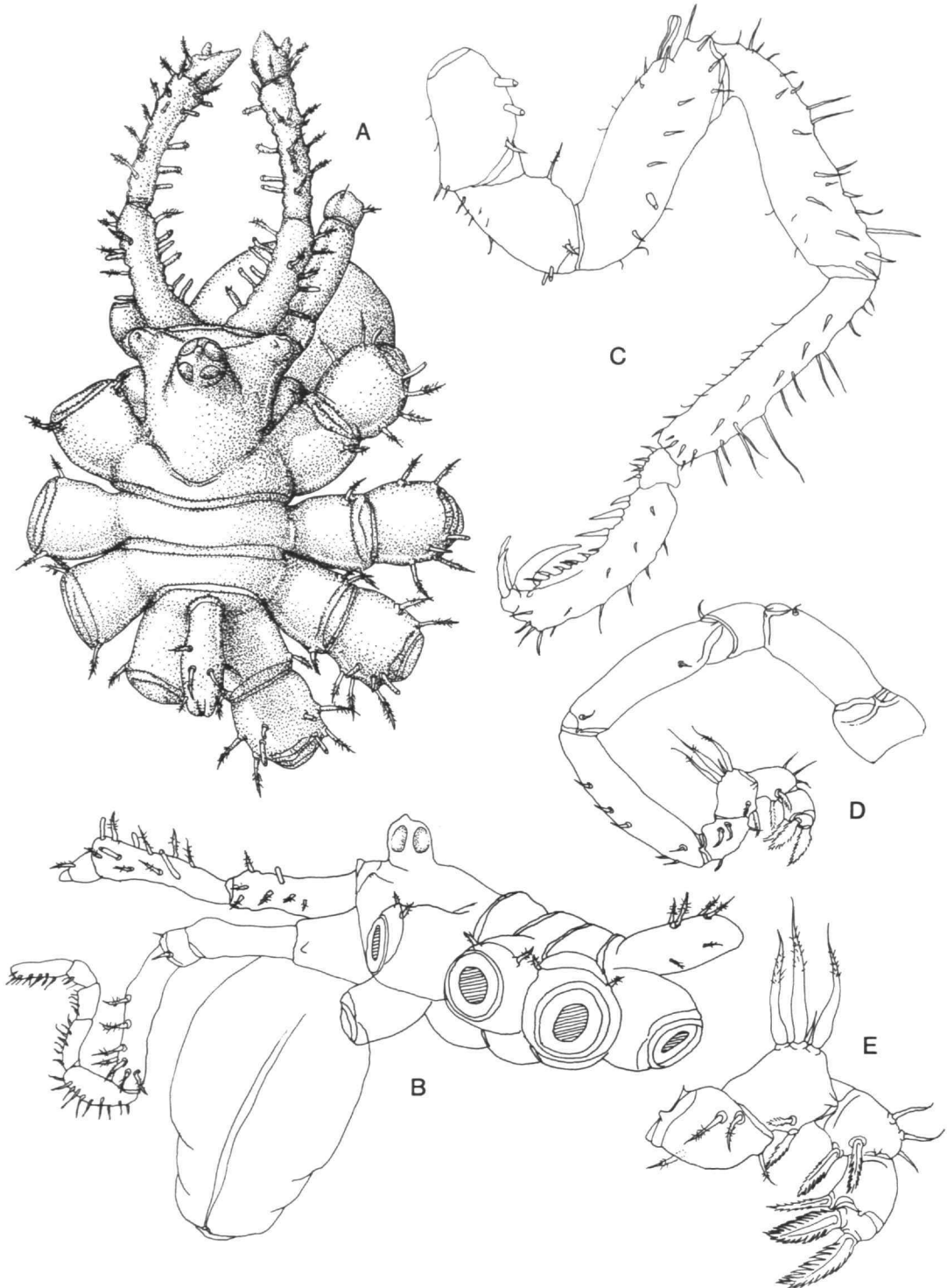


FIGURE 3.—*Amnothella heterosetosa* Hilton, male: A, trunk, dorsal view; B, trunk, lateral view; C, third leg; D, oviger; E, oviger strigilis, enlarged.

only from intertidal and littoral depths. These records extend its distribution to Ecuador and to the Southern Hemisphere for the first time.

REMARKS.—A sympatric species, *Ammothella symbia* Child, is quite close in several characters and general habitus to this species, but this species has longer chelifores measuring 0.7 as long as the proboscis, while those of *A. symbia* measure only 0.5 of the proboscis length. There are short dorsomedian trunk spines on most specimens of *A. spinifera*, while *A. symbia* lacks median trunk adornment.

Genus *Ascorhynchus* Sars, 1877

Ascorhynchus birsteini Turpaeva

Ascorhynchus birsteini Turpaeva, 1971:107–109, fig. 2.

MATERIAL EXAMINED.—PERU. Milne-Edwards Deep of Peru-Chile Trench: NW of Trujillo, 08°10.5'S, 81°08.1'W, beam trawl, 6002 m, coll. *Eltanin*, sta 1-37, 9 Jun 1962, 1♂ with eggs, 6♂, 10♀, 1 juv; W of Trujillo, 08°25'S, 81°05'W, beam trawl, 6052–6220 m, sta 11-72, 12 Oct 1965, 1♂, 2♀, 1 juv; SW of Trujillo, 08°22'S, 81°02'W, beam trawl, 6260 m, sta 11-77, 13 Oct 1965, 1♂; W of Chimbote, 08°44'S, 80°45'W, beam trawl, 5986–6134 m, sta 11-113, 19 Oct 1965, 1♂ with eggs, 1♀.

DISTRIBUTION.—The two type specimens described by Turpaeva were taken in almost the same locality as the *Eltanin* specimens listed above, at 6040 meters. There is little significance in these limited records except that they continue to maintain the species as an endemic in the northern parts of the Peru-Chile Trench with a slightly expanded depth distribution of 5986–6260 meters.

REMARKS.—This slender, delicate, blind species is quite distinctive and would be difficult to confuse with any other deep-sea *Ascorhynchus*, mostly because it lacks eyes and an ocular tubercle (except for a low swelling) and has a glabrous nontuberculate trunk. It has the typical inflated posteriors of the trunk segments, but there are no tubercles, spikes, or long setae on these or any part of the trunk. The trunk and appendages are clothed in a field of tiny setules and the male has a few longer leg setae measuring half their segment diameter or slightly longer. The propodal claws are all equal in size and the first or anterior pair are not reduced in length. The proboscis has a hint of a proximal suture ring but a typical corresponding ring distally is lacking. The juvenile chelae are fully formed until a late juvenile stage and are toothless pincers about twice the size of the atrophied adult chelae. There is almost no variation of diagnostic characters in the 25 specimens examined except in the tarsus which is slightly shorter than its usual length in some specimens.

Ascorhynchus comatum, new species

FIGURE 4

MATERIAL EXAMINED.—ECUADOR. W of Quito,

01°30'S, 82°19'W, 1363–1369 m, trawl, coll. R/V *Vema*, sta V-15-62, 3 Dec 1958, 1♀ (holotype, USNM 234560), 4♂ (no complete legs), 1♀, 2 juv (paratypes, USNM 234561).

DESCRIPTION.—Size fairly large for genus, but not a giant species; leg span 25.4 mm. Trunk, lateral processes, all appendages proximally covered with rugosities or papillae, disappearing distally. Trunk slender, fully segmented with posterior of each segment swollen into cowl at insertion of next posterior segment, cowls without mediandorsal tubercles, spines, or setae. Lateral processes well separated by 1.5 times their maximum diameters, slender proximally, swollen or clubbed distally, armed with lateral rows of 4–8 long setae, most longer than maximum lateral process diameters. Neck moderately long, straight, with 2–3 lateral long setae between palp and oviger insertions. Oviger implantation separate from and just anterior to first lateral processes. Ocular tubercle at anterior of ocular segment, dorsal to palp implantation, tall, four times longer than its diameter, tip bifurcate with lateral tubercles slightly longer than ocular tubercle diameter, eyes entirely lacking.

Proboscis slender, slightly shorter than combined length of first two trunk segments, with lightly marked proximal and distal segmentation lines making typical tripartite shape, lips slightly pointed. Abdomen long, extending almost to distal tip of second coxae of fourth leg pair, carried slightly downcurved, armed with two extremely long dorsomedian setae and two shorter distal setae.

Chelifores small, slender, scapes 1-segmented, 3.5 times longer than their diameters, armed with 3–5 very long lateral setae. Chelae tiny, vestigial, with distal cleft marking remainder of fingers.

Palps typical, slender, inserting at anterolateral corners of cephalic segment, third segment longest, armed with few short dorsal and ventral setae. Fifth segment only 0.6 length of third, armed with few short setae and single long lateral seta proximally. Sixth segment half length of seventh, eighth through tenth increasingly shorter and more slender, sixth through tenth armed with dense ventral setae slightly longer than their segment diameters.

Ovigiers slender, fourth segment longest, fifth 0.95 length of fourth, sixth 0.6 length of fifth, all armed with few tiny setae. Strigilis segments each shorter than last, armed ectally with 1–2 short setae and endally with 1–2 rows of major and minor denticulate spines, the minor or smaller spines with the formula 7:5:4:0, the major or larger spines with the formula 7:5:3:3. Terminal claw moderately small, well curved, shorter than terminal segment. Major denticulate spines with 4–5 lateral serrations and 5–6 tiny distal serrations per side.

Legs slender, armed with many long setae, some 2–3 times longer than diameter of their segments and few short setae distally on major segments. First tibiae the longest, femorae slightly longer than second tibiae. Femorae slightly inflated distally. Tarsus almost 0.6 length of propodus, both armed with uneven row of short sole spines of equal length. Claw subequal to tarsus length, slender, well curved.

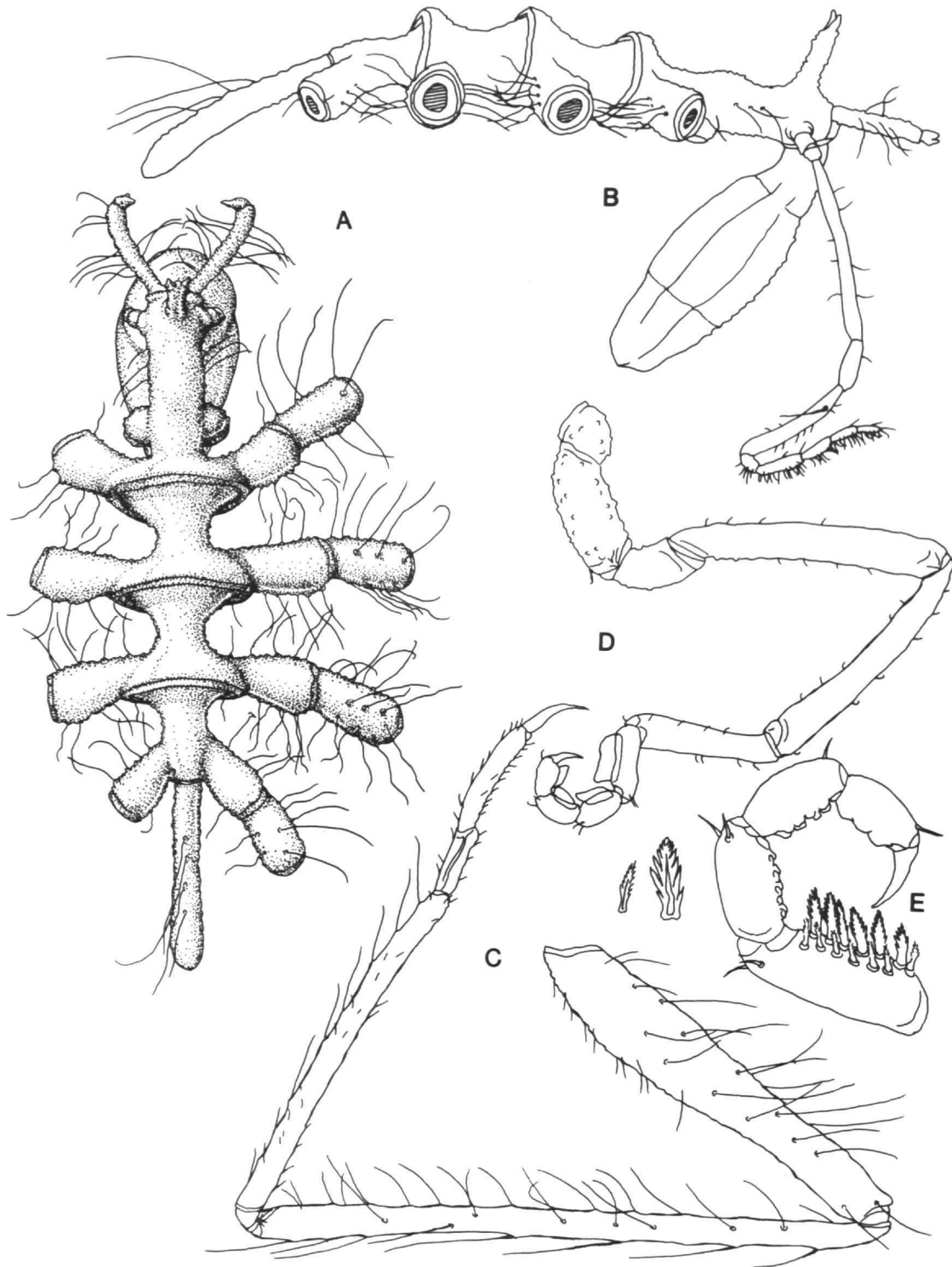


FIGURE 4.—*Ascorhynchus comatum*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, third leg; D, oviger; E, oviger strigilis with major and minor denticulate spines, enlarged.

Male (all legs missing): Slightly smaller than female. Lateral setae more numerous than those of female. Oviger only slightly longer but with 1-2 more denticulate spines per segment.

MEASUREMENTS (holotype, in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 3.59; trunk width (across 2nd lateral processes), 2.08; proboscis length, 2.37; abdomen length, 1.26; fourth leg, coxa 1, 0.7; coxa 2, 0.79; coxa 3, 0.53; femur, 2.23; tibia 1, 3.12; tibia 2, 2.14; tarsus, 0.62; propodus, 0.96; claw, 0.59.

ETYMOLOGY.—The species name (Latin: *comatus*, meaning with long hair or shaggy) has reference to the very long lateral setae of the new species.

DISTRIBUTION.—This species is known only from the Pacific west of Quito, Ecuador, its type-locality, in 1363-1369 meters.

REMARKS.—This new species is superficially close to at least two other Pacific deep-sea species, *Ascorhynchus laterospinum* and *A. mariae* Turpaeva. The former species was taken only slightly to the west in the Galapagos Islands in 1159 meters, and has very similar 1-segmented chelifores, and similar proboscis, palps, ovigers, and legs. It has a similar series of lateral spines on the neck and lateral processes, but these are spines and not the long setae of *A. comatum*. The ocular tubercle of both species is tall, with a bifurcate tip, both lack eyes, and the tubercle is placed at the anterior rim of the cephalic segment. The lateral processes are the same shape and length in both species, but those of the new species are more widely spaced. Another major difference is the lack of large dorsomedian trunk tubercles in the new species which are present on *A. laterospinum*.

The differences between this new species and *A. mariae* are more marked, but the two species share the character of a blind, anterior-placed, bifurcate, ocular tubercle, a similar proboscis, palp, and oviger, and well separated lateral processes of similar length. Turpaeva's species, taken in the Kurile-Kamchatka Trench at about 3200 meters, lacks the distinctive setation of the new species and has, instead, setae on dorsomedian trunk swellings which also lack the typical dorsomedian tubercles. Although the tarsi and propodi of the two species are of similar lengths, the claws of *A. mariae* are shorter than those of *A. comatum*.

The very long leg setae are reminiscent of several species in the genus *Cilunculus*, a genus noted for its long setae of the trunk or appendages. This genus also has several species bearing long blind ocular tubercles with more than one having a bifurcate tip similar to that of the new species. Although *Cilunculus* is an uneasy genus in its classification, there are several characters making it more closely related to the genus *Ammothella* than to *Ascorhynchus*.

Ascorhynchus inflatum Stock

Ascorhynchus inflatum Stock, 1963:323-326, figs. 2-3.—Turpaeva,

1971a:284-286, fig. 6; 1971b:104-105; 1974:285; 1975:242-244, fig. 8(3-4).

MATERIAL EXAMINED.—PERU. Milne-Edwards Deep of Peru-Chile Trench: W of Chimbote, 08°48'S, 80°40'W, beam trawl, 5069-5173 m, sta 11-178, 3 Nov 1965, 1♂; NW of Chimbote, 08°56'S, 80°38'W, beam trawl, 4423-4536 m, sta 11-182, 4 Nov 1965, 1♀.

DISTRIBUTION.—This species has been taken at scattered localities in the Kuril-Kamchatka Trench, Scotia Sea, the Cape Basin off South Africa, and in the Peru-Chile Trench, in depths of 2743-6070 meters. Turpaeva (1971b:104-105) reported two lots of specimens from further north in the Peru-Chile Trench in 4100 and 5300 meters. Its distribution therefore appears to be cosmopolitan or nearly so at abyssal to hadal depths.

REMARKS.—This is another easily recognized blind species having a 1-segmented scape. It has a variably tall blind ocular tubercle, tall slender mediandorsal trunk tubercles and similar tubercles on the lateral processes. There are scattered short setae on the legs and the tarsus is only about 0.3 the propodal length. Turpaeva (1971a, fig. 6(1)) figures a specimen with small eyes, but neither of the specimens in hand have any hint of eyes. The cement gland pore(s) of the male specimen are not evident.

Ascorhynchus paxillum, new species

FIGURE 5

MATERIAL EXAMINED.—COSTA RICA. Cocos Ridge, E of Isla Cocos, 06°21'N, 85°17'W, 1892 m, coll. R/V *Vema*, sta V-15-60, 30 Nov 1958, 1♀ (holotype, USNM 234562) (badly damaged), 1 juv (paratype, USNM 234563).

DESCRIPTION.—Size moderately small for genus; leg span about 16 mm. Trunk (bent, crushed, badly damaged) robust, rather stout in relation to length, fully segmented, posterior of each segment flared into cowl with tiny dorsomedian tubercle. Lateral processes about 1.5 times as long as wide, separated by slightly less than their diameters, armed with 2-3 dorsolateral short setae and tall slender dorsodistal tubercle less than half as long as segment diameter. Ovigers implanted just anterior to bases of first lateral processes. Ocular tubercle low, rounded, eyes small, sensory papillae prominent, tubercle placed at median length of cephalic segment, anterior to oviger implantation. Anterior of cephalic segment with anterolateral tubercles slightly more robust and longer than those of lateral processes, directed anteriorly.

Proboscis (contorted, collapsed) rotund, with proximal hint of suture lines, without distal suture lines. Abdomen fairly short, held little above horizontal, swollen distally, armed with 4-6 short distal setae.

Chelifore scapes 1-segmented, extremely short and small, only as wide as palp bases, as long as 2.5 times their diameters, armed with three setae as long as their diameters. Chelae tiny

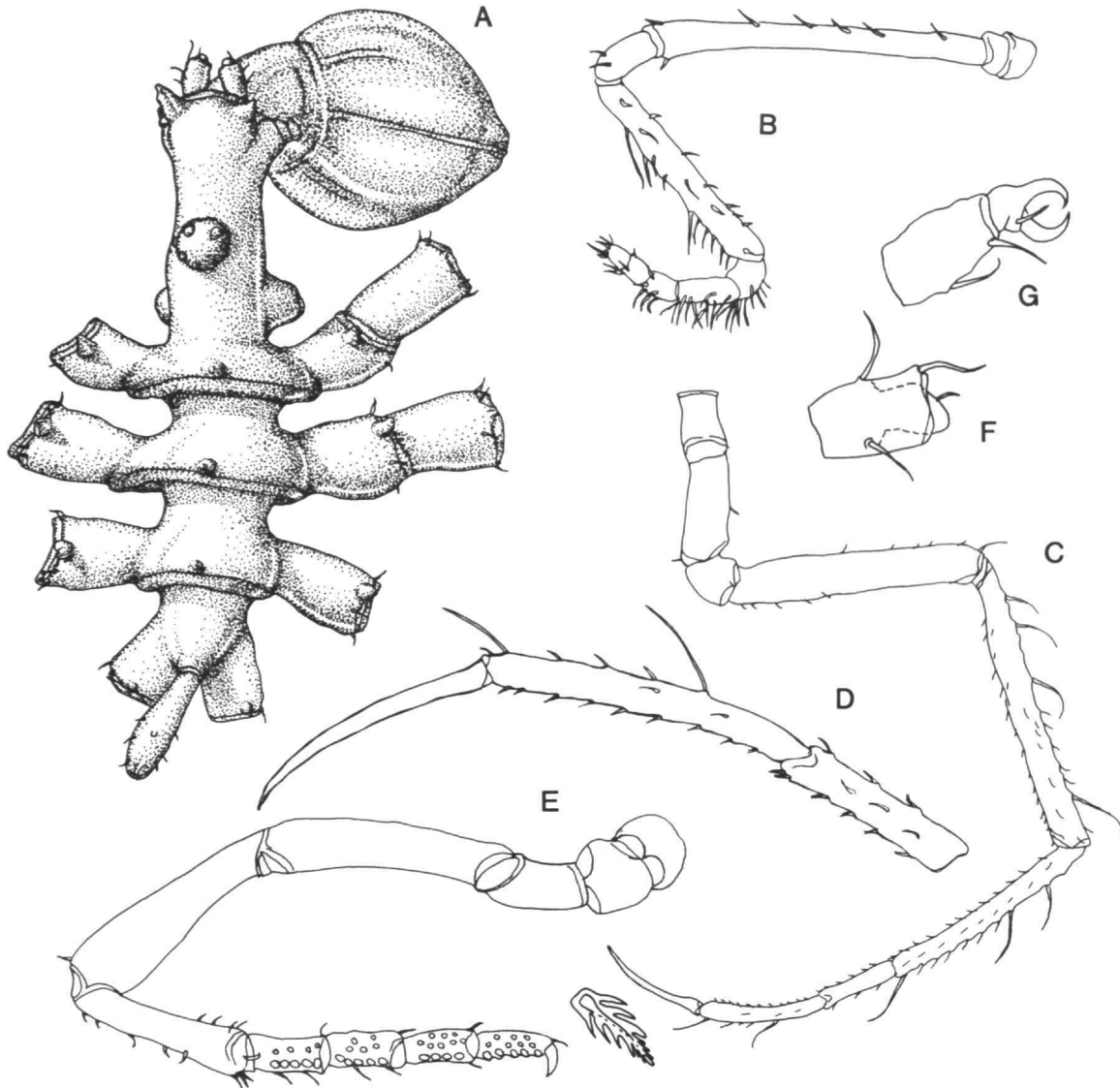


FIGURE 5.—*Ascorhynchus paxillum*, new species, holotype: A, trunk, dorsal view; B, palp; C, third leg; D, third leg terminal segments, enlarged; E, oviger, with major denticulate spine, enlarged; F, chelifore, enlarged. Juvenile paratype; G, chelifore, enlarged.

globular knobs, everted within scape tip, armed with one tiny seta each.

Palps typical, third segment longest, fifth only 0.6 length of third, both armed with few short setae, fifth with 3-4 longer setae, slightly longer than segment diameter. Sixth curved, shorter than seventh, terminal three segments only slightly longer than wide, all armed with fringe of setae of about same length as their segment diameters.

Ovigers also typical, first three segments quite short, fourth and fifth subequal, sixth only 0.7 length of fifth but armed with

few very short lateral setae. Strigilis segments each slightly shorter than last, armed with 1-2 ectodistal setae and three rows of endal denticulate spines, two rows of minor or short spines and one row of major or larger spines, major spines in the formula 6 : 4 : 4 : 5, with 3-4 large serrations and several tiny distal serrations per side. Terminal claw very small, only about half length of terminal segment, slender.

Legs slender, lightly setose with few very short setae and several longer dorsal setae measuring 1.5 times segment diameter. First tibiae longest with femorae and second tibiae

respectively shorter. Tarsus slightly more than 0.6 length of propodus, both armed with few short endal setae and row of tiny endal sole spines of equal size. Propodus with pair of long ectal spines longer than twice segment diameter. Claw extremely long, longer than tarsus, almost 0.8 propodal length, slender, moderately curved, of equal length on all legs.

Juvenile: Chelae fully formed, fingers without teeth, only slightly larger than adult chelae knobs, ovigers mere buds. Tubercles of trunk middorsum and lateral processes smaller, more pointed.

Male: Unknown.

MEASUREMENTS (holotype, in mm).—Trunk length (chelifore insertion to 4th lateral processes, approximate), 2.29; trunk width (across 2nd lateral processes, approximate), 1.33; proboscis (too badly damaged to measure accurately); abdomen, 0.45; fourth leg, coxa 1, 0.37; coxa 2, 0.64; coxa 3, 0.31; femur, 1.46; tibia 1, 1.63; tibia 2, 1.19; tarsus, 0.46; propodus, 0.74; claw, 0.58.

ETYMOLOGY.—The species name (Latin: *paxillus*, a peg or small stake) refers to the extremely long propodal claws of this new species.

DISTRIBUTION.—Known only from the type-locality on the Cocos Ridge, east of Isla Cocos, Costa Rica, in 1892 meters.

REMARKS.—It is unfortunate that these two specimens were so badly damaged during their collection because of their being a new species and thus more difficult to describe with some characters macerated.

The characters of this new species, where they are clearly available for comparison in these two specimens, are perhaps most closely related to *Ascorhynchus breviscapus* Stock, which shares the features of very small and short chelifores, very similar legs in regard to segment lengths and setation, short terminal palp segments, small mediandorsal and lateral process tubercles, placement of the ocular tubercle and ovigers, and a short abdomen. They are both from fairly deep water, Stock's species was taken in 1361 meters off South Africa, and this new species in 1892 meters. The depth similarity probably has very little or no significance.

The differences are numerous but mostly rather small in degree. The lateral processes of Stock's species are shorter and more widely separated than are those of the new species. Stock's species also has a shorter blind ocular tubercle, shorter oviger segments, shorter claws on the anterior pair of legs than those of the posterior six legs, shorter proximal palp segments, taller and more pointed mediandorsal trunk tubercles with much smaller and shorter lateral process tubercles, and oviger denticulate spines which are shorter and have fewer lateral serrations.

This new species also has some close similarities to *A. parvituberculatum* Stock, the type female from Indonesia in 10–15 meters. Both of these species have a very similar trunk habitus with moderately separated lateral processes, tiny trunk dorsomedian tubercles, a low rounded ocular tubercle placed in the same midneck position, and a very similar oviger. The new

species differs from Stock's Indonesian species in having a chelifore scape only half as long and one which bears setae while that of Stock's species is glabrous, having much longer propodal claws of equal length on all legs, a proboscis having flat lips instead of pointed lips, much taller lateral process tubercles, much shorter terminal palp segments, a slightly longer abdomen carried in a more elevated position (although abdomen elevation may have little or no significance), and the new species has large anterior-pointing tubercles over the chelifore insertions while Stock's species has only slight elevations in this position.

Genus *Eurycyde* Schiodte, 1857

Eurycyde longisetosa Hilton

FIGURE 6

Eurycyde longisetosa Hilton, 1942a:99; 1942b:305–307, pl. 46.—Stock, 1955:263 [key].—Child, 1988:7 [key].

Eurycyde encantada Child and Hedgpeth, 1971:617–619, fig. 4.—Child, 1988:7 [key].

MATERIAL EXAMINED.—COLOMBIA. N of Punta Utria, 06°00'N, 77°21'W, 37 m, coll. R/V *Velero III*, sta 423–35, 25 Jan 1935, 1♂ (holotype of *E. longisetosa*, USNM 79431), 1♂ (paratype of same species, USNM 125892).

GALAPAGOS ISLANDS. *Isla San Salvador*: Bahia Sullivan, tidepool, coll. J.L. Barnard, sta 144, 16 Feb 1964, 1♂ (holotype of *E. encantada*, USNM 125160). *Isla Santa Cruz*: Bahia Academy, 00°45'S, 90°18'W, 33 m, sta 18B–790, 20 Sep 1966, 1♂ with eggs, 1♂.

ECUADOR. *Isla El Viejo*: 28 km N of Salinas, 01°56'N, 80°49'W, 25 m, sta 16–6665, 5 May 1966, 1♀. Bahia de Santa Elena, 1 km NE of Punta Ballenita, 02°12'20"S, 80°52'10"W, 8–9 m, sta 16–6670, 8 May 1966, 1♂ with eggs, 2♂, 1♀, 1 juv.

DISTRIBUTION.—This species was known from the types of *E. encantada* in the Galapagos Islands and known only from the preliminary description of *E. longisetosa* from Colombia. It is now known from these localities and also from Ecuador with a depth range of 0–37 meters.

REMARKS.—Examination of the two types along with the present specimens demands that they all be united under the senior synonym, *E. longisetosa*. There is more variation evident in these specimens, on the other hand, than is usually known among the species of this fairly stable genus. The greatest variation is apparent in the degree of lateral process separation and in the tubercles and spination of the first coxae. The lateral processes of the holotype of *E. encantada* are separated by about half their diameters while in two paratype juveniles the lateral processes are almost touching. This holds true for other specimens and the type of *E. longisetosa*, where the lateral processes are well separated to actually touching in various specimens.

In males, the first coxae anterior and posterior tubercles can be almost of equal size to a reduction of about 0.3 in the

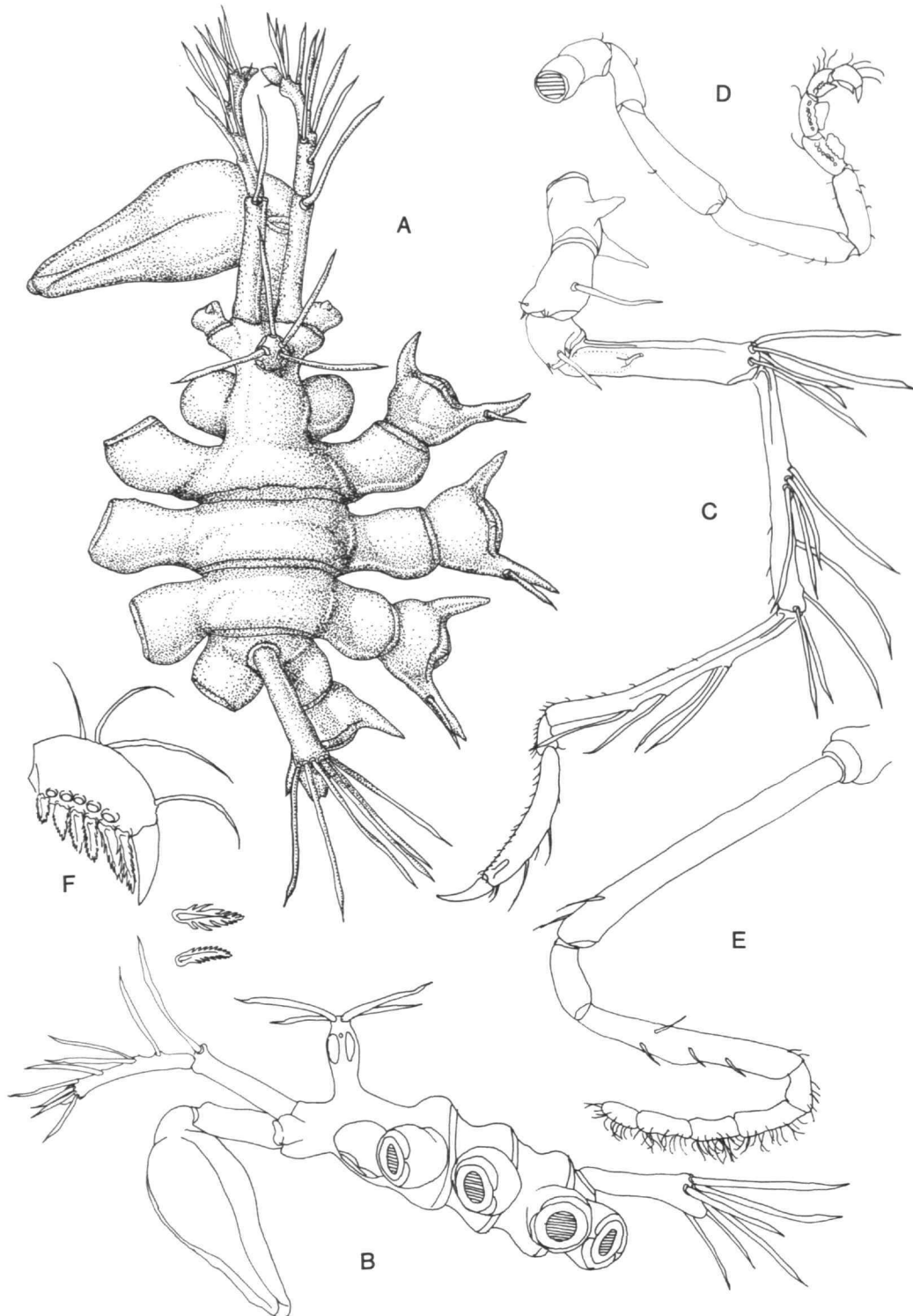


FIGURE 6.—*Eurycyde longisetosa* Hilton, male: A, trunk, dorsal view; B, trunk, lateral view; C, third leg; D, oviger; E, palp; F, oviger strigilis terminal segment with two forms of denticulate spines, enlarged.

anterior tubercle over the posterior one. In females, both tubercles are reduced in relation to those of the male, but the anterior tubercle can be very tiny in relation to the posterior tubercle. Placement of the large broad spine on the posterior one of these paired tubercles is usually less variable. It is situated at 0.3 or 0.4 of the distance to the tubercle tip and never appears on the anterior tubercle of the pair. It can, on the other hand, be present or absent from the first coxae. It may be lacking on the posterior four first coxae or lacking only on the posterior pair, but is always present on the anterior four first coxae.

In a comparison of cement gland tubes among these specimens, the small proximal tube is always found on the posterior surface of the femur, but may vary in length of the tube. In more than one male, the tube does not extend beyond the diameter of the femorae while in others it is longer and extends beyond this segment diameter. The specimens are very much alike on other characters.

The large diameter ocular tubercle spines are fairly short in this species, but are often broken off necessitating a careful search for their basal rings in order to establish their past presence. There are usually four of these spines on fresh material.

Eurycyde spinosa Hilton

FIGURE 7

Eurycyde spinosa Hilton, 1916:19-24, figs. 1-6; 1939a:32; 1939b:72.—Hedgpeth, 1941:254 [text, key], pl. 9.—Hilton, 1942a:98.—Stock, 1955:263 [key].

MATERIAL EXAMINED.—UNITED STATES. CALIFORNIA: Laguna Beach, Two Rock Bay, intertidal, coll. W.A. Hilton, Sep 1915, 1♂? (holotype, 5 slides, USNM 168759). (Also several other California non-type specimens).

GALAPAGOS ISLANDS. *Isla Fernandina*: 00°15'43"S, 91°26'38"W, shallow, sta 16-66141, 25 May 1966, 1♂ with eggs, 1♀; same locality and date, sta 16-66142, 3♀. *Isla San Salvador*: Bahia James, 00°12'S, 90°50'W, intertidal, sta 18B-794A, 23 Sep 1966, 2♀.

DISTRIBUTION.—This species was known only from several localities in California, from San Francisco to San Diego, but had never been taken to the south. It is recorded from the Galapagos Islands for the first time here, but has yet to be found on the mainland coast of South America. All recorded collecting depths are very shallow.

REMARKS.—This species has never been adequately illustrated (Hilton's figures have been described as delirious!) and a set of figures is therefore provided here. The type-specimen is crushed, contorted, and collapsed on old dried balsam mounted slides, but enough of it can be recognized to confirm the identity of these specimens along with a few others from California.

It is surprising how many characters this species shares with

its sympatric species, *E. longisetosa*. There are two main characters which mark the two species as different but very closely related. First, the ocular tubercle of *E. spinosa* is only as tall as its diameter, or even shorter, and has 4-6 short apical spines, while that of *E. longisetosa* is 3-4 times taller than its diameter and has (usually) 4 long apical spines. Second, the abdomen of *E. spinosa* is barely longer than the fourth lateral processes and bears 4-5 broad spines, the longest of which is only about twice as long as the maximum diameter of the abdomen. The abdomen of *E. longisetosa* extends to the distal tips of the first coxae of the fourth legs and has 5-6 very long spines, the longest of which is about as long as the abdomen itself and perhaps four times longer than the abdomen's diameter.

All other differences between the two species seem to be those of degree. The chelifores of both are extremely close but those of *E. spinosa* are slightly shorter and a little broader in diameter, the number of long spines of the second chelifore segment vary in numbers in both species (7-9 spines), the spacing of the lateral processes can be from well separated to almost touching in both species, the first coxae spines are only on the posterior tubercles of *E. longisetosa*, while they are shorter, more toward the base of the tubercle, and there can also be a similar spine on the anterior tubercle of the first coxae of *E. spinosa*. The cement gland usually has a longer tube in *E. spinosa* but the gland and tube are very similar in both species, and the tibiae and femorae of *E. spinosa* are shorter than those segments of *E. longisetosa*. These differences in characters might be attributable to variation and the two species synonymized were it not for the two striking differences of the ocular tubercles and abdomina. Even with the few specimens examined, there is no observable tendency in any of the specimens of *E. spinosa* toward a longer abdomen or a taller ocular tubercle. Both are uniformly short in all specimens of *E. spinosa* available for examination.

Genus *Prototrygaeus* Stock, 1975

EMENDED DIAGNOSIS.—With the characters of the type-species of the genus, *Prototrygaeus ammothelloides* Stock, 1975, except palps 6- to 8-segmented in both sexes; oviger 9- or 10-segmented in male, 10-segmented in female.

Prototrygaeus contrarius, new species

FIGURE 8

MATERIAL EXAMINED.—ECUADOR. Outer Gulf of Guayaquil, 03°19'S, 80°43'W, ~80 m, Menzies trawl, sta 18B-769D, 10 Sep 1966, 1♂ (holotype, USNM 234564), 1 juv (paratype, USNM 234565).

DESCRIPTION.—Size moderately small; leg span 8.3 mm. Trunk slender, fully segmented, without tubercles or setae. Lateral processes extremely attenuated, slender, cylindrical, separated by half to as much as their diameters at their bases,

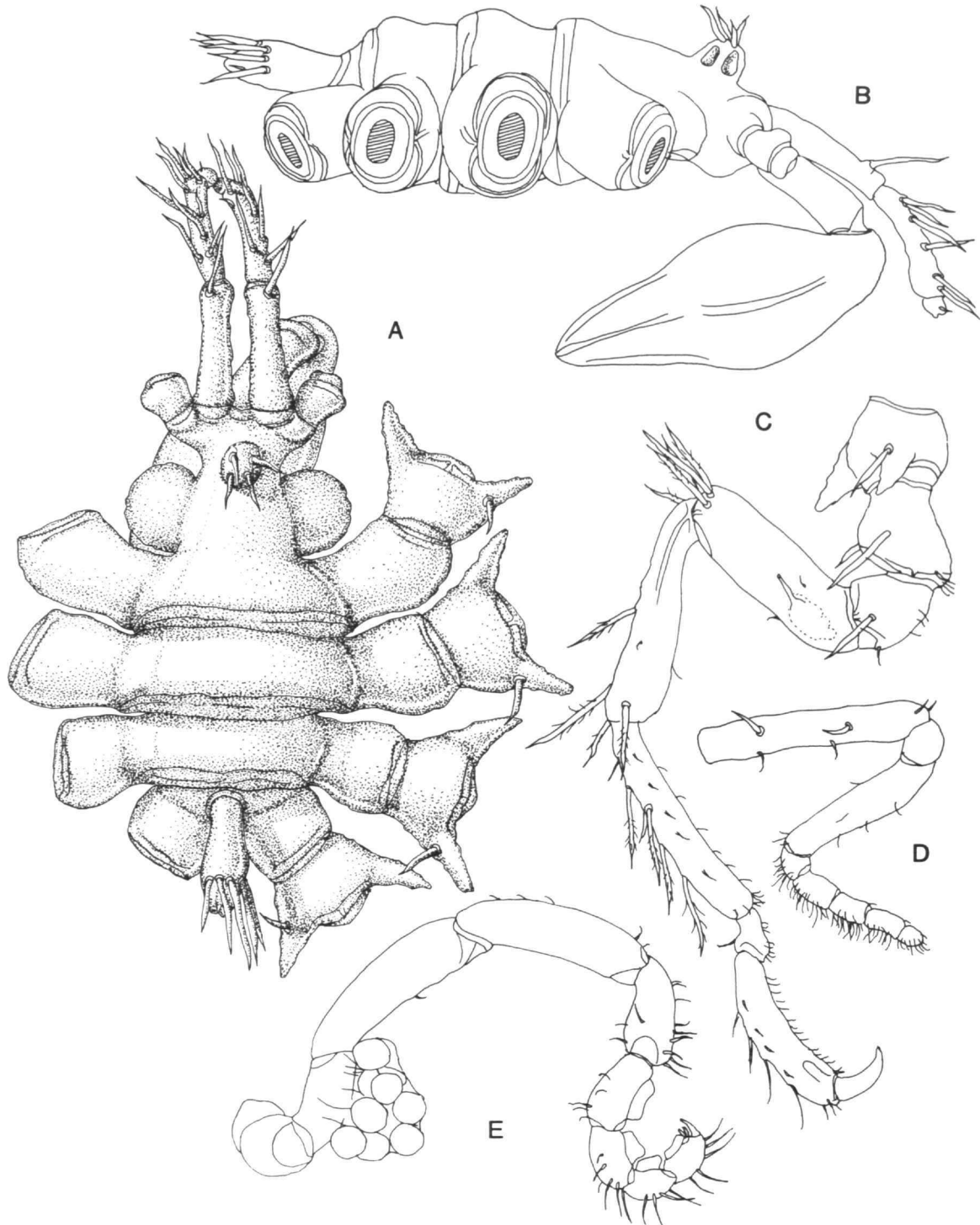


FIGURE 7.—*Eurycyde spinosa* Hilton, male: A, trunk, dorsal view; B, trunk, lateral view; C, third leg; D, palp; E, oviger, with several eggs attached.

glabrous, span of second lateral processes greater than trunk length. Ocular tubercle long, cylindrical, placed at anterior of cephalic segment, bearing tiny slender tubercle at apex. Eyes large, slightly pigmented, placed at apex of tubercle, posterior pair slightly larger than anterior pair.

Proboscis slender, gradually swelling distally before constricted tip with small rounded lips. Proboscis shorter than chelifores. Abdomen very long, extending to midpoint of second coxae of fourth legs, cylindrical, slightly swollen distally, carried horizontally, armed with few short distal setae.

Chelifores very long, slender, scape of two segments, second slightly more than three times length of first, second armed with 4-5 long dorsodistal and lateral setae, each 2-3 times as long as segment diameter. Chelae atrophied, with hint of fingers remaining as two distal knobs, armed with single lateral seta longer than chela diameter.

Palps short, not as long as proboscis, 8-segmented, armed with a short distal seta on third segment, 5-6 longer setae on fourth, terminal four segments with 4-5 long ventral and lateral setae, as long as twice segment diameter. Terminal segment a knob of reduced diameter hardly longer than wide.

Oviger 10-segmented, slender, second segment longest, fourth about 0.6 as long as second, third and fifth subequal, shorter than fourth. Second segment armed with two distal setae, fourth with 2-3 short distal setae, fifth with one lateral and two longer distal setae. Sixth segment with 6-7 long lateral setae, seventh joined anaxially to sixth, armed with two very long laterodistal setae, eighth with two similar setae and one endal short spine. Ninth segment a curved cylinder twice as long as wide, unarmed, tenth a tiny bud as wide as long, armed with two short terminal broad spines lacking serrations.

Legs very setose with many very long lateral setae on coxae and major segments. First coxae with pair of long laterodistal setae, second with 3-4 long lateral and ventrodistal setae, third coxae with same form of lateral setae and several ventral setae. Femur with 7-8 long proximoventral setae and three pairs of medianlateral setae. Cement gland dorsodistally with slender tube slightly shorter than segment diameter pointing distally. First tibiae with several long dorsal setae, 4-5 pairs of long lateral setae and several long ventrodistal setae. Second tibiae with similar dorsal and lateral setae and many shorter ventral setae along length of segment. Tarsus very short, with long dorsal seta and several shorter ventral setae. Propodus slender, slightly curved, armed with 4-5 dorsodistal setae longer than segment diameter, eight short lateral setae, four slender heel spines and 11-12 slightly shorter sole setae. Claw half propodal length, well curved, armed with 4-5 endal teeth pointing distally, increasing in size distally. Auxiliary claws as long as main claw, very slender, well curved.

Female: Unknown.

Juvenile: Chelae with simple pincer-like fingers lacking teeth. Trunk more stout, ocular tubercle much broader, capped with round knob at apex. Palp 8-segmented, ovigers incompletely formed in specimen available.

MEASUREMENTS (holotype, in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 0.91; trunk width (across 2nd lateral processes), 1.02; proboscis length, 0.5; abdomen length, 0.56; second leg, coxa 1, 0.19; coxa 2, 0.38; coxa 3, 0.33; femur, 0.72; tibia 1, 0.78; tibia 2, 0.7; tarsus, 0.07; propodus, 0.32; claw, 0.16.

DISTRIBUTION.—Known only from the type-locality, the outer Gulf of Guayaquil, Ecuador, in about 80 meters.

ETYMOLOGY.—The species name (Latin: *contrarius*, against, opposite) refers to the lack of agreement or contrariness in appendage segment counts between this new species and the type of the genus, *Prototrygaeus ammothelloides* Stock, and to the fact that the two species are found on opposite sides of the South American Continent.

REMARKS.—This new species contributes another set of differences in appendage segment counts now known for the three species of this genus; *P. ammothelloides* Stock, *P. jordanae* Child, and *P. contrarius*, new species. Stock's type of the genus has 6-segmented palps and 9-segmented ovigers in the male (10 in the female). The type of *P. jordanae* has 7-segmented palps and 10-segmented ovigers in both sexes. This new species has 8-segmented palps and 10-segmented male ovigers (female unknown). The palp segment counts vary among many genera of Ammotheidae, but it is unusual to have variation in the number of oviger segments in any single genus of the family. This fact is not without precedent and is common in such genera as *Pycnogonum* and *Anoplodactylus*. These count differences suggest a genus in transition or at least one which is unsettled and undergoing rapid speciation.

The differences between this new species and Stock's species, besides the appendage segment counts, are that the new species has a small apical cone on the tall ocular tubercle, much longer and more slender chelifores and proximal palp segments, lacks the lateral papillae or tiny tubercles between the lateral processes, and generally has a more slender habitus with notably longer lateral processes. In many characters, the two species are remarkably close and probably form a geminate pair on either side of the South American land mass.

The new species differs in more characters from *P. jordanae* than from *P. ammothelloides*, besides those of the palp segment counts. The general habitus of *P. jordanae* is more stout with shorter lateral processes than in *P. contrarius*. The chelifores of *P. jordanae* are shorter, being little longer than the proboscis, and the palp is longer (longer than the proboscis) than that of the new species (palp shorter than the proboscis). The ocular tubercle is not as tall and has a truncate cone at its apex in *P. jordanae*, and the shorter abdomen is carried erect rather than horizontally as in the new species.

The legs of all three species are remarkably alike including the setation, relative lengths of the major segments, tarsus and propodal lengths, and main and auxiliary claw lengths with the main claw of all three species armed with 3-4 endal teeth. The strigilis segments of male ovigers are quite small in relation to the lengths of the proximal five segments and the proboscis is more or less cylindrical in all species known.

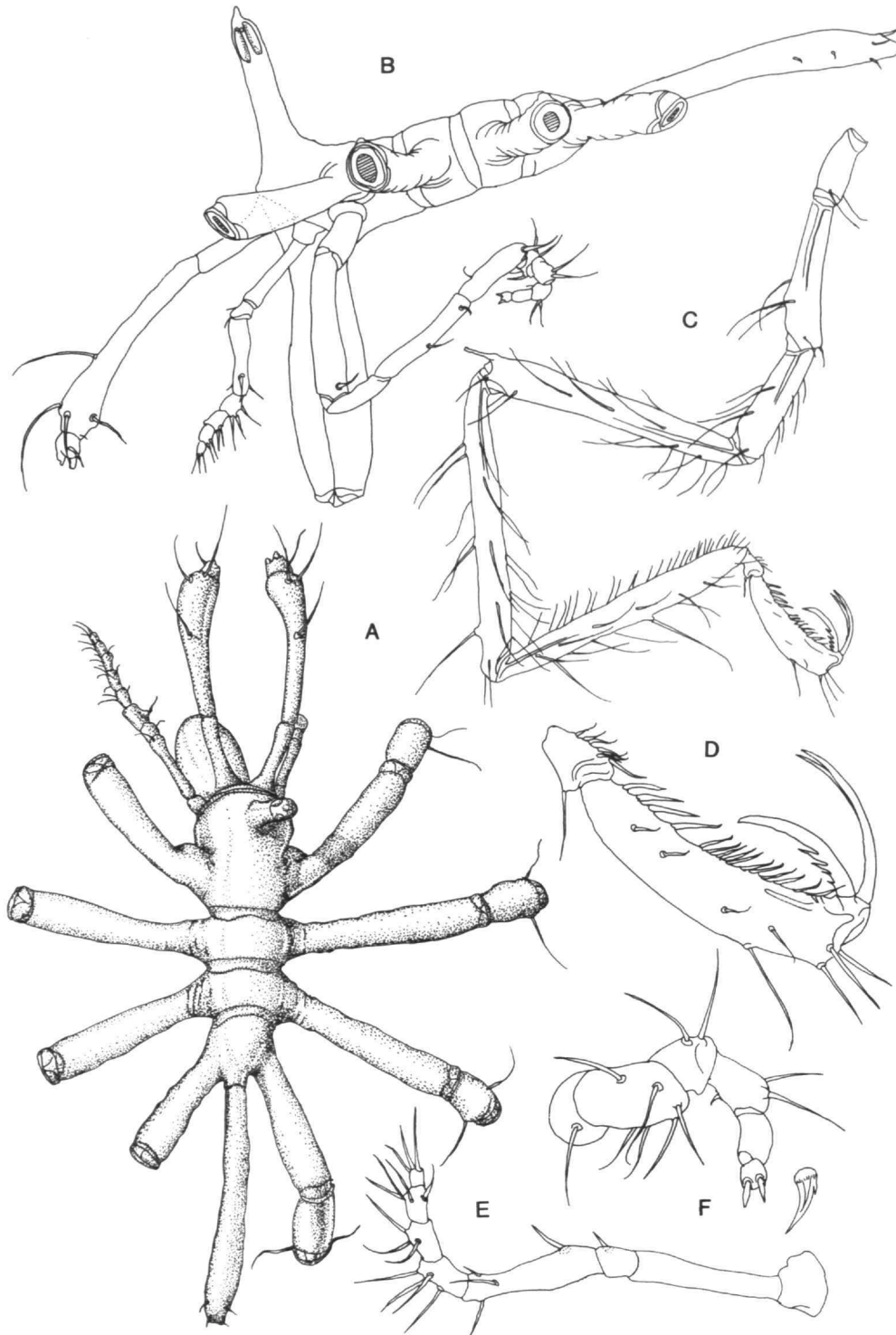


FIGURE 8.—*Prototrygaeus contrarius*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, third leg; D, third leg terminal segments, enlarged; E, palp; F, oviger terminal segments with one terminal spine, enlarged.

Genus *Tanystylum* Miers, 1879*Tanystylum distinctum* Child and Hedgpeth

Tanystylum distinctum Child and Hedgpeth, 1971:623-625, fig. 6.

MATERIAL EXAMINED.—GALAPAGOS ISLANDS. *Isla Isabela*: Tagus Cove, reef N of anchorage, intertidal rubble, coll. *Velero III*, sta 154-34, 15 Jan 1934, 2♂ with eggs, 1 juv. *Isla Hood*: Punta Suarez, W of blow hole, 5-9 m, coll. D. Hope, Feb 1978, 1♂ with eggs.

ECUADOR. Bahia de Santa Elena, 02°13'09"S, 80°54'38"W, 3 m, sta 16-6671, 8 May 1966, 23 specimens.

CHILE. *Isla San Felix*: N of Rocas de Peterborough, 26°16'S, 80°06'W, 75 m, sta 12-MV65-IV-37, 7 Dec 1965, 1♂.

DISTRIBUTION.—It is surprising to find this species as far south as the *Isla San Felix* off the Chilean coast in 75 meters. The species was described from a Galapagos Islands type series found in 0-6 meters. Until the present specimens were collected, it had not been recorded from any other place and was not known from the mainland.

REMARKS.—All of these specimens agree in their main characters with each other but not entirely with the type material. The distinctive characters of this species are the anterior placement of the abdomen, the low ocular tubercle with a small apical cone, the male oviger which lacks a seventh segment apophysis, a 4-segmented palp, and moderately broad chelifores which are quite visible in dorsal aspect.

Variation in this species accounts for differences in the ocular tubercle which was damaged and laterally compressed in the type as figured by Child and Hedgpeth (1971:624, fig. 6a, b). In fresh specimens, the ocular tubercle is round in dorsal aspect and in some specimens is slightly taller than that of the type. The abdomen of the type also seems to have been damaged, although several other specimens of the type series have shortened abdomina. The abdomina of the specimens in hand are variously longer in length with some measuring twice the height of the ocular tubercle, particularly among the Santa Elena specimens, but the abdomen is always placed anteriorly, allowing the separation between the fourth lateral processes to show in dorsal view. The terminal oviger spines are simple and without any denticulations in all males examined.

Tanystylum intermedium Cole

Tanystylum intermedium Cole, 1904:278-280, pl. 21: figs. 7-9, pl. 22: figs. 1-7, pl. 23: figs. 1-3.—Child, 1979:28-29 [literature].

MATERIAL EXAMINED.—ECUADOR. *Isla La Plata*: N of anchorage, 01°16'S, 81°06'W, 13-18 m, coll. *Velero III*, sta 213-34, 10 Feb 1934, 3♂, 1 juv. Bahia de Santa Elena, near La Libertad, 02°11'28"S, 80°56'31"W, 8-9 m, sta 16-6670, 8 May 1966, 40+ specimens.

GALAPAGOS ISLANDS. *Isla Wenman*: Intertidal rocks, 01°22'S, 91°49'W, coll. *Velero III*, sta 144-34, 11 Jan 1934, 1♀ ovig. *Isla Isabela*: Tagus Cove, intertidal coral rubble, coll. *Velero III*, sta 152-34, 14 Jan 1934, 1♂ with eggs, 4♀, 2 juv.

PERU. *Islas Lobos de Afuera*: Main isle W of light, 06°57'S, 80°42'W, shore rocks, coll. *Velero III*, sta 391-35, 15 Jan 1935, 1 juv. Callao, harbor off Penal Colony, 12°09'S, 77°10'W, 10 m, coll. *Velero III*, sta 370-35, 11 Jan 1935, 2 juv.

DISTRIBUTION.—This species is known to be widely distributed along the Pacific coast of the Americas from California south to northern Chile, in intertidal and shallow waters.

Tanystylum malpelensis Child

Tanystylum malpelensis Child, 1979:30-32, fig. 10.

MATERIAL EXAMINED.—GALAPAGOS ISLANDS. *Isla Wenman*: Intertidal rocks, 01°22'S, 91°49'W, coll. *Velero III*, sta 144-34, 11 Jan 1934, 1♂.

DISTRIBUTION.—This species was known from four type-specimens taken at *Isla Malpelo*, Colombia, in shallow water. This limited distribution is now extended to the northern Galapagos at *Wenman Island*, still in shallow water.

REMARKS.—This is a species difficult to confuse with any other in this large genus due to its possibly unique proboscis configuration. It appears to have an additional or second segment at the base of an otherwise common proboscis. This basal segment is a truncate cone bearing a definite suture line between it and the remainder of the barrel-shaped proboscis.

The abdomen of this species is similar to that of *T. distinctum*, but the shorter palp, the proboscis characters, and the different shape of the oviger seventh segment, lacking an apophysis, and its juncture with the eighth segment serve to separate this species from *T. distinctum* and all others.

Tanystylum cinctum, new species

FIGURE 9

MATERIAL EXAMINED.—ECUADOR. Bahia de Santa Elena, 02°13'09"S, 80°54'38"W, 3 m, sta 16-6671, 8 May 1966, 1♂ (holotype, USNM 234566), 1♂ with eggs, 4♀ (paratypes, USNM 234567).

DESCRIPTION.—Size very small; leg span 4.3 mm. Trunk circular, unsegmented, with partial fold or crease dorsally between ocular tubercle and abdomen. Lateral processes contiguous, each armed with a low conical dorsodistal tubercle bearing a short seta, except posterior pair, and a low rounded tubercle with seta on anterolateral surface of each lateral process except anterior pair. Cephalic segment extending only slightly beyond circle formed by contiguous lateral processes, armed at anterolateral corners with very short spine on low tubercle. Ocular tubercle large, almost at anterior of cephalic segment on elevated surface, about 1.5 times taller than its base, with a tall nodose apical cone at anterior and low rounded tubercle posteriorly. Eyes large, darkly pigmented, anterior pair larger than posterior pair, lateral sensory papillae prominent. Abdomen long, twice length of basal swelling, tapering slightly from basal bulge to pointed tip bearing 7-8 short setae.

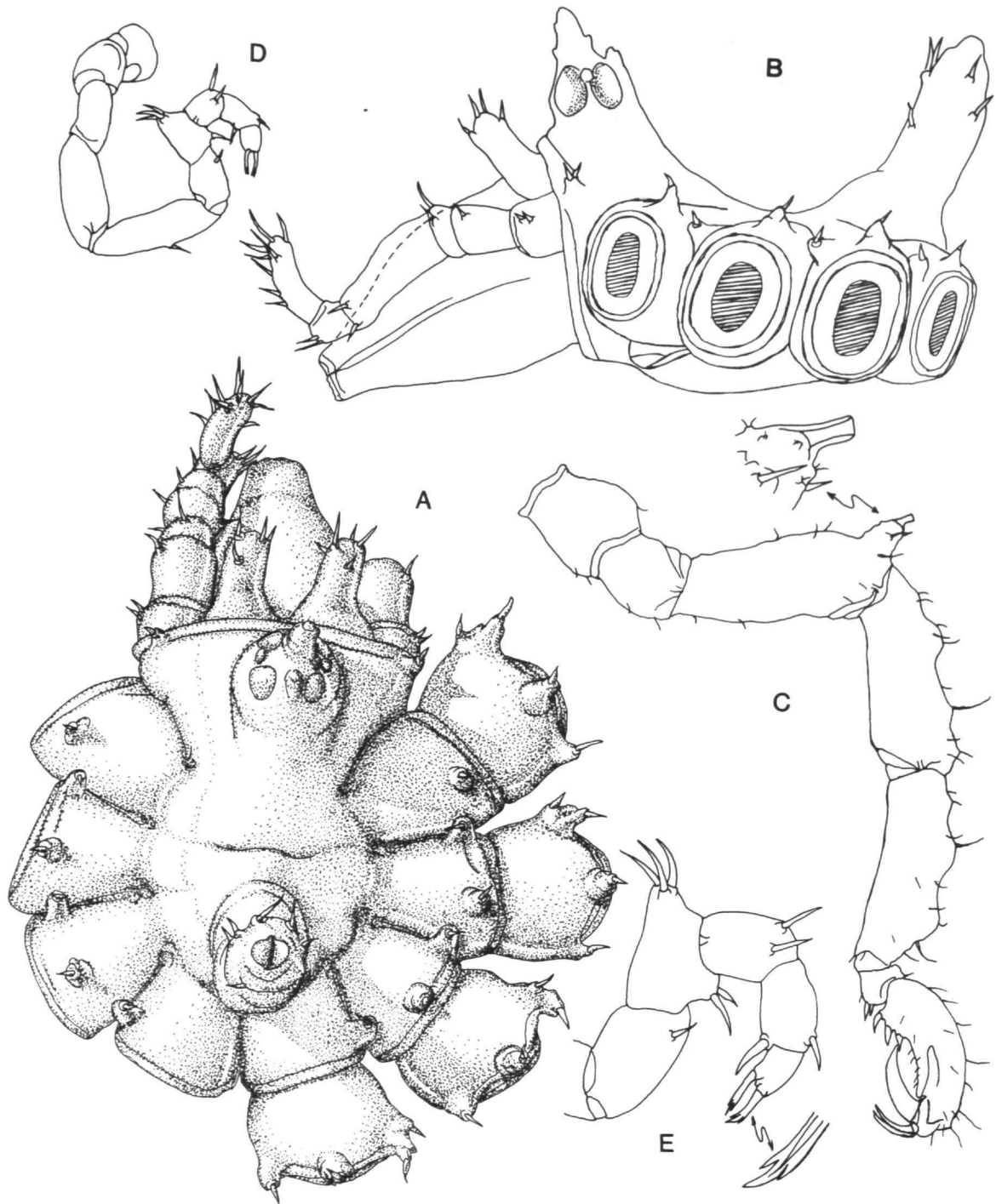


FIGURE 9.—*Tanystylum cinctum*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, third leg with enlargement of cement gland tube; D, oviger; E, oviger strigilis and one terminal spine, enlarged.

Abdomen placed well anterior, anterior of base in line with juncture of second and third pair of lateral processes, posterior not reaching to tips of fourth lateral processes and allowing their juncture to appear in dorsal view.

Proboscis bottle-shaped, broad at base, sides tapering gradually to become concave near tip. Mouth and lips small, flat.

Chelifore stumps large, with broad bases in dorsal aspect, carried bent dorsally, almost erect, armed with 5-6 short distal setae.

Palps 6-segmented, first five segments as long as proboscis. First and second segments subequal in length, third only half as long as its diameter, all armed with 1-2 short lateral setae. Fourth segment longest, three times longer than its diameter, armed with several short lateral setae, fifth segment little longer than its diameter, armed with 3-4 ventral setae, sixth segment long, slender, twice length of fifth, armed with few ventral and distal setae as long as segment diameter.

Ovigers typical, fourth and fifth segments longest but only about three times their diameters, seventh segment with lateral apophysis bearing three apical setae not as long as segment diameter and two slender endal spines. Eighth segment carried anaxially on seventh, armed with 2-3 ectal setae, without endal spines. Ninth segment slightly smaller than eighth, armed with one ectal seta and one endal plain spine, tenth segment smaller, only slightly longer than wide, with two distal spines each bearing pair of lateral teeth distally.

Legs also typical, with three dorsal bulges bearing setae on tibiae. Femur slightly longer than tibiae, bearing very short cement gland tube dorsodistally on large tubercle flanked by smaller tubercles with setae. Propodus robust, well curved, with three broad heel spines and several shorter sole spines. Claw large, broad, well curved, auxiliaries slender, slightly over half main claw length.

Female: Trunk and legs slightly larger, tubercles smaller or lacking on lateral processes. Ocular tubercle apical cone not as tall. Oviger smaller, typical for females, without denticulate spines or lateral teeth on terminal segment.

MEASUREMENTS (holotype, in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 0.63; trunk width (across 2nd lateral processes), 0.61; proboscis length, 0.36; abdomen length, 0.28; third leg, coxa 1, 0.14; coxa 2, 0.15; coxa 3, 0.13; femur, 0.39; tibia 1, 0.33; tibia 2, 0.33; tarsus, 0.09; propodus, 0.28; claw, 0.16.

DISTRIBUTION.—The new species is known only from the type-locality, Bahia de Santa Elena, Ecuador, in 3 terms.

ETYMOLOGY.—The species name (Latin: *cinctum*, a girdle, belt, or zone) pertains to the belt of the equator and thus to Ecuador, its type-locality.

REMARKS.—This new species was taken at the same station as several hundred other specimens of *Tanystylum*, including *T. distinctum* and *T. oculospinosum*. The specimens of this type-series do not conform to the set of variations found among the other specimens, most of which were *T. oculospinosum*.

They may constitute just another variation of the latter species, but several characters are sufficiently different than any of Hilton's species examined from the same station that it is felt a new species designation is justified.

The ocular tubercle and abdomen of *T. oculospinosum* are less extreme in their configuration and not as tall as those of this new species. In all specimens of Hilton's species examined, the ocular tubercle is shorter and has a much smaller apical cone. In some specimens, including the type-series, the ocular tubercle is much lower and only has a very small apical papilla. The abdomen originates in a marked bulbous swelling and is carried at a low oblique angle, sometimes even horizontally, in *T. oculospinosum*. The palp in Hilton's species typically has one less segment although the third or longest segment often has a proximal pseudosegment line or constriction under the integument to signify the partial division between segments three and four. I find no specimens in which this segmentation line is complete, but in all specimens of the new species the line is complete giving the palp an additional segment. Otherwise, the remaining segments of the palp are very much alike in both species. Nothing definitive can be said about the lateral process tuberculation of either species because those of *T. oculospinosum* are sufficiently variable as to include specimens with tubercles which correspond to those of *T. cinctum*. The proboscis of Hilton's species is never as bulbous proximally, at least in the many specimens examined, as that of *T. cinctum*, and the small distal tip is more constricted over a greater length than that of the new species, imparting a longer neck to its bottle shape. The two species are otherwise very similar, including having a male oviger bearing the seventh segment apophysis.

The other species collected at this station, *T. distinctum*, shares fewer characters in common with the new species than does *T. oculospinosum*. The critical character immediately separating the two is the lack of a seventh segment apophysis on the male oviger of *T. distinctum*, a character present in the new species.

The ocular tubercle of the new species is very similar to that of *T. mexicanum* Child, but in other characters such as the fewer and shorter palp segments and very constricted distal proboscis, the new species differs markedly from the Mexican species, a species unfortunately described with only females available.

Tanystylum oculospinosum Hilton

Tanystylum oculospinosum Hilton, 1942:70.—Child, 1979:34 [literature].

Tanystylum tubirostre Stock, 1954:117-120, figs. 24, 25.

Tanystylum tubirostrum.—Stock, 1975:984.—Child, 1979:34-35 [literature]; 1982:363. [New synonymy.]

?*Tanystylum mexicanum* Child, 1979:32-34, fig. 11. [New synonymy.]

MATERIAL EXAMINED.—ECUADOR. Bahia de Santa Elena, 02°13'09"S, 80°54'38"W, 3 m, sta 16-6671, 8 May 1966, 200+ specimens.

GALAPAGOS ISLANDS. *Isla Wenman*: 01°22'S,

91°49'W, intertidal rocks, coll. *Velero III*, sta 144-34, 11 Jan 1934, 2♂, 2 juv. *Isla Baltra*: W side, 00°25'55"S, 90°17'25"W, sta unknown, 14 May 1966, 1♂, 1♀. *Isla Santa Cruz*: Bahia Academy, 00°45'11"S, 90°18'15"W, 8-10 m, sta 16-66112, 19 May 1966, 2♂, 6♀, 2 juv. *Isla Isabela*: Point 3 km NW of Tagus Cove, 00°14'27"S, 91°23'22"W, 0-7 m, sta 16-66134, 24 May 1966, 1♂ with eggs, 1♀ [returned to Museum of Comparative Zoology, Harvard University]; Canal Bolivar, Punta Tortuga, intertidal rocks, sta 16-66137, 24 May 1966, 1 juv [returned to M.C.Z.]; Tagus Cove, intertidal algal mat, 00°12'S, 91°23'W, coll. D. Hope, sta 9, Feb 1978, 1♀, 1 juv; Caleta Iguana, 00°57'S, 91°28'W, 6 m, coll. D. Hope, sta 13, Feb 1978, 1♂ with eggs, 2♀. *Isla Fernandina*: 00°15'43"S, 91°26'38"W, intertidal, sta 16-66141, 25 May 1966, 1♂, 1♀; same locality and date, depth unknown, sta 16-66142, 3♂, 1♀, 2 juv. Nameless small island near Isla Santa Cruz, intertidal rocks, coll. D. Hope, sta 26A, 22 Feb 1978, 1♂, 1♀, 1 juv.

PERU. ISLAS LOBOS DE AFUERA: Main isle W of light, shore rocks, 06°57'S, 80°42'W, coll. *Velero III*, sta 391-35, 17 Jan 1935, 1♂, 1♀, 1 juv.

DISTRIBUTION.—This species (as *T. oculospinosum*) has been recorded in several places in Baja California, Mexico, and the Galapagos Islands, and (as *T. tubirostrum*) on the Pacific coast of Mexico and Panama, and from Stock's type specimens in the Netherlands West Indies, and finally from Bermuda, all in shallow and littoral depths.

If this species includes *T. mexicanum*, as suspected, then it is also known from several localities along the Pacific coast of middle Mexico in subtidal depths.

Its distribution is extended by these collections to the Peru and Ecuador coasts to as far as almost 07°S with depths recorded of 0-10 meters.

REMARKS.—Examination of *T. oculospinosum* specimens from the Galapagos reported in Child and Hedgpeth (1971: 619-623, fig. 5), specimens reported in Child (1979:34-35) as both *T. tubirostrum* and *T. oculospinosum*, and several Caribbean specimens identified as *T. tubirostrum*, in addition to the specimens listed here, convinces me that Stock's species is referable to Hilton's senior synonym.

This species displays an unusual degree of variation between mainland and island specimens and those from closely adjacent localities. This variation occurs mainly in the ocular tubercle, abdomen, proboscis shape, and chelifore length. The chelifore stub length has long been a diagnostic character in this genus. If all of these specimens are *T. oculospinosum*, then they have all chelifore lengths from nearly hidden in dorsal view to slightly longer than those of figure 5 of Child and Hedgpeth (1971:620). Short chelifores are a valid character in *T. tubirostrum*, but several of the Galapagos specimens examined for this report have chelifore stubs as short as those of Stock's species.

The proboscis shape of several Galapagos specimens is downcurved and of the same basic shape as that figured for Stock's (1954:118, fig. 24c) type-specimen of *T. tubirostrum*, while in others from the same station, it is not curved and more

stout further toward the tip. The palps of all specimens examined as well as those of the figured specimens have five segments, although the length of the distal segments varies from short to moderately long. The ocular tubercle always has an apical cone of varying size, but in some specimens it is quite tall and almost as long as the ocular tubercle is high. The height of the ocular tubercle itself varies from being shorter than its basal diameter to slightly taller than its diameter and the eyes can be moderately pigmented to lacking any pigment.

The abdomen of all specimens examined and those figured and cited above has a proximal swelling of varying size at its base. The abdominal distal portion extends horizontally, is slightly elevated, or is elevated to as much as 45 degrees from the horizontal in some specimens. The proboscis is always a tapering tube distally but can be curved dorsally, curved ventrally, or be straight in relation to the plane of the proboscis. The lateral process tubercles always have short setae at their tips, but the tubercles can be dorsodistal, dorsolateral, of just low bumps placed somewhere distally. The oviger of every male examined has the seventh segment apophysis as figured for each species named.

The type-series of *T. mexicanum* contains only females, but it is possible that this species is also *T. oculospinosum* in a slightly different guise of characters. The main difference between these species is in the ocular tubercle which is slightly taller and has a slightly larger apical cone than in any of the female specimens examined of *T. oculospinosum*. The oviger of *T. mexicanum* is typical of those of *T. tubirostrum* and *T. oculospinosum* females, including the denticulate spines of the terminal segments and their numbers per segment. The abdomen of *T. mexicanum* is slightly longer and has less of a basal bulge than is typical of the other species, but some specimens examined here have an abdomen of the same shape and elevation as that of *T. mexicanum*. It is unfortunate that at least one male of *T. mexicanum* was not taken in the type-series so that its characters could be described. If it is found in the future to have a seventh oviger segment apophysis (common to the majority of males in this genus), then I believe the three species can be combined.

Family CALLIPALLENIDAE Hilton

Genus *Anoropallene* Stock, 1956

Anoropallene palpida (Hilton)

Palene [sic] *palpida* Hilton, 1939:30.

Anoropallene palpida.—Stock, 1956:46.—Child, 1979:40-41, fig. 3d, 3e [literature].

MATERIAL EXAMINED.—ECUADOR. S of Bahia de Santa Elena, intertidal, sta 16-6668, 8 May 1966, 1♂ with eggs; Bahia de Santa Elena, near La Libertad, 02°11'28"S, 80°56'31"W, 8-9 m, sta 16-6670, 8 May 1966, 1 juv.

PERU. SE of Punta Lomas, 15°39'S, 74°44'W, 30 m, sta 18A-736C, 25 Aug 1966, 2♂ with eggs, 2♀, 21 juv + larv.

DISTRIBUTION.—This species has been commonly collected in localities from southern California to at least as far south as the Panama Canal area. The above records extend its distribution to southern Peru. All captures have taken place in fairly shallow waters and it apparently is often taken on mud bottoms.

REMARKS.—This species belongs to an uneasy genus in which there is controversy over the presence or absence of a terminal oviger claw and auxiliary propodal claws. The auxiliary claws are not a valid diagnostic character as there are several genera with species which either lack or possess these claws (eg., *Nymphon*). It is generally held that a terminal oviger claw has more diagnostic importance (Stock, 1956:46) than auxiliary claws, and this seems to be the case with this species. It lacks both oviger terminal claw and auxiliaries, while the other two species known in the genus (*A. valida* (Haswell) and *A. laysani* Child) lack the oviger claw but have auxiliary claws.

Genus *Callipallene* Flynn, 1929

Callipallene californiensis (Hall)

Pallene californiensis Hall, 1913:131, 133–135, pl. 4: figs. 9–13.
Callipallene californiensis.—Child, 1987:555–556 [literature].

MATERIAL EXAMINED.—GALAPAGOS ISLANDS. *Isla Isabela*: Caleta Iguana, 00°57'S, 91°28'W, 6 m, coll. D. Hope, sta 13, Feb 1978, 1♀, 2 juv. *Isla Floreana*: Black Beach, 01°17'S, 90°29'W, 8 m, coll. D. Hope, sta 22, 21 Feb 1978, 1♂, 1♀.

CHILE. ISLAS JUAN FERNANDEZ: *Isla Robinson Crusoe*: Bahia San Juan Bautista, 33°38'20"S, 78°48'50"W, 3–12 m, sta 12-65235, 11 Dec 1965, 1 juv (returned to MCZ); Puerto Ingles, 33°37'18"S, 78°50'20"W, 26–29 m, sta 12-65240, 12 Dec 1965, 2♂ with eggs, 3♀, 1 juv; W Bahia Carvajal, 10–13 m, sta 12-65256, 15 Dec 1965, 1♂, 1♀; exact locality unknown, 28 m, sta 12-65260, 16 Dec 1965, 6♂, 1♀, 9 juv; same, 0–2 m, sta 12-65261, 16 Dec 1965, 1♀ ovig.; same, depth unknown, coll. with scuba, sta 12-DRAB 134, 13 Dec 1965, 1♀ ovig; W end of West Bay, 33°37'00"S, 78°50'50"W, depth unknown, sta 12-MV65-IV-45, 12 Dec 1965, 1♂ with eggs; off Punta Bacalao, 33°38'12"S, 78°47'48"W, depth unknown, sta 12-MV65-IV-58, 14 Dec 1965, 1 juv.

DISTRIBUTION.—This species was first described from California in shallow localities and was later found in Mexico and in Middle America to Panama in depths from subtidal to 10 meters. This is the first time it has been recorded from South American Pacific localities and from the offshore islands.

REMARKS.—Child (1987:555–556) gave a review of the literature and the diagnostic characters for this species.

Callipallene species indeterminate

MATERIAL EXAMINED.—CHILE. ISLAS JUAN FERNANDEZ: *Isla Robinson Crusoe*: Off Bahia Chupones, 33°41'12"S,

78°57'00"W, depth unknown, sta 12-MV-65-IV-63, 15 Dec 1965, 1♀ ovig.

REMARKS.—This female specimen is three times larger than females of *C. californiensis*, and has extremely long legs, although the terminal leg segments are very similar to those of Hall's species. With a single female, I will not give a name to this specimen which lacks the male diagnostic characters.

Genus *Pallenopsis* Wilson, 1881

Subgenus (*Pallenopsis*) Stock, 1975

Pallenopsis (Pallenopsis) notiosa, new species

FIGURE 10

MATERIAL EXAMINED.—CHILE. W of Bahia Las Canas, 35°27'S, 73°01'W, 290–450 m, sta 18A-697, 9 Aug 1966, 1♂ (holotype, USNM 234568), 1♀ (paratype, USNM 234569).

DESCRIPTION.—Size moderate for the genus; leg span 91 mm. Trunk slender, glabrous, lateral processes separated by about their diameters or slightly less, as long as 1.5 times their diameters, armed with 1–2 short dorsodistal setae. Lateral suture lines conspicuous. Neck narrow, tapering anteriorly to chelifore insertion, ovigers implanted slightly anterior and ventral to first lateral processes. Palp buds oblong, just anterior to oviger implantation. Ocular tubercle at extreme anterior of cephalic segment, erect, twice as long as its diameter, rounded at apex, eyes well pigmented, anterior pair slightly larger and more proximal on ocular tubercle than posterior pair.

Proboscis cylindrical, with slight median swelling, lips rounded, armed with many very short setae. Abdomen long, a curved cylinder, erect, armed with four lateral setae shorter than diameter of segment, and two lateral setae longer than its diameter.

Chelifores massive, scape a single segment with hint of median segmentation line, armed dorsally with many short setae. Chelae large, palm a long oval with many short distal setae and several longer ventral setae. Fingers articulated anaxially, short, slightly curved, with pad of integument bearing many short setae on proximal third of movable finger. Immobile finger slightly shorter than movable finger, with tiny ridge of integument on cutting edge.

Palp a single segmented oval.

Oviger with many short setae on each segment, increasing in numbers on distal segments. Second and fourth segments subequal, third about 0.6 their length, fifth the longest segment, about 1.2 the length of fourth. Sixth segment very curved, short, with many ectal setae but without endal recurved spines. Strigilis segments each increasingly smaller in diameter and length than last, armed with many ectal and endal setae, only those of short terminal segment longer than segment diameters.

Legs long, slender, armed with long lateral and dorsal setae increasing in numbers on second tibiae. Second coxae very long, three times length of third coxae, femorae and first tibiae subequal, second tibiae almost 1.5 times longer. Tarsus very

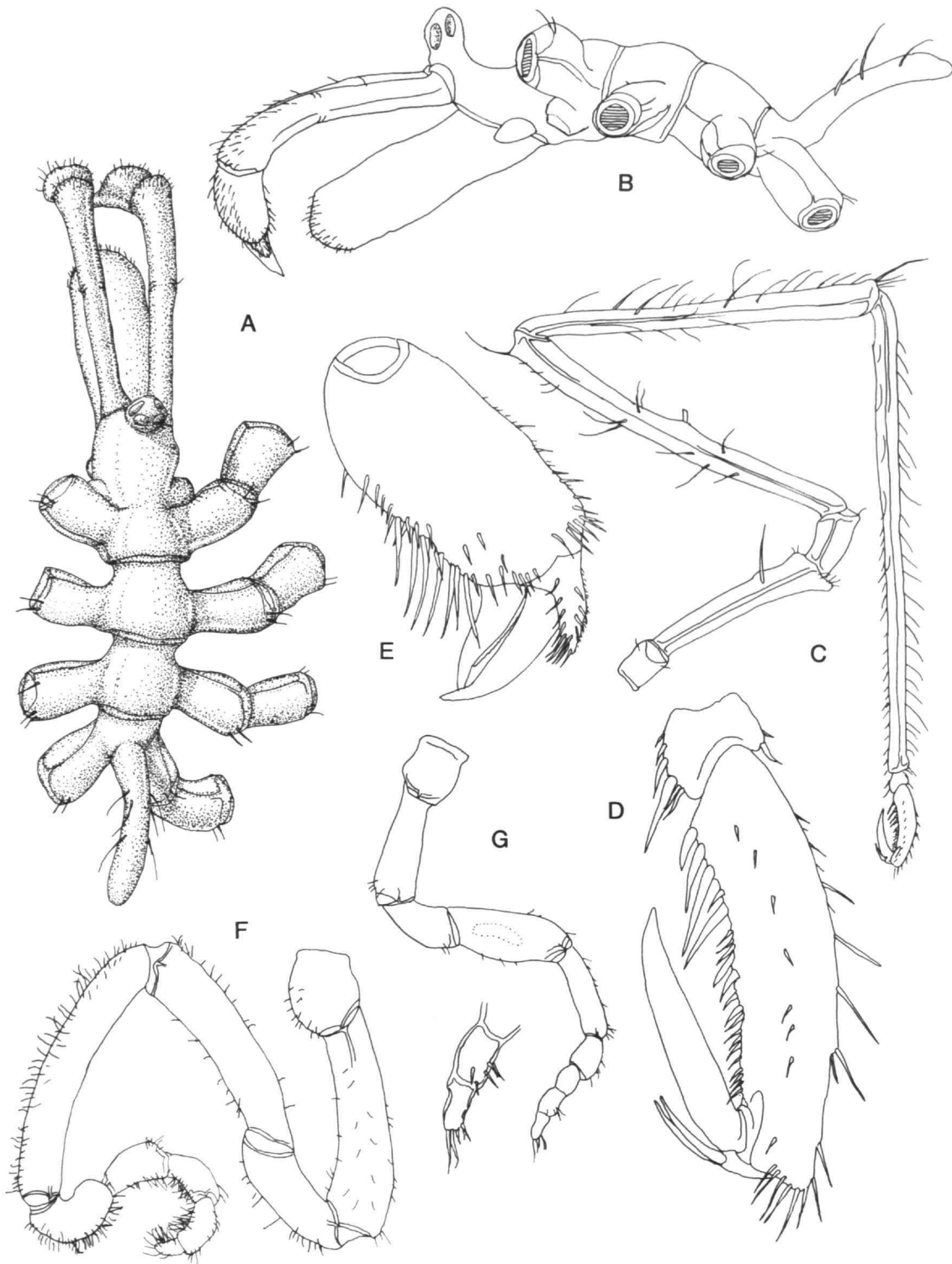


FIGURE 10.—*Pallenopsis (Pallenopsis) notiosa*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, third leg; D, third leg terminal segments, enlarged; E, chelifore, enlarged; F, oviger. Female paratype; G, oviger, with terminal segments enlarged.

short, armed with dorsal setae, 5–6 ventral setae, and long ventral spine. Propodus slender, moderately curved, without heel but with four heel spines increasing in size from proximal shortest to distal longest. Sole with many short spines with short setae distally, a row of short lateral setae, and several short dorsal setae of varying lengths. Claw robust, slightly curved, auxiliary claws about 0.4 length of main claw. Cement gland tube medianventral on femur, on slightly raised surface, only half segment width. Sexual pore on small ventrodiscal tubercle of second coxae on third and fourth leg pairs.

Female: Ovipiger 9-segmented, second segment slightly shorter than fourth, both armed with few short distal setae. Fifth segment about 0.8 length of fourth, both with few short endal setae. Strigilis segments small, terminal three with incomplete segmentation, armed with few ventral and distal setae, those of terminal segment longer than its diameter. Sexual pores on all second coxae on swollen ventrodiscal surface.

MEASUREMENTS (holotype, in mm.)—Trunk length (chelifore insertion to tip 4th lateral processes), 8.22; trunk width (across 2nd lateral processes), 4.01; proboscis length, 3.84; abdomen length, 2.58; third leg, coxa 1, 1.01; coxa 2, 5.95; coxa 3, 1.92; femur, 9.67; tibia 1, 9.58; tibia 2, 11.36; tarsus, 0.48; propodus, 2.21; claw, 1.3.

DISTRIBUTION.—Known only from the type-locality, off Bahia Las Canas, Chile, in 290–450 meters.

ETYMOLOGY.—This far southern species is named (Greek: *notios*, meaning southern) for its capture locality, 35°S in Chile.

REMARKS.—There are no outstanding characters present in this new species which serve to separate it from most other species of this genus, but the combination of its several diagnostic characters will serve to differentiate it from the 60–70 others known. Males of this genus have 10-segmented ovigers but females have ovigers with eight to ten segments depending on the species. This female has 9-segmented ovigers which serves to separate it from those with eight or ten segments. The other critical diagnostic characters are; auxiliary claws about 0.4 of the main claw length, a slender propodus slightly more than four times longer than wide, second tibiae about 15 percent longer than the femorae, a second oviger segment about as long as the fourth, leg setae longer than twice the segment diameter on the major segments, short tibiae with a single major sole spine, the propodus with four major heel spines and many shorter sole spines and setae, the second coxae at least three times longer than third coxae, and a cement gland tube measuring about half as long as the femoral diameter.

There are several known species which share some of these characters. Among these are *P. temperans* Stock, *P. mauii* Clark, *P. meinerti* Schimkewitsch, and *P. varioculata* Stock. The male of Stock's *P. varioculata* has a row of recurved spines on the sixth oviger segment which are lacking in this new species, much smaller chelae fingers, a different sole spine arrangement of the propodus with fewer well separated spines and many less setae, lateral processes which are longer and more widely separated, a different shape to the eyes and ocular tubercle. The difference which is probably of greatest impor-

tance is that of the female ovigers between these two species. Stock's species has an 8-segmented oviger with differences in segment lengths from the new species, although it shares many of the characters listed above for *P. (P.) notiosa*.

The legs and particularly the propodi of *P. meinerti* (see Stock, 1975:1021–1024, figs. 26–27) are very close to those of the new species, but the auxiliary claws of *P. meinerti* are slightly longer in relation to the main claw. Other differences between these two rather similar species are found in the ocular tubercle, with its apex rounded in *P. (P.) notiosa* and pointed in *P. meinerti*, median trunk glabrous in the former while it has several setae at each segmentation line in the latter, sixth oviger segment with an endal bulge bearing setae while this bulge and setae are absent in the new species, and again, as with the last species discussed, the female oviger segment number differs from that of the new species. The oviger of *P. meinerti* females has ten segments while that of the new species clearly has nine with the terminal three segments coalesced in part.

Stock's *P. temperans* also has a pointed ocular tubercle, much longer auxiliary claws, a cement gland tube originating from a flat surface rather than from a swelling, more compact trunk and lateral processes, a much shorter abdomen, and much shorter strigilis segments although they are as setose as those of the new species male. The female of Stock's species remains unknown.

The similarities between *P. mauii* Clark (1958:4–6 [part], figs. 11, 14, 16, 18, 19; 1971:433–435, fig. 3) and *P. notiosa* are mainly those of the legs, ocular tubercles, and ovigers which are all very similar. The lateral processes of the new species are less robust and placed further apart than those of Clark's species, the tarsus is not as heavily setose and spinose, the chelae are less setose on the distal palm and the movable finger ectal pad is much larger than in Clark's species. The legs of the new species are notably more setose although they are very similar in lengths and cement gland to *P. mauii*.

Pallenopsis (Pallenopsis) truncatula, new species

FIGURE 11

MATERIAL EXAMINED.—PERU. Just S of Isla Lobos de Afuera, 06°58'S, 80°44'W, 80 m, sta 18B-756, 6 Sep 1966, 1♂ (holotype, USNM 234570), 1♂ (paratype, USNM 234571).

Other Material: PERU. W of Punta Malabrigo, 07°49'S, 80°38'W, 605–735 m, sta 18B-754, 5 Sep 1966, 7♂, 1♀, 1 juv.

CHILE. W of Bahia Las Canas, 35°27'S, 73°01'W, 290–450 m, sta 18A-697, 9 Aug 1966, 1♀.

DESCRIPTION.—Size moderate for the genus; leg span 110.5 mm. Trunk slender, lateral processes separated by slightly more than their diameters, glabrous, twice as long as their diameters, lateral suture lines conspicuous. Neck little wider than posterior of trunk segments, tapering to rounded anterior rim at chelifore insertion. Ovipiger insertion at posterior of neck, almost hidden by first lateral processes. Ocular tubercle at anterior of neck, only slightly longer than basal diameter, apex slightly conical,

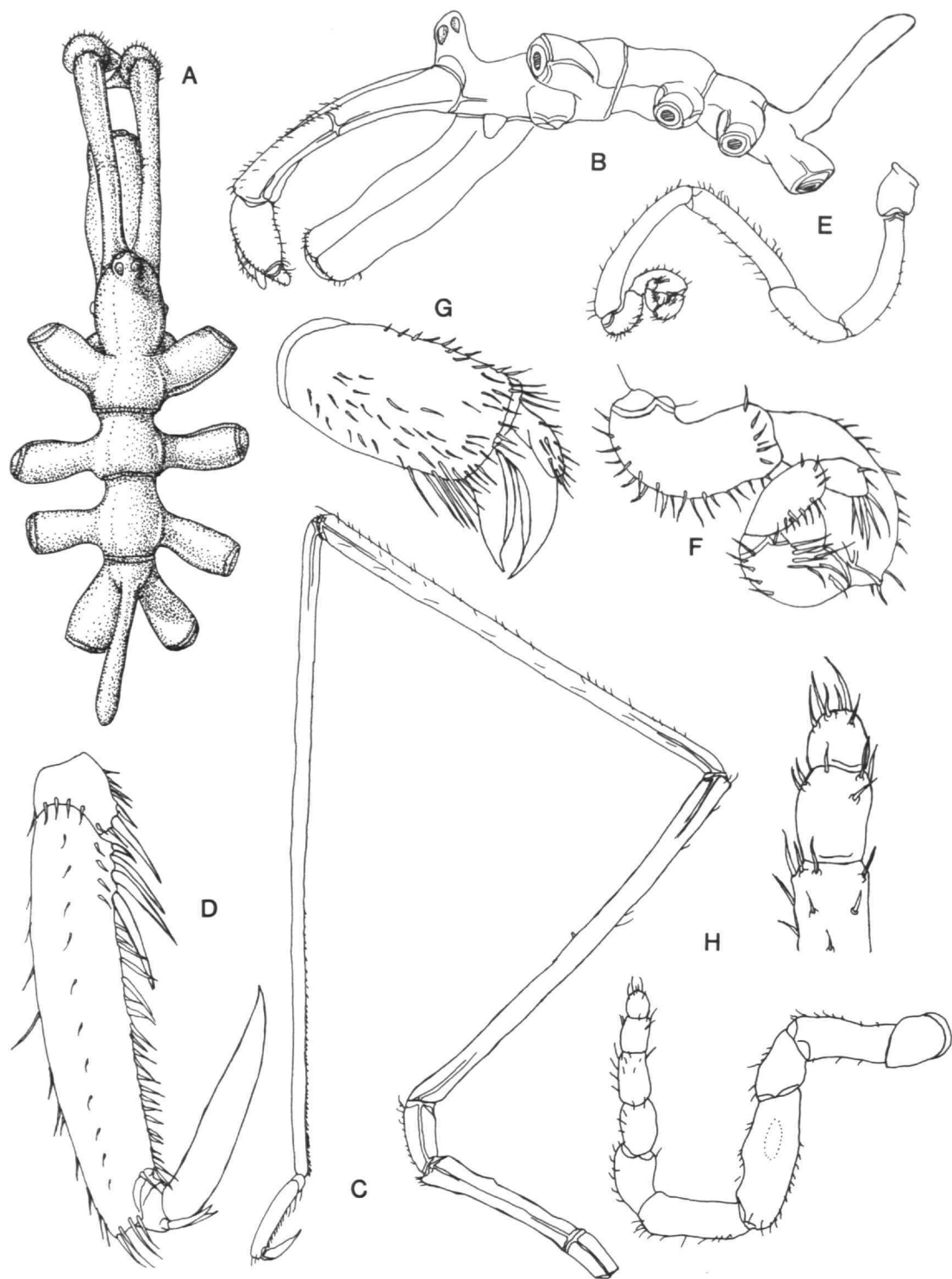


FIGURE 11.—*Pallenopsis (Pallenopsis) truncatula*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, third leg; D, third leg terminal segments, enlarged; E, oviger; F, oviger strigilis, enlarged; G, chela, enlarged. Female paratype; H, oviger, with terminal segments enlarged.

without cone or tubercle. Eyes small for genus, posterior pair smaller and more distal than anterior pair, slightly pigmented.

Proboscis almost cylindrical, with proximal and distal constrictions, lips protruding slightly from flat oral surface bearing many short setae. Abdomen cylindrical, carried almost vertically, glabrous, 0.6 length of proboscis.

Chelifores large, downcurved, chelae overreaching proboscis and carried in front of mouth. Scapes robust, with many short dorsodistal setae, lateral suture lines prominent with only hint of incomplete median sutures marking division into two segments. Chelae moderately robust, very setose distally, short fingers carried anaxially to inflated palm. Fingers without serrations or lamellar cutting edge, tips overlapping. Movable finger slightly longer than immovable finger, with low setose pad on proximal third of movable finger.

Single segmented palps carried closely lateral to proboscis, hardly visible in dorsal view.

Oviger with very setose major segments with setae increasing in numbers distally on strigilis segments. Second, fourth, and fifth segments subequal, sixth very curved with many ectal and distal setae, seventh similar, less curved, eighth with many recurved lateral setae, ninth a short cylinder with fewer lateral setae, tenth little longer than wide with several distal setae longer than segment diameter.

Legs very slender, all segments with rows of tiny setae with very few longer setae on tibiae. Second coxae 2.5 times longer than first or third, with small ventrodistal tubercle bearing sex pore surrounded by short setae, found on posterior two pairs of legs. Femur with very few distal setae half length of segment diameter, cement gland with low midventral swelling, tube very short, bottle-shaped, only 0.15 as long as segment diameter. First tibiae little longer than femur, second tibiae about 0.2 longer than first, very slender. Tarsus extremely short, armed with row of distal and ventral setae, single long ventrodistal spine. Propodus moderately long, not curved, armed with three very long heel spines distal to single very short heel spine, a row of 15-18 short sole spines, and few short lateral and distal setae. Claw straight, 0.6 as long as propodus, auxiliaries tiny, little more than 0.15 as long as main claw, very slender.

Female: Oviger 10-segmented, fourth segment longest, second and fifth segments subequal, about 0.6 as long as fourth, all armed with few short setae. Strigilis five segments increasingly shorter in length, armed with few lateral and distal setae, none as long as segment diameters. Sexual pores ventrodistal on all second coxae. Female size slightly larger in most measurements.

MEASUREMENTS (holotype, in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 7.81; trunk width (across 2nd lateral processes), 4.52; proboscis length, 4.18; abdomen length, 2.51; third leg, coxa 1, 1.61; coxa 2, 4.68; coxa 3, 1.87; femur, 12.36; tibia 1, 12.84; tibia 2, 15.24; tarsus, 0.48; propodus, 2.22; claw, 1.44; auxiliaries, 0.28.

DISTRIBUTION.—The new species is known from the type-locality off Isla Lobos de Afuera, Peru, in 80 meters. It is

also known from nontype material off Punta Malabrigo, Peru, in 605-735 meters, and off Bahia Las Canas, Chile, in 290-450 meters.

ETYMOLOGY.—The species name (Latin: diminutive of *truncatus*—shortened or truncate) refers to the very short cement gland tubes of the male femorae.

REMARKS.—This new species does not appear to be related closely to any known species described from the Pacific off either North or South America. It is perhaps as nearly related to *P. forficifera* Wilson, a predominantly North Atlantic species, as it is to other Atlantic or Caribbean forms.

There are many differences with the principal one being the very short cement gland tube of this new species. There are apparently few *Pallenopsis* (*P.*) species with a cement tube of this short length. They are almost universally longer or, in the case of *P. (P.) mixta* Stock, have no cement tube at all. The cement tube of *P. (P.) forficifera* is as long as the width of the femur. The similarities between the new species and Wilson's well known species are in the chelae, the legs, the general trunk habitus although this is more compact in Wilson's species, and in the oviger in which the segmentation and setation are similar, but the new species lacks the ring of recurved spines around the sixth segment distally which Wilson's species has. The rounded anterior portion of the neck at the chelifore insertion is also atypical for the genus. The chelifores usually insert into a relatively flat neck anterior which is then variously curved posterior to this insertion. The general trunk habitus is rather typical of many species of this subgenus and it bears no outstanding characters for easy differentiation from others so that the only real recognition characters are the rounded neck anterior, the very short cement tubes, and the 10-segmented ovigers in both sexes.

The wide depth range at which this new species was taken is not unlike that of *Colossendeis angusta* in this report. The latter species was taken at 27 and 77-80 meters at two stations although it is known from many other localities in much deeper water. This wide range, as for *C. angusta*, can be attributed to current upwelling in proximity to coastal and island areas along the South American Pacific.

Pallenopsis (Pallenopsis) species indeterminate

MATERIAL EXAMINED.—CHILE. ISLAS JUAN FERNANDEZ: *Isla Robinson Crusoe*: N of Punta San Carlos, 33°37'30"S, 78°49'42"W, 135 m, sta 12-MV65-IV-47, 12 Dec 1965, 2 juv.

REMARKS.—These two specimens have incompletely formed ovigers of five or six segments and chelae with blunt juvenile fingers. In a complex of closely related species such as is found in this subgenus, it is best to leave such juvenile specimens unnamed.

There are characters in these specimens that are reminiscent of *P. (P.) triregia* Clark, from northern New Zealand waters. The terminal leg segments are particularly alike, with the tarsus, propodus, heel spines, and auxiliary claws in relation to the main claw, all having the same length ratios as those of

Clark's species. The trunk habitus of both is very similar with a relatively long slender trunk bearing moderately short glabrous lateral processes. Both also have large posterior eyes and smaller anterior eyes placed more proximally than the posterior eyes on the ocular tubercle.

Juvenile characters are comparable only at risk to those of adult specimens, but the chelae of these specimens have shorter blunt fingers with a smaller proximal pad on the movable finger than in those of Clark's species. His species has many more chelae setae (possibly an adult character?) than on those in hand. It is evident from examination of many juvenile specimens of *Pallenopsis* (*P.*) species from American shores that the chelae and propodi are often longer, more slender, and have different setae arrangements in adults than in juveniles. This may be true for these juveniles which in the adult stage would possibly have more lengthy propodi and a slightly different sole spine arrangement.

Subgenus (*Bathypallenopsis*) Stock, 1975

Pallenopsis (*Bathypallenopsis*) *comosa* Stock

Pallenopsis (*Bathypallenopsis*) *comosa* Stock, 1975:1043–1045, fig. 37.

MATERIAL EXAMINED.—PERU. Slope of Milne-Edwards Deep, Peru-Chile Trench, SW of Trujillo, 08°23'S, 80°25'W, 2945–2966 m, sta 11-161, 31 Oct 1965, 1♂.

DISTRIBUTION.—This species is known only from the type-series taken in the Gulf of Panama in 3200 meters. This male extends its known distribution southward to northern Peru where it was taken in slightly shallower water.

REMARKS.—This fairly large specimen agrees well in most characters with Stock's type figures. The minor differences are in the chelifore scapes in which the first segment of this specimen is notably longer (by about 0.25–0.3, but about 0.1 in Stock's male type) than the second, and in the auxiliary claws which are slightly smaller than those of the type male and appear more like a pair of distal propodal setae than auxiliary claws. The extremely slender long setae of the tibiae are not as numerous nor as conspicuous as those figured for the type, and the proboscis has a larger swollen area just distal to its midpoint than the same area as figured by Stock. There are four sole spines on the heel of the only complete leg of this specimen and the tarsus has a matching if smaller sole spine along with many smaller setae on both soles. The terminal oviger segment agrees with the type in having a thick endal field of slender setae and in lacking any form of a terminal claw or spine.

Genus *Pycnothea* Loman, 1920

Pycnothea selkirki Loman

FIGURE 12

Pycnothea Selkirki Loman, 1920:137–139, fig. 1.

Pycnothea selkirkii.—Marcus, 1940:34.—Williams, 1940:204 [text].

Pycnothea selkirki.—Clark, 1963:48 [text].—Child, 1975:16 [text].

MATERIAL EXAMINED.—CHILE. *Isla San Felix*: San Felix Road, 26°17'30"S, 80°05'40"W, 0–10 m, scuba, sta 12-65218, 5 Dec 1965, 1♂, 1♀.

ISLAS JUAN FERNANDEZ: *Isla Robinson Crusoe*: N of Punta Norte, 33°34'18"S, 78°54'54"W, 160–180 m, sta 12-DRAB-135, 14 Dec 1965, 1 juv; off Punta Bacalao, 33°38'12"S, 78°47'48"W, depth unknown, trawl, sta 12-MV65-IV-58, 14 Dec 1965, 1♂.

DISTRIBUTION.—This species was described from three type-specimens taken at Islas Juan Fernandez in 30–40 meters and was regarded as endemic for many years. The *Isla San Felix* specimens extend its distribution to other Chilean offshore islands to the north and all specimens reported here extend its known depth range to 0–180 meters.

REMARKS.—I include new figures of this species here because Loman's publication is not now generally available to specialists and his figures are sketches and do not emphasize the differences between this and the only other known species of the genus, *P. flynni* Williams (1940:202–204, figs. 6–9) from Western Australia.

The two species are very closely related and could be synonymized were it not for a few apparently consistent differences in morphology besides their great distributional separation. The trunk of *P. selkirki* is slightly more compact and the lateral processes therefore more crowded than in *P. flynni*. The setose mediandorsal ridges of the anterior two trunk segments are larger, more compact, and form part of the two trunk suture lines in Loman's species while the same setose ridges in Williams' species are lower, smaller, and are placed more anterior to each trunk suture line and do not form part of the sutures. The proboscis of *P. flynni* is longer in relation to the trunk, is cylindrical over most of its length, and bears scattered setae on most of its surface, while the proboscis of this species is shorter with relation to the trunk (a comparison only possible with both species in hand), tapers gently from its base toward the lips, and lacks short setae.

The most obvious difference is in the length of the chelifore scape. The chelae of both species are virtually identical, but the scape of *P. flynni* is slightly more than twice as long as that of *P. selkirki*. The male oviger of both species is very setose, but the distal four segments of *P. flynni* have almost twice the numbers of setae as the distal segments of this species, giving them a very crowded setose appearance. The only other recognizable difference between these two species is in the length of their coxal sexual spurs of the posterior two pairs of legs. Those of *P. flynni* are slightly longer and more prominent than the spurs of *P. selkirki*. Also, at least in the few specimens examined, the size of *P. flynni* is half again larger than *P. selkirki*. Reexamination of specimens of *P. flynni* from Western Australia (Child, 1975:16, fig. 6f–h) has permitted a firsthand comparison of these two look-alike species and allowed these observed differences to confirm their continued separation as valid species.

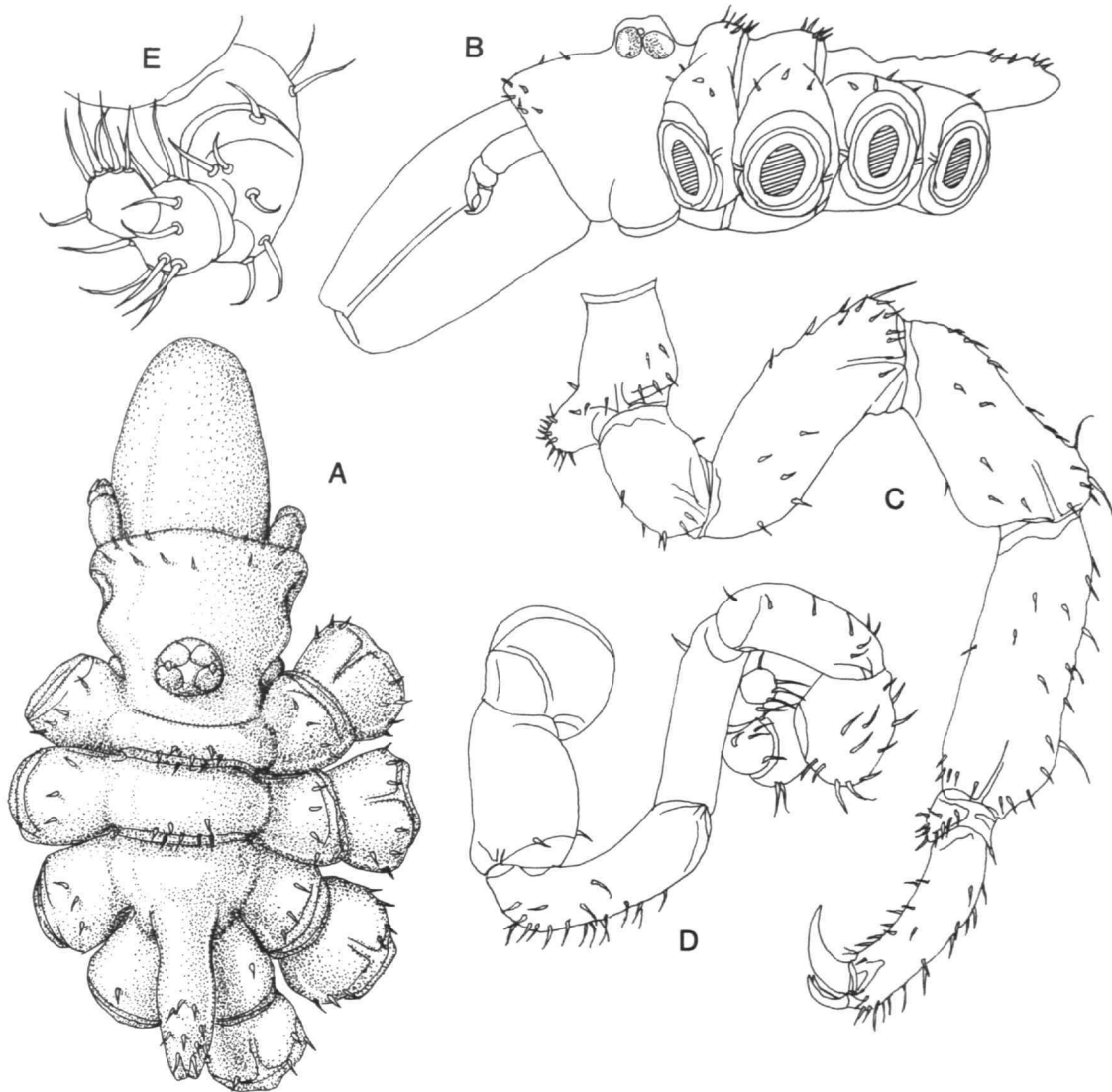


FIGURE 12.—*Pycnothea selkirki* Loman, male: A, trunk, dorsal view; B, trunk, lateral view; C, third leg; D, oviger; E, oviger strigilis, enlarged.

Family NYMPHONIDAE Wilson

Genus *Nymphon* Fabricius, 1794

***Nymphon similis*, new species**

FIGURE 13

MATERIAL EXAMINED.—ECUADOR. *Isla El Viejo*: 28 km N of Salinas, 01°56'S, 80°49'W, 25 m, sta 16-6665, 5 May 1966, 1♂ (holotype), 1♀ (paratype, both specimens returned to Museum of Comparative Zoology, Harvard University).

DESCRIPTION.—Size moderate for genus; leg span slightly

more than 24 mm. Trunk moderately robust, fully segmented, neck fairly long, parallel sides about 2.0–2.5 times neck diameter. Lateral processes only slightly longer to 1.5 times longer in anterior pair than their maximum diameters, glabrous, first three pairs separated by 1.5 to 2.0 times their diameters, posterior pairs separated from third pair by about their diameters only. Ocular tubercle only as tall as its basal diameter, rounded at apex, with pair of prominent lateral papillae. Eyes large, anterior pair slightly larger than posterior pair, slightly pigmented.

Proboscis small, only as long as neck and “crop,” with slight

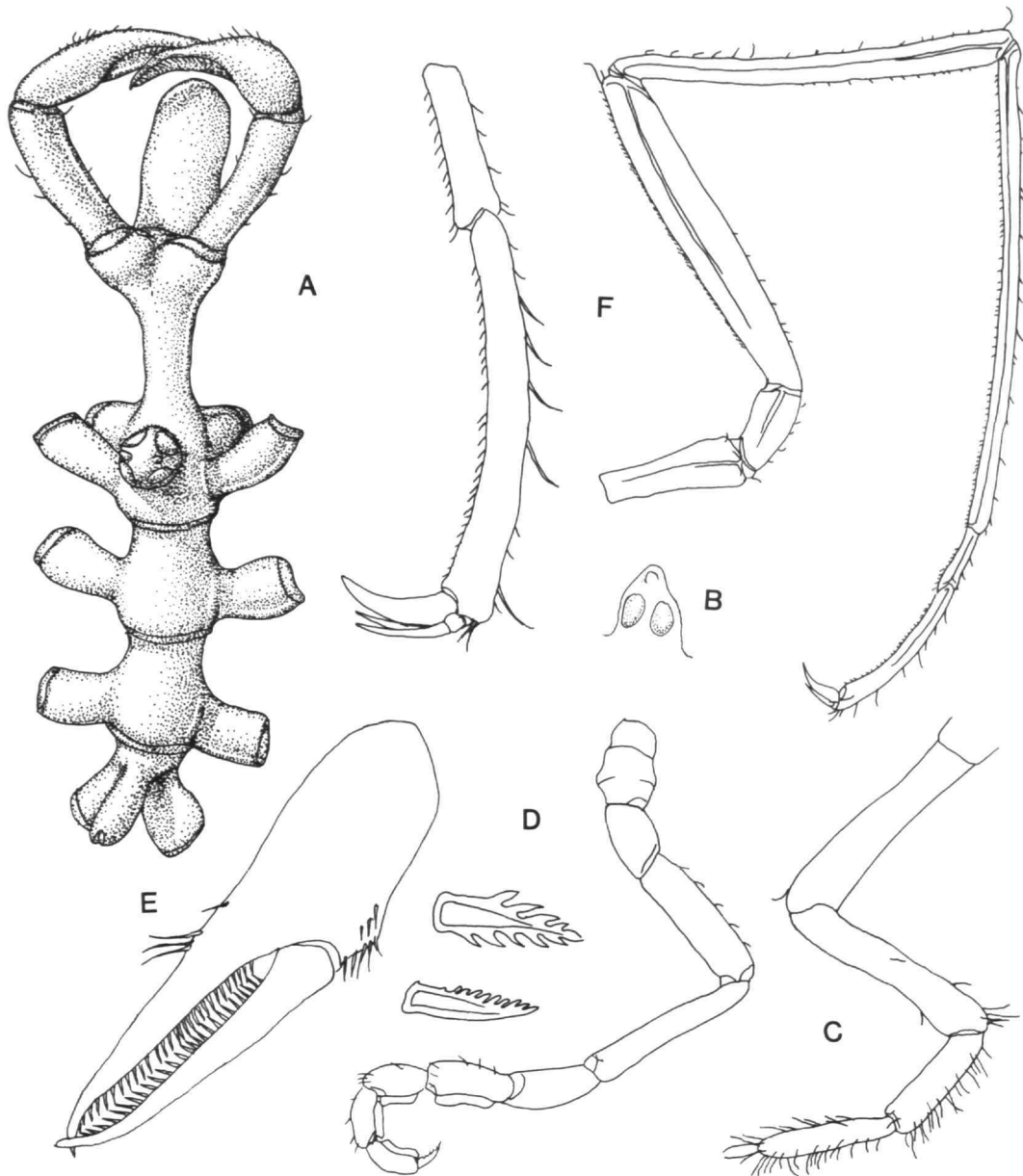


FIGURE 13.—*Nymphon similis*, new species, holotype: A, trunk, dorsal view; B, ocular tubercle, left side; C, palp; D, oviger, with denticulate spine and terminal claw enlarged; E, chela; F, third leg, with terminal segments enlarged.

median inflation, lips rounded. Abdomen short, slightly constricted proximally, rounded distally, glabrous.

Chelifores short, armed with few short setae, scapes shorter than proboscis or chelae, cylindrical, curved slightly inward. Chelae long, slender, palm shorter than fingers, not inflated, with tuft of short setae at movable finger insertion. Fingers

slightly curved at tips only, armed with 27–28 narrow pointed teeth each, immovable finger with tuft of few setae toward base, setae as long as basal finger width.

Palps moderately short, longer than proboscis, second and third segments subequal in length, third with few short distal setae. Fourth and fifth segments subequal, about 0.6 length of

second and third segments, armed with ventral setae increasing in numbers distally and few distal and dorsal setae on fifth segment. Setae shorter than or equal to segment diameters.

Oviger fifth segment slightly longer than fourth, both with 4–5 short ectal setae, sixth segment slightly curved, glabrous. Strigilis segment seven subequal to sixth segment, 1.3 times longer than distal three segments which are subequal in length. Tenth segment of smaller diameter than those before, strigilis segments armed with few short ectal and lateral setae and endal denticulate spines in the formula 11 : 10 : 10 : 10, with a short terminal claw, half length of tenth segment and armed with 7–8 serrations on 0.6 of its endal length. Denticulate spines with 4–5 evenly spaced serrations per side.

Legs slender, moderately long, armed with very few setae as long as segment diameters and rows of very tiny dorsal and ventral setae. Femorae slightly swollen. First tibiae about 0.25 longer than femorae, second tibiae slightly longer. Tarsus and propodus slender, tarsus little more than half as long as propodus, both armed with few dorsal setae as long as segment diameter and row of very short sole spines. Claw moderately short, curved in distal third only, auxiliary claws very slender, about 0.75 as long as main claw. Sexual pores ventrodiscal on all second coxae.

Male: Unknown.

MEASUREMENTS (holotype, in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 1.59; trunk width (across 1st lateral processes), 0.79; proboscis length, 0.45; abdomen length, 0.23; third leg, coxa 1, 0.64; coxa 2, 0.89; coxa 3, 0.62; femur, 2.08; tibia 1, 2.75; tibia 2, 2.91; tarsus, 0.53; propodus, 1.01; claw, 0.23.

DISTRIBUTION.—This species is known from its type-locality only, 20 km north of Salinas, Ecuador, in 25 meters.

ETYMOLOGY.—The species name (Latin: *similis*, like, similar) refers to the similarities shared by the new species with *Nymphon subtile* Loman and *N. benthos* Hedgpeth.

REMARKS.—This species is perhaps closest in character relationships to *N. subtile*, a species from the Falkland Islands, but neither species has outstanding characters with which to separate them readily from all others of this cumbersome genus. The trunk, chelifore, proboscis, and neck are strikingly similar in both species, although the palp differs in *N. subtile* from that of the new species by having a second segment notably longer than the third and shorter fourth and fifth segments in relation to the third. The tarsus of Loman's species is much longer than in the new species, apparently about 0.6 as long as the propodus, while the tarsus of the new species is only about half the propodal length. Loman's type-specimen is a male, so comparisons of its oviger segments in relation to this female new species are irrelevant. The oviger denticulate spines, as figured by Loman (1923:19, fig. C3), are very similar, if broader, to those of the new species.

The new species is possibly related, if less closely, to the Japanese species, *N. benthos*. The habitus of trunk, neck, and

chelifores are very similar, but the chelae fingers are shorter than the palm, are carried at a greater angle to the palm and have fewer teeth than the chelae of the new species. The palp fourth and fifth segments are quite different, the tarsus is much longer and the auxiliary claws much shorter, and the oviger terminal claw is much longer in *N. benthos*. The oviger denticulate spines as with the last species, are very similar in their lateral serrations, although there are only four of these serrations present while denticulate spines of the new species have four to six lateral serrations. The relative lengths of oviger segments are, in this case, comparable because the type of Hedgpeth's *N. benthos* is also a female. The fourth and fifth segments are very close (the only segments described by Hedgpeth), but there are fewer denticulate spines per strigilis segment than in the new species, and the longer terminal claw has ten rather than 7 endal teeth as in *N. similis*. The new species is also only about 0.3 the size of *N. benthos*.

Nymphon species indeterminate

MATERIAL EXAMINED.—ECUADOR. W of Quito, 01°30'S, 82°19'W, 1363–1369 m, coll. R/V *Vema*, sta V-15-62, 3 Dec 1958, 1 juv.

REMARKS.—This specimen is young enough to refrain from identifying it with any other species of this giant genus, but it will possibly become a new species when adults are taken from the same area to provide all the necessary diagnostic characters.

The ovigers do not yet have the full ten segments and the propodus has a juvenile sole spine arrangement, but the palp is distinctive in having two very short terminal segments with the result that the palp is only about as long as the proboscis.

The chelae are distinctive in having slender fingers longer than the palm and bearing 9–10 long slender teeth. The abdomen is longer than that typical of the genus and is moderately setose distally. The relatively short trunk with lateral processes separated by about their diameters are without any distinctive characters.

Family RHYNCHOTHORACIDAE Thompson

Genus *Rhynchothorax* Costa, 1861

Rhynchothorax architectus Child

Rhynchothorax architectus Child, 1979:68–72, figs. 23, 24a–g, 25a–e; 1982:374.

MATERIAL EXAMINED.—GALAPAGOS ISLANDS. *Isla Fernandina*: Canal Bolivar, bay below Punta Espinosa, 01°15'55"S, 91°26'30"W, 0–3 m, sta 16-66139, 25 May 1966, 4♂, 7♀, 1 juv.

DISTRIBUTION.—This species was known from both the Pacific and Caribbean coasts of Panama and on the Belize barrier reef in littoral depths. It is surprising to find it well off the mainland in the Galapagos.

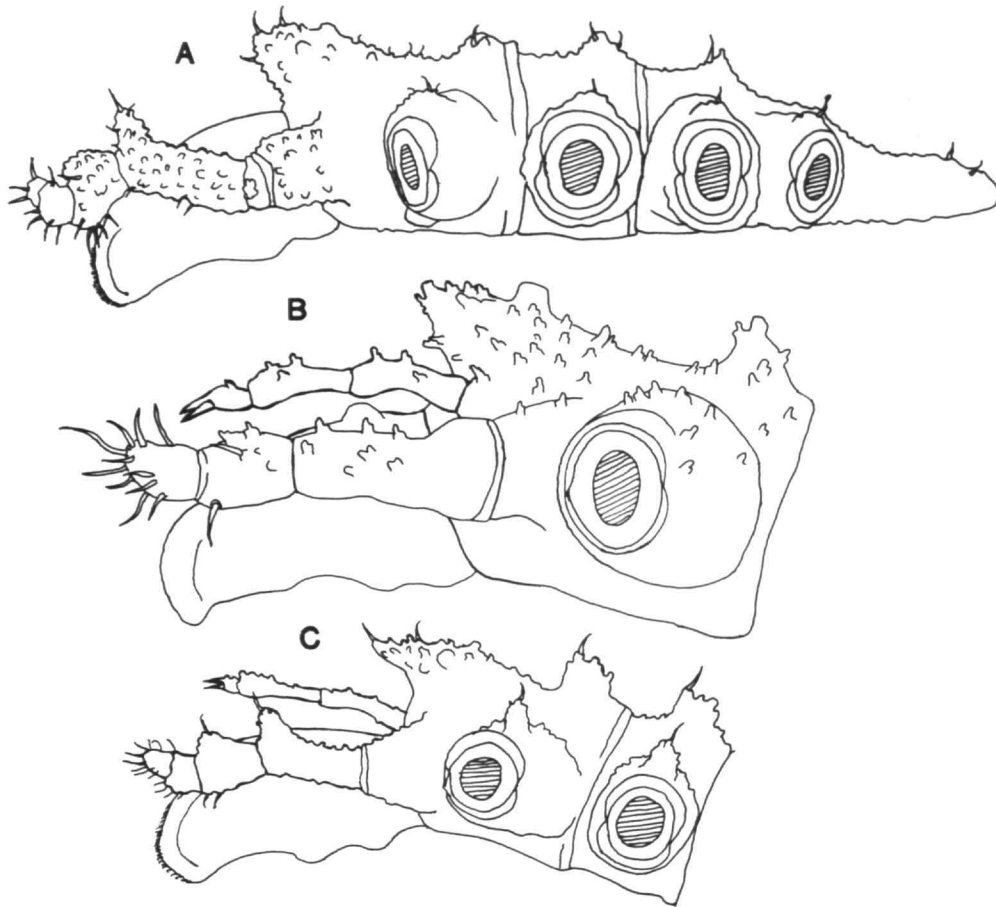


FIGURE 14.—*Rhynchothorax barnardi* Child and Hedgpeth, adult paratype: A, trunk, lateral view. Chelate juvenile from Callao: B, trunk anterior, lateral view. Chelate juvenile from Isla Isabela, Galapagos: C, trunk anterior, lateral view.

REMARKS.—During the examination of this suite of specimens, a character came to light which had remained unnoticed when the species was described. The second coxae of the third leg pair in males have a lateral tubercle or tubercles which are absent on the same segment of females. Since the sexual pores are difficult or impossible to locate in most of the tiny species in this genus, this alternative sexual character serves as a handy device with which to differentiate the sexes in the absence of internal ova or external eggs. Males of this species are also slightly more tuberculate than females as is evident in the figures given with the type description.

***Rhynchothorax barnardi* Child and Hedgpeth**

FIGURE 14

Rhynchothorax barnardi Child and Hedgpeth, 1971:626–628, fig. 7.—Krapp, 1973:121 [key], 123 [table].—Clark, 1976:295 [key].

MATERIAL EXAMINED.—GALAPAGOS ISLANDS. *Isla Wenman*: Intertidal rocks, coll. *Velero III*, sta 144-34, 01°22'S, 91°49'W, 11 Jan 1934, 1♂, 2♀, 1 juv. *Isla Isabela*: Caleta Iguana, 00°57'S, 91°28'W, 6 m, coll. D. Hope, Feb 1978, 1 juv.

PERU. Callao, off Penal Colony, 9 m, coll. *Velero III*, sta 370-35, 11 Jan 1935, 3♂, 2♀, 1 juv.

DISTRIBUTION.—This species has been known only from its type-locality in the central Galapagos Islands, in 0–3 meters. This distribution is extended to the northern and western Galapagos at Islas Wenman and Isabela, and the depth record is extended to 9 meters. It is surprising to find this species also on the mainland at Callao, Peru, but there is a growing number of species known to share Galapagos and mainland distribution.

REMARKS.—Among the above specimens are two chelate juveniles which contribute to our knowledge of this tiny species. The tiny slender chelifores atrophy and disappear completely before the ovigers become fully formed (Figure

14B,C). The chelae apparently begin to atrophy even earlier because at the growth stage reached by both of these juveniles, the chelae are non-functional and reduced to tiny spine-shaped tubercles.

The eyes figured by Child and Hedgpeth (1971, fig. 7a) are false and caused by air bubbles in a permanent slide made of the specimen. The eyes of adults are either absent or represented by an unpigmented distal rim in some specimens. In juveniles, the eyes are slightly more evident or entirely absent in some specimens. In all specimens examined, there is only a hint of a distal eye rim if the eye is present at all.

This species has palps of only four segments instead of the six stated in the description. The lateral palp bases on the trunk have the hint of an extremely short fifth segment, but this could be the flexible connective integument between segments and does not appear to be a distinct segment itself.

Family PHOXICHILIDIIDAE Sars

Genus *Anoplodactylus* Wilson, 1878

Anoplodactylus bruuni, new species

FIGURE 15

MATERIAL EXAMINED.—CHILE. ISLAS JUAN FERNANDEZ: *Isla Santa Clara*: Off W point, on lobster net, 46 m, coll. W.L. Schmitt, sta 39, 11 Dec 1926, 1♂ (holotype, USNM 234572). *Isla Robinson Crusoe*: Surface dip net, sta 12-65232, 10 Dec 1965, 1♀ (paratype, USNM 234573).

Other Material: CHILE. ISLAS JUAN FERNANDEZ: *Isla Robinson Crusoe*: Bahia San Juan Bautista, 33°38'20"S, 78°48'50"W, 3-12 m, sta 12-65235, 11 Dec 1965, 1♂, 1♀; Puerto Ingles, 33°37'18"S, 78°50'20"W, 26-29 m, sta 12-65240, 12 Dec 1965, 1♂ with eggs, 1♂, 4♀, 1 juv; Bahia Carvajal, W side, rocks and sand in 10-13 m, sta 12-65256, 15 Dec 1965, 10♂, 22♀; Bahia San Juan Bautista, 28 m, sta 12-65260, 16 Dec 1965, 13♂, 9♀, 2 juv; same locality, 33°38'S, 78°49'W, intertidal, sta 12-DRAB-126, 11 Dec 1965, 1♂ with eggs, 1♀, 2 juv; same locality and coordinates, 46 m, sta 12-DRAB-130, 12 Dec 1965, 1 juv; same locality, depth unknown, sta 12-DRAB-134, 13 Dec 1965, 2♀; N of Punta Norte, 33°34'18"S, 78°54'54"W, 160-180 m, sta 12-DRAB-135, 14 Dec 1965, 1♂; N of Punta San Carlos, 33°37'30"S, 78°49'42"W, 135 m, sta 12-MV65-IV-47, 12 Dec 1965, 1♂, 1 juv; N of Punta Pescadores, 33°38'00"S, 78°45'48"W, depth unknown, sta 12-MV65-IV-54, 13 Dec 1965, 1♂, 1 juv; off Bahia Chupones, 33°41'12"S, 78°57'00"W, depth unknown, sta 12-MV65-IV-63, 15 Dec 1965, 1♀. *Isla Alejandro Selkirk*: 33°45'S, 80°49'W, 79-91 m, coll. R/V *Eltanin*, sta 21-203, 26 Nov 1965, 1♂, 1 juv.

DESCRIPTION.—Size small; leg span 9.5 mm. Trunk robust, first two segmentation lines fully formed, third absent. Lateral processes short, closely spaced, separated by half their diameters or less, only slightly longer than their diameters, with

tiny low tubercles on anterior two pairs, tubercles lacking on posterior two pairs. Neck short, only as long as ocular tubercle base, flanked by small oviger implantation bulges on anterior of first lateral processes. Ocular tubercle with broad base, tapering to tall apical cone slightly longer than tubercle diameter at eye level. Eyes large, well pigmented, anterior pair slightly larger than posterior pair.

Proboscis short, robust, only slightly longer than twice its diameter, constricted at base, slightly inflated over most of its length, tapering distally to small oral surface. Abdomen conical, erect, tapering to tiny tip, armed with four short distal setae.

Chelifores moderately short, as long as proboscis, scape cylindrical, moderately downcurved, armed with dorsodistal seta. Chela small, fingers only slightly longer than bulbous palm, with six short distal setae on palm. Fingers slightly curved, movable finger more curved than immovable finger, movable finger armed with 2-3 short ectal setae, none on immovable finger.

Ovigers moderately setose, second segment equal in length to third, fourth about 0.8 as long as third, fifth only little shorter than fourth, sixth slender, less than half length of fifth. Second segment armed with row of 4-5 short lateral setae, third with few lateral setae not in row, fourth with 1-2 distal setae, fifth with several longer lateral setae and several short lateral recurved spines, sixth with row of 6-7 lateral setae little longer than segment diameter. Third segment proximally constricted.

Legs moderately long, slender, lightly setose with short setae, single longer dorsodistal seta on each major segment. Femorae the longest segment with second tibiae slightly longer than first. Femoral cement gland placed middorsally with distally-pointing low broad tube. Femur distally swollen with low dorsodistal tubercle bearing long seta. Tarsus very short, subtriangular, with few short ventral setae. Propodus robust, well curved, with large heel bearing two short robust spines and four stout setae just distal to spines. Sole armed with many short setae flanking lamina which extends complete length of sole. Claw robust, slightly curved, auxiliaries absent.

Female: Slightly larger in all measurements. Femur apparently always inflated whether or not with ova. Propodal lamina shorter than in male, covering only about 0.85 of sole length. Ocular tubercle conical apex not as tall as that of male.

Variation: Ocular tubercle cone sometimes longer, to 1.5 times length of ocular tubercle from distal eye rim to base. Anterior lateral process tubercles sometimes only low swellings and posterior lateral processes sometimes armed with single dorsodistal setae. Major leg segments sometimes shorter than those of type, but with same general characters. Oviger third segment sometimes longer than second by 0.1. First coxae rarely with slender rounded dorsolateral tubercle bearing seta on posterior of anterior two first coxae pairs.

MEASUREMENTS (holotype, in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 1.2; trunk width (across 1st lateral processes), 0.86; proboscis length, 0.61;

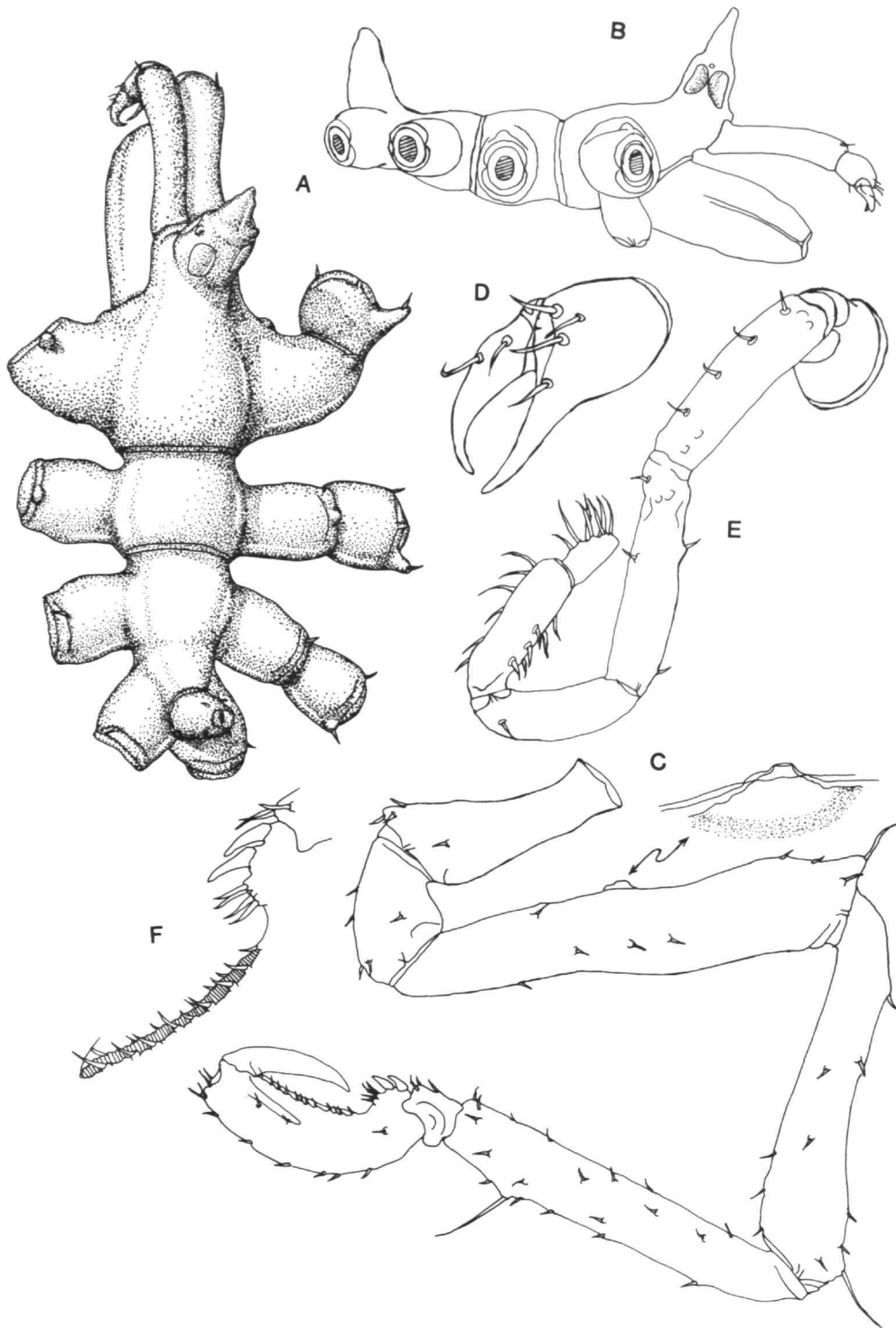


FIGURE 15.—*Anoplodactylus bruuni*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, third leg, with cement gland enlarged; D, chela; E, oviger; F, propodal sole, enlarged.

abdomen length, 0.26; third leg, coxa 1, 0.22; coxa 2, 0.45; coxa 3, 0.3; femur, 0.94; tibia 1, 0.78; tibia 2, 0.82; tarsus, 0.13; propodus, 0.45; claw, 0.26.

DISTRIBUTION.—The new species is known only from the type-locality, the Islas Juan Fernandez, in many localities over a wide depth range of 0–180 meters.

ETYMOLOGY.—This species is named for the R/V *Anton Bruun* from which most of the specimens reported on herein were taken. The vessel, of course, was named for the late Dr. Anton Bruun, the prominent marine zoologist and student of deep-sea fauna.

The vessel has had an interesting history. It began as a private yacht and was eventually purchased by the U.S. Government for use as a presidential yacht, and commissioned as the M/V *Williamsburg*. It was subsequently decommissioned as a budget cutting measure and for many years remained in a reserve fleet. In 1963, it was reactivated and equipped with apparatus for oceanographic investigation, and recommissioned as the R/V *Anton Bruun*. As an oceanographic vessel, it participated in eight cruises of the International Indian Ocean Expeditions (1964–1965), and subsequently in seven cruises (five of them reported on here) of the SEPPOP expeditions in 1965–1966. After another decommissioning, the vessel was sold and passed through the hands of several owners eventually to become a riverside restaurant in the northeast United States.

REMARKS.—This new species has nothing extraordinary about its characters and aside from its apparently restricted distribution in the Islas Juan Fernandez, it would be similar to many species in this large worldwide genus. There are a few uncommon characters shared by a few species such as the tall apical cone of the ocular tubercle, the tiny lateral process tubercles with the tallest on the anterior processes with others diminishing in size to disappear on the posterior processes, the anterior projected oviger bases on the first lateral processes, the almost full length propodal lamina and the single dorsomedian cement gland orifice of male specimens. An ocular tubercle cone of this size is rare and in conjunction with the other characters listed above, permit this to be called a new species. The tall ocular cone is more often found on long slender species with widely separated lateral processes (e.g., *A. pharus* Stock, 1975).

Anoplodactylus californicus Hall

Anoplodactylus californicus Hall, 1912:91–93, figs. 49, 52D, F, I, J.—Child, 1987:554–555 [literature].

Anoplodactylus portus Calman, 1927:405–408, fig. 103.

MATERIAL EXAMINED.—ECUADOR. *Isla El Viejo*: 20 km N of Salinas, 01°56'S, 80°49'W, 25 m, sta 16-6665, 5 May 1966, 1♀. *Bahia de Santa Elena*, 2 sites, 02°12'S, 80°52'W, depth unknown, sta 16-6668, 8 May 1966, 2♂ with eggs, 3♂, 9♀, 1 juv; same locality, near La Libertad, 02°11'28"S, 80°56'31"W, 8–9 m, sta 16-6670, 8 May 1966, 21 specimens.

DISTRIBUTION.—Ecuador may now be added to the many localities in which this species has been taken. It is known to be of pantropical-pantemperate distribution and has been collected in shallow waters of less than 100 meters. It is probably widely distributed along the South American Pacific coast.

REMARKS.—An easily recognized species, this is one of the few species in this genus in which the female has alar processes on the proximoventral proboscis. The male has long sex pore tubercles on the second coxae and a tiny narrow cement gland tube and a very hirsute oviger strigilis.

Hedgpeth (1961:5–7, fig. 2) has described a variety of this species from Chile which may represent a population with more variation than normal or it may even be a separate species. Neither specimens of his variety nor specimens of *A. californicus* were taken on the Chile coast during the SEPPOP cruises to permit comparison of fresh specimens of both species.

Anoplodactylus erectus Cole

Anoplodactylus erectus Cole, 1904:289–291, pl. XIV: fig. 12, pl. XXVI: figs. 1–9.—Nakamura and Child, 1988:813 [literature].

MATERIAL EXAMINED.—CHILE. *Isla San Felix*: San Felix Road, 26°17'30"S, 80°05'40"W, 5–15 m, sta 12-65225, 6 Dec 1965, 1♀. Off Cabo Humos, 35°22'S, 72°32'W, 27 m, sta 18A-688, 6 Aug 1966, 1♀.

ECUADOR. *Bahia de Santa Elena*, 1 km NE of Punta Ballenita, 02°12'20"S, 80°52'10"W, 8–9 m, sta 16-6669, 8 May 1966, 1♀; same locality, 02°13'09"S, 80°54'38"W, 3 m, sta 16-6671, 8 May 1966, 3♂ with eggs, 5♀, 6 juv.

DISTRIBUTION.—This species was previously known to range as far south as Colombia and as far north as British Columbia, Canada. It is reported here from Ecuador and the offshore Chilean *Isla San Felix* for the first time. It is also known from Korea, Hawaii, the Tuamotu Islands, and in American Samoa, all in shallow depths.

REMARKS.—The males of this species have a long subcutaneous cement gland tube culminating in a short distal-projecting tube on the femoral surface. This serves as an appropriate recognition character for this well known species as well as the characters of the small lateral process tubercles and a long third oviger segment. The propodal heel has two short spines and is well formed while the short chelae have no finger teeth.

Anoplodactylus monotrema Stock

Anoplodactylus monotrema Stock, 1979:15–18, figs. 4–5.—Child, 1979:56–58, fig. 19c; 1982:372.

Anoplodactylus robustus.—Child and Hedgpeth, 1971:612–613 [literature].

MATERIAL EXAMINED.—GALAPAGOS ISLANDS. *Isla Marchena*: N shore, 00°27'N, 90°29'W, intertidal, sta 18B-792D, 22 Sep 1966, 1♂. *Isla Isabela*: Tagus Cove, reef N of

anchorage, intertidal rubble, coll. *Velero III*, sta 154-34, 15 Jan 1934, 1♀.

DISTRIBUTION.—This species is the Western Hemisphere counterpart of *A. robustus* (Dohrn) found in Europe and in the Mediterranean (or perhaps the Mediterranean only), and was called by that species name for many years. It has been taken, under both names, on both coasts of North America, the Caribbean, and in Hawaii and the Galapagos. It does not appear to have been found south of the Pacific coast of Panama in collections made on the mainland from Ecuador to Chile. The species is only known from shallow water.

REMARKS.—This species has the small compact habitus of those species formerly referred to as the synonymized *Halosoma*. It shares with *A. robustus*, *A. virescens* (Hodge) and a few others the rare character in this genus of a 5-segmented oviger instead of the more usual six segments. All species of this form are small and robust with closely crowded lateral processes and short appendage segments. What separates this species from the two others above is the presence of a single rather broad cement gland orifice. The other two usually have three and sometimes only two cement gland pores smaller than the single cribriform pore of *A. monotrema*.

Anoplodactylus reimerae Child

Anoplodactylus reimerae Child, 1979:59–61, fig. 20.

MATERIAL EXAMINED.—ECUADOR. Bahia de Santa Elena, 02°13'09"S, 80°54'38"W, 3 m, sta 16-6671, 8 May 1966, 2♂, 2 juv.

DISTRIBUTION.—This species is only known from its type-locality, Isla Taboguilla and nearby Panama City on the Pacific coast of Panama in 0–9 meters. This collection extends its range south to the Ecuador coast, but within its known depth range.

REMARKS.—This is a distinctive species although nothing about it is unique among the growing hordes of *Anoplodactylus* species. The characters which separate it from others are; a conical ocular tubercle, a very erect abdomen, small lateral process tubercles, distinctive palp buds on the anterior lateral processes, broad laterodistal tubercles on the first coxae, long sex pore tubercles on the posterior two leg pairs, a conical cement gland pore on the femorae, a relatively short propodus with large heel in contrast to the fairly long leg segments, and the distinctive club-shaped fifth and sixth oviger segments with their short lateral setae. The slender chelae are without finger teeth and the fingers are also very slender. The species is apparently not very common in light of all the other *Anoplodactylus* specimens taken along these coasts from Panama to Chile.

Anoplodactylus typhlops Sars

Anoplodactylus typhlops Sars, 1888:341–342; 1891:29, pl. 2: fig. 3a–e.—Amaud and Child, 1988:130–131 [literature].

MATERIAL EXAMINED.—COSTA RICA. Cocos Ridge, E of Isla Cocos, 06°21'N, 85°17'W, trawl, 1892 m, coll. R/V *Vema*, sta V-15-60, 30 Nov 1958, 1♀.

DISTRIBUTION.—This long-known species has been reported, under various names, from the North and South Atlantic, the Indian Ocean (Subantarctic zone), and is known from the Gulf of Alaska, all in deep water to 3600 meters. This is the first time it has been taken in the tropical Pacific, but it could be expected from here as it is probably a cosmopolitan deep-water species. It is also probably the deepest living member of this genus.

REMARKS.—This female specimen has two small regenerated legs and is also damaged elsewhere. It is typical of the many figures given for the species, including the extremely long propodi and claws, the absence of an ocular tubercle and eyes, and the long slender habitus of the trunk and appendages. It is a rather large graceful species in a genus having mostly smaller to tiny species.

Anoplodactylus vulcanus, new species

FIGURE 16

MATERIAL EXAMINED.—ECUADOR. Salinas coast, intertidal, sta 16-HA-3, 3 May 1966, 1♂ (holotype, USNM 234574), 1♂ with eggs, 1♂, 1♀ (paratypes, USNM 234575).

DESCRIPTION.—Size tiny; leg span 4.4 mm. Trunk short, robust, dorsal outline almost circular, without segmentation lines. Lateral processes contiguous except distally, only slightly longer than their diameters, each armed with low broad dorsodistal tubercle bearing a seta. Neck broad, very short, not extending as far anteriorly as width of ocular tubercle base, glabrous. Oviger basal insertions prominent, bulges extending laterally from neck to coalesce with anterior of first lateral processes. Ocular tubercle a low cone, broad based, large darkly pigmented eyes filling most of tubercle except for small pointed apical cone.

Proboscis barrel-shaped, short, only slightly longer than maximum diameter, with laterodistal constriction evident only in dorsal view, tapering to rounded lips. Abdomen a cylinder carried obliquely at low angle, rounded at tip, armed with single distal setae per side.

Chelifores short, chelae downcurved in front of lips. Scape a short cylinder, slightly downcurved, armed with dorsodistal seta. Chela palm a slightly curved cylinder armed with three short dorsodistal setae, immovable finger little shorter than palm, curved only at tip, without teeth. Movable finger longer than palm, very curved, overlaps immovable finger, armed with two short lateral setae and two slender sharp endal teeth.

Oviger short, second and third segments subequal, fourth only 0.75 length of third, fifth and sixth combined equal to length of fourth. Second segment armed with row of four short setae, third with 3–4 short proximal setae, fourth with row of three short lateral setae, fifth with two lateral rows of four setae

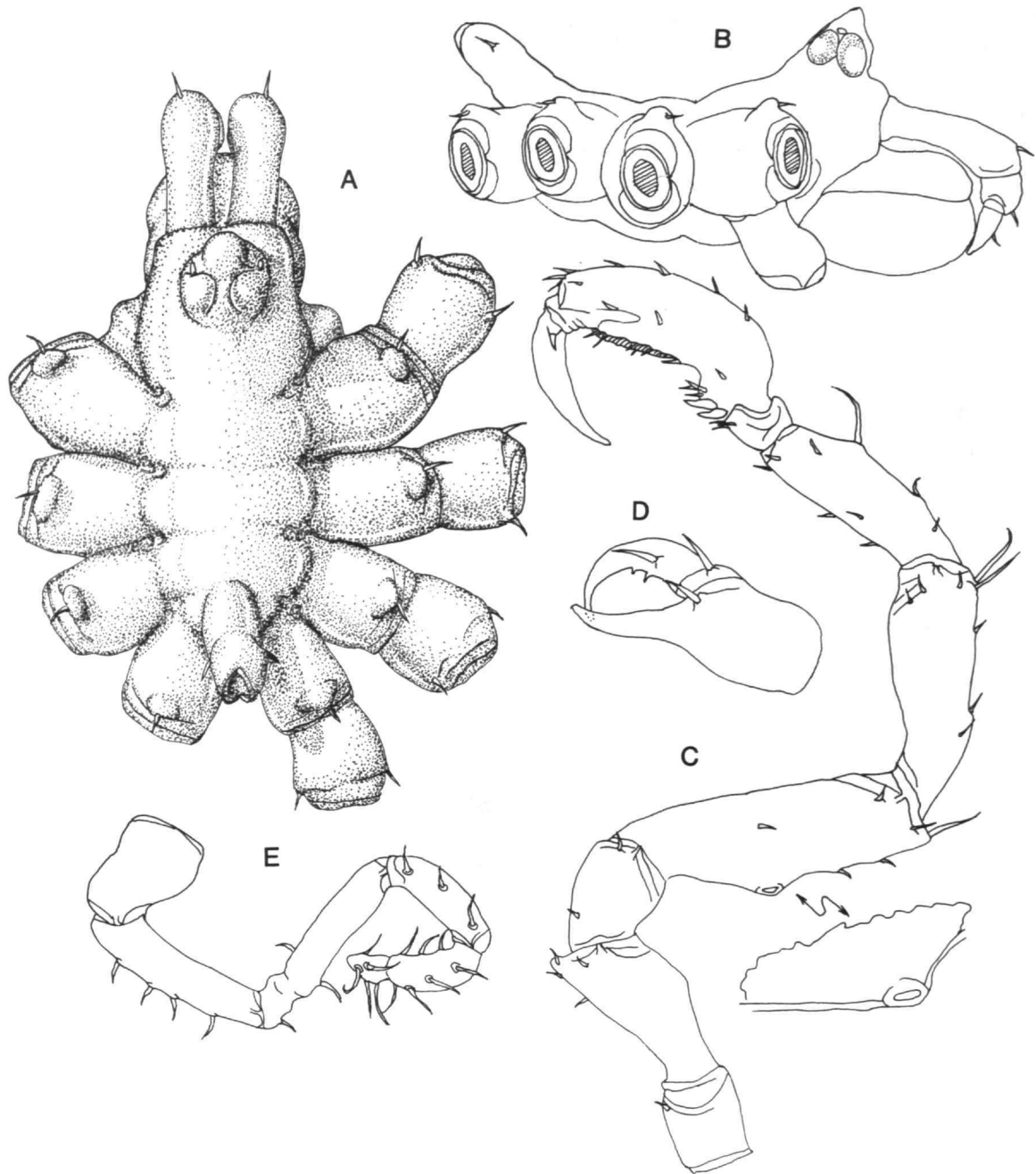


FIGURE 16.—*Anoplodactylus vulcanus*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, third leg, with cement gland enlarged; D, chela; E, oviger.

longer than segment diameter, and sixth with 5–6 lateral setae as long as those of fifth. Sixth segment less than half length of fifth.

Legs moderately short, armed with few short setae and 1–2 longer setae dorsodistally on major segments. Second coxae of posterior two pairs of legs with small ventrodiscal sexual spur not extending beyond segmentation line of segment. Femur the longest segment with first tibia slightly longer than second. Cement gland a large mass extending from proximal femur-coxa segmentation line to just beyond midpoint of femur, creating a volcano-like swelling of the segment dorsum. The gland pore is a fairly large round orifice in the form of a sunken volcanic-like depression. Tarsus small, quadrangular, armed with 3–4 short sole setae. Propodus short, robust, slightly curved, heel armed with two broad spines and four broad setae just anterior to spines. Sole armed with few short setae flanking long lamina covering about 0.75 sole length. Claw broad, well curved, auxiliaries tiny.

Female: Habitus matching that of male but slightly larger in most measurements, and lacking ovigers.

MEASUREMENTS (holotype, in mm).—Trunk length (cheli-fore insertion to tip 4th lateral processes), 0.53; trunk width (across 1st lateral processes), 0.42; proboscis length, 0.45; abdomen length, 0.32; third leg, coxa 1, 0.13; coxa 2, 0.23; coxa 3, 0.16; femur, 0.37; tibia 1, 0.3; tibia 2, 0.26; tarsus, 0.06; propodus, 0.3; claw, 0.19.

DISTRIBUTION.—The species is known only from the type-locality, the Salinas coast of Ecuador, in approximately 0–1 meter.

ETYMOLOGY.—The species name (Latin: a volcano, *Vulcanus*, the God of Fire) refers to the volcano-like femoral cement glands.

REMARKS.—This new species is a member of a small group of tiny compact species which Stock (1975:1075) called the *Anoplodactylus pygmaeus*-complex. Not all species belonging to this complex are as compact nor do they have contiguous lateral processes like those of *A. vulcanus*. The group of species very similar to *A. vulcanus* would include the complex's namesake, *A. pygmaeus* (Hodge), and the Pacific species *A. brevisrostris* Child, *A. chamorrus* Child, *A. compactus* (Hilton), *A. crassus* Nakamura and Child, *A. stri* Child, *A. viridintestinalis* (Cole), and *A. species 1* Child, 1979. There are a few other species with this compact form, but for the most part, most of them have multiple cement gland pores or else have only five oviger segments and are of the synonymized *Halosoma* form of the genus. Also, a number of species included by Stock in his *A. pygmaeus*-complex have lateral processes which are not contiguous but more widely spaced. These will not be included here for comparison purposes.

The new species differs from *A. pygmaeus* in having longer leg segments, a very different cement gland (a bulbous tube in *A. pygmaeus*), a longer abdomen, and smaller lateral process tubercles. The two species are otherwise very similar. Although *A. brevisrostris* is another compact species, it has an extremely

short proboscis, shorter ocular tubercle, chelifores, abdomen, and leg segments.

The proboscis of *A. chamorrus* has a very different shape with its taper and distal constriction, the oviger bases are on large connective "wings" between the neck and first lateral processes, it has a cement gland tube which is long and distal-pointing, and it has other minor features unlike those of the new species.

This species is perhaps closest to *A. compactus* with many characters in agreement between the two. The characters which differ in *A. vulcanus* are; a longer propodal lamina, taller lateral process tubercles, a rounded ocular tubercle apex without an apical cone, longer sex pore tubercles on the fourth leg pair, and a smaller cement gland with a slightly different orifice. None of these characters is immediately evident with only superficial examination, so that the two species could be easily confused.

Another pair of species very close to *A. vulcanus* in habitus are *A. crassus* and *A. viridintestinalis* (the differences between these two species are discussed by Nakamura and Child, 1988:810–815, figs. 1, 2). They both share many characters in common with the new species, but both lack the volcano-like raised cement gland surface and sunken pit orifice of the new species. The females of both of the previously known species have their posterior lateral processes well separated from the third pair while all lateral processes of the new species female are contiguous. There are also differences in the lateral process tubercles which are much smaller or absent in the new species while being large and tall on both known species.

The differences between the new species and *A. stri* are greater than for the previously discussed species. In *A. stri*, the lateral processes are almost but not quite contiguous, the leg segments are longer, the cement gland pore is of a different shape and not at the top of a swelling, the propodus has only one heel spine and a shorter lamina, and the chelae fingers each have teeth. The unnamed female specimen, *A. species 1* Child (1979:64–65, fig. 22) is slightly like *A. viridintestinalis* in having separated posterior lateral processes (not contiguous) but has a general habitus similar to *A. vulcanus* except for the leg segments which have different length ratios, the propodal lamina is much shorter than that of the new species female, the chelae fingers have teeth, the ocular tubercle is much broader, and the lateral process tubercles are not at the dorsodistal tip of each process but are slightly proximal to the tip.

Anoplodactylus species indeterminate

MATERIAL EXAMINED.—ECUADOR. Bahia de Santa Elena, 0.5 km NE of Punta Ballenita, 02°12'20"S, 80°52'10"W, 8–9 m, sta 16-6669, 8 May 1966, 1 larva; Salinas coast, shallow, sta 16-HA-3, 3 May 1966, 1♀.

REMARKS.—These two specimens have no distinctive characters with which to separate them from others in this often difficult genus.

Family PYCNOGONIDAE Wilson

Genus *Pycnogonum* Brunnich, 1764

Pycnogonum hancocki Schmitt

Pycnogonum hancocki Schmitt, 1934:65-67, fig. 2.—Hilton, 1942:308-310, pl. 47; 1943:19.—Stock, 1966:402 [key].—Child and Hedgpeth, 1971:631.

MATERIAL EXAMINED.—GALAPAGOS ISLANDS. *Isla Seymour*: Shore, coll. R/V *Velero III*, sta 85-33, 18 Feb 1933, 1♂, 2♀. *Isla Baltra*: 00°26'05"S, 90°17'18"W, shallow, sta 16-6691, 14 May 1966, 8♂, 4♀. *Isla Isabela*: Canal Bolivar, Punta Tortuga, 00°14'07"S, 91°23'22"W, intertidal, sta 16-66137, 24 May 1966, 1♀; 00°34'S, 90°56'W, intertidal, sta 18B-795D, 24 Sep 1966, 1 juv. *Isla Fernandina*: Canal Bolivar, bay below Punta Espinosa, 00°15'53"S, 91°26'30"W, 0-20 m, sta 16-66138, 25 May 1966, 1♀; same locality, 00°15'43"S, 91°26'38"W, shallow, sta 16-66140, 25 May 1966, 1♂; same locality, shallow, sta 16-66141, 25 May 1966, 1♂, 1♀, 2 juv; same locality, shallow, sta 16-66142, 25 May 1966, 1 juv. *Isla San Salvador*: Bahia James, 00°12'S, 90°50'W, intertidal, sta 18B-794A, 23 Sep 1966, 4♂, 1♀.

DISTRIBUTION.—This apparently common shallow water species is endemic to the Galapagos. It was reported from mainland South America by Hilton, but examination of his specimens identified with this name proved them to be misidentified.

REMARKS.—This beautifully reticulated species is easily separated from others with this character by its barrel-shaped slightly downcurved proboscis, the low middorsal trunk tubercles not as tall as the ocular tubercle, and its simple rounded leg segments lacking tubercular adornment. Other known eastern Pacific species all have leg tubercles, proboscides other than barrel-shaped, and median trunk tubercles either taller or much shorter than those of this species.

Family COLOSSENDEIDAE Hoek

Genus *Colossendeis* Jarzynsky, 1870

Colossendeis angusta Sars

Colossendeis angusta Sars, 1877:268-269.—Fry and Hedgpeth, 1969:52-53, figs. 7, 8 [literature].—Stock, 1987:508.

Colossendeis gracilis Hoek, 1881:69-70, pl. IX: figs. 6-8, pl. X: figs. 6, 7.—Schimkewitsch, 1893:32.—Marcus, 1940:110.—Stock, 1963:330, fig. 6a.

MATERIAL EXAMINED.—ECUADOR. Gulf of Guayaquil, 03°15'S, 80°55'W, 945-960 m, sta 18B-770, 10 Sep 1966, 2 spec; Gulf of Guayaquil, 03°15'S, 80°50'W, 77-80 m, sta 18B-771, 10 Sep 1966, 2 spec.

PERU. Slope of Milne-Edwards Deep, 11°58'S, 78°35'W, 3117-3177 m, sta 11-149, 27 Oct 1965, 1 spec; W of Punta Malabrigo, 07°49'S, 80°38'W, 605-735 m, sta 18B-754, 5 Sep 1966, 48 spec; just S of Isla Lobos de Afuera, 06°58'S, 80°44'W, 80 m, sta 18B-756, 6 Sep 1966, 1 spec; W of San

Jose, 06°44'S, 80°18'W, 30 m, sta 18B-758, 6 Sep 1966, 1 spec.

CHILE. Off Punta Topocalma, 34°07'S, 72°19'W, 730-750 m, sta 18A-687, 5 Aug 1966, 1 spec; off Cabo Humos, 35°22'S, 72°32'W, 27 m, sta 18A-688, 6 Aug 1966, 1 spec; off Bahia Las Canas, 35°27'S, 72°53'W, 130 m, sta 18A-689, 6 Aug 1966, 1 spec; off Punta Molles, 32°17'S, 71°40'W, 580 m, sta 18A-702, 11 Aug 1966, 1 spec.

DISTRIBUTION.—Some of the above depths are amazingly shallow for this species, but the specimens agree in all particulars with figures of Sars' species, and particularly figures of Hoek's *C. gracilis*. This species is known to be cosmopolitan in deep cold waters, but perhaps upwelling of deeper waters along these coasts has permitted some specimens to be taken in these extraordinarily shallow depths.

REMARKS.—All of these specimens have setose palps with an extremely short eighth segment and very long propodal claws in agreement with the characters of *C. angusta*.

Colossendeis arcuata A. Milne-Edwards

Colossendeis arcuatus A. Milne-Edwards in Filhol, 1885:151, fig. 48.

Colossendeis arcuata.—Bouvier, 1937:26-30, figs. 2-8.—Stock, 1978:403-405, figs. 1g-j.

Colossendeis michaelsarsi Olson, 1913:4-5, figs. 1-4, pl. IA.—Hedgpeth, 1948:274, fig. 50f.

Colossendeis Tūan Perrier, 1886 (non Filhol, 1885):302, fig. 241, no. 7.

MATERIAL EXAMINED.—CHILE. Off Punta Topocalma, 34°07'S, 72°19'W, 730-750 m, sta 18A-687, 5 Aug 1966, 1 spec.

DISTRIBUTION.—This apparently rare species has heretofore been taken only in deep North Atlantic Basin waters at a few localities in well over 1000 meters. This record greatly extends its distribution to the southeastern Pacific and into shallower depths.

REMARKS.—This large handsome specimen agrees almost exactly with Stock's (1978, figs. 1g-j) figures of his Bay of Biscay specimen. It has the robust downturned proboscis which is curved over its entire surface rather than only distally, the same terminal leg segment characters, and equally as important, the same palp characters. The palp has a strange curvature (Stock's fig. 1h) in which the palp curves back on itself twice. This Topocalma specimen also retains some of the red pigment of the live specimen, particularly in the proboscis.

We are indebted to both Hedgpeth and Stock for unraveling the tight knots of synonymy into which this elusive species had been placed by several authors over the past hundred years. This genus is a complex of perhaps several closely related groups of species and any clarification of status in their extensive literature is most welcome.

Colossendeis colossea Wilson

Colossendeis colossea Wilson, 1881:244-246, pl. I: fig. 1, pl. III: figs. 5-7.—Fry and Hedgpeth, 1969:53-54, fig. 8 [literature].—Stock, 1978:402-403; 1983:300; 1986:508.

MATERIAL EXAMINED.—CHILE. Off Puerto San Antonio, 33°39'S, 72°10'W, 1170–1480 m, sta 18A-699, 10 Aug 1966, 5 spec; SW of Roca del Rincon, 25°00'S, 70°40'W, 950 m, sta 18A-714, 16 Aug 1966, 13 spec.

DISTRIBUTION.—A very large species distributed in all ocean basins.

Colossendeis leptorhynchus Hoek

Colossendeis leptorhynchus Hoek, 1881:64–65, pl. 18: figs. 3–7.—Stock, 1978:402, 406–408, fig. 2 (all figures labeled 1); 1981:454–455; 1983:299–300; 1986:417.—Nakamura and Child, 1990:308–309.

MATERIAL EXAMINED.—PERU. Slope of Milne-Edwards Deep, SW of Trujillo, 08°23'S, 80°25'W, 2945–2966 m, sta 11-161, 31 Oct 1965, 1 spec.

CHILE. SW of Roca del Rincon, 25°00'S, 70°40'W, 950 m, sta 18A-714, 16 Aug 1966, 3 spec.

DISTRIBUTION.—This species was described from *Chalenger* specimens taken off Chile in 2514 meters, almost the same depth as the Trujillo specimen. Stock (1978:402) remarked that the species is limited in distribution to Southern Hemisphere localities in abyssal depths, but he subsequently found it in much shallower waters off the Islands of

Guadeloupe and Jamaica in the Caribbean. These records place it further south off the Chilean coast than Hoek's types. It may be cosmopolitan in distribution.

REMARKS.—Terminal palp segment length ratios and diameters apparently separate this species from the closely related *C. macerrima* Wilson. The seventh palp segment of this species is distinctly longer than the sixth, and the tarsus is also markedly longer than the propodus. Stock (1978:402, 407, fig. 2(1)) gave an excellent diagnosis and figures of this species permitting its rapid identification.

Colossendeis macerrima Wilson

Colossendeis macerrima Wilson, 1881:246–247, pl. I: fig. 2, pl. IV: figs. 9–12, pl. V: fig. 32.—Hedgpeth, 1948:273, fig. 50d [literature].—Stock, 1987:508.—Nakamura and Child, 1990:309 [recent literature].

MATERIAL EXAMINED.—CHILE. Off Puerto San Antonio, 33°39'S, 72°10'W, 1170–1480 m, sta 18A-699, 10 Aug 1966, 19 spec.

DISTRIBUTION.—This is another species having a worldwide ocean basin distribution, but it has not apparently invaded the Mediterranean Sea.

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