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THE MARINE ISOPOD CRUSTACEANS OF THE GULF OF CALIFORNIA II. IDOTEIDAE: NEW GENUS AND SPECIES, RANGE EXTENSIONS, AND COMMENTS ON EVOLUTION AND TAXONOMY WITHIN THE FAMILY

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Abstract.—Three new records of Idoteidae (Isopoda; Valvifera) in the Gulf of California are presented, bringing the total known idoteid species of this region (the Cortez Province of Briggs, 1974) to 11. One new genus and species (*Parasymmerus annamaryae*) and one formerly described species (*Cleantioides occidentalis*) are fully described and figured. A key to the Idoteidae of the Gulf of California is presented.

Parasymmerus is a highly derived taxon that appears to have evolved from *Eusymmerus* (or a common ancestor). *Edotea* apparently evolved as a tropical component of the Transisthmian Track fauna, but was quickly excluded to the colder temperate waters north and south of the American tropics where it exists today.

Synidotea harfordi is a widely ranging species, whose occurrence in the Cortez Province is uncommon. *Cleantioides occidentalis* is a widely ranging tropical/subtropical species, extending through 4 zoogeographic provinces. In light of recent morphological discoveries (in this paper and elsewhere) it is apparent that the genera *Cleantis, Cleantioides,* and *Zenobiana* are in need of reexamination.

Taxonomic characters of the Idoteidae are discussed and the use of "dorsally visible coxal plates" or "dorsally visible coxal plate sutures" is seen to be largely unreliable. Presence or absence of dorsal coxal plates, and their general morphology, are important characters in the Idoteidae, and workers are urged to describe these structures more fully, and to distinguish between "dorsal coxal plates" and "ventral coxal plates."

Brusca and Wallerstein (1977) reported the presence of 8 species of idoteid isopods from the Gulf of California. We report herein the presence of 3 additional species, one of which represents a new genus and species. The materials upon which this study is based are derived primarily from 3 sources: recently discovered collections of the late E. Yale Dawson from Western Mexico; material from Scripps Institution of Oceanography; and specimens collected on an expedition to tropical west Mexico by the authors, accompanied by P. Pepe and A. M. Mackey, in the summer of 1976.

Genera of the family Idoteidae are, at the present time, distinguished primarily by 4 characters: development of the pleonal somites; arrangement of the (dorsal) coxal plates; number of flagellar articles in antenna 2; and number of articles in the maxillipedal palp. A recent paper by Menzies and Miller (1972) reviews the subfamily Idoteinae, to which most of the Idoteidae genera belong, and the criteria and terminology used in the present paper are largely those used by these workers (see also Menzies, 1950). The following abbreviations are used: AHF, Allan Hancock Foundation; USNM, National Museum of Natural History; NMC, National Museums of Canada, Ottawa; AMNH, American Museum of Natural History (New York).

Parasymmerus, new genus

Etymology.—The generic name is indicative of the close similarity to the genus *Eusymmerus*; gender masculine.

Type-species.—The type and only known species of the genus is described below, *Parasymmerus annamaryae* n. sp.

Diagnosis.—Pleon comprised of a single segment, with one pair of small, partial, anterolateral sutures. Coxae of pereonites II to IV simple rings, not forming dorsal coxal plates; coxae of pereonites V and VI free, expanded anterolaterally into small dorsal coxal plates (visible only in ventrolateral aspect); coxae of pereonite VII free, plates visible in dorsal aspect. Antenna 1 much shorter than antenna 2. Antenna 2 of 6 articles, the sixth being the single, large, flagellar article. Maxillipedal palp of 3 articles. Cephalon without a dorsal hump.

Affinities.—*Parasymmerus* closely resembles the genera *Eusymmerus* and *Edotea*. It is similar to *Eusymmerus* in the following respects: general body symmetry; relative lengths of antennae 1 and 2; pleonal characteristics; and possession of a single, large, flagellar article on antenna 2. *Parasymmerus* differs from *Eusymmerus* in possessing only 3 articles on the maxillipedal palp, lacking a cephalic hump, and in having a dorsal coxal plate (albeit small) on pereonite V. We have found that even in very young individuals of *Eusymmerus* (less than 3.0 mm in length) the maxillipedal palp is always composed of 4 articles, never 3. *Parasymmerus* shares with *Edotea* the pleonal characteristics and a maxillipedal palp of 3 articles. It differs from *Edotea* in the possession of free dorsal coxal plates on pereonites V–VII, and in having a large, uniarticulate, clavate flagellum on the second antennae (see Table 1).

Menzies and Miller (1972) put forth the hypothesis that there exists, in the subfamily Idoteinae, a phylogenetic trend towards increasing degrees of fusion of certain body parts—notably the pleonites, dorsal coxal plates, articles of the maxillipedal palp, and possibly the flagellar articles of the second antennae. What has in the past, however, been interpreted as fusion

Table 1. Comparison of Some Generic Characters of *Eusymmerus, Parasymmerus,* and *Edotea* (family Idoteidae; subfamily Idoteinae).

Genus	Number articles in maxillipedal palp	Number pereonites with dorsal coxal plates*	Pleonal sutures (complete + partial sutures)	Number articles in flagellum of 2nd antenna††
Eusymmerus	4	2 (unfused)	0 + 1	1
Parasymmerus	3	3 (unfused)	0 + 1	1
Edotea	3	3 (fused or partially fused)	0 + 1†	1 – 4

* This refers to the actual number of dorsal coxal plates present on pereonites II through VII (whether fused or not with their respective pereonite), not just those which are visible in the dorsal view alone (see text).

† In some species of *Edotea* grooves may extend across the dorsum of the pleon (e.g. Edotea *transversa*). These grooves are not true pleonite articulations, but appear to be remnants of the embryonic fusion of the pleonal somites.

†† There appears to be two distinctly different types of reduction that has occurred on the flagellum of antenna 2 of the Idoteinae. In most genera possessing a uniarticulate flagellum (including *Eusymmerus* and *Parasymmerus*) the single article is a large, clavate structure, suggesting possible fusion of the flagellar articles. In *Edotea,* on the other hand, the flagellar articles are simply reduced in size and number, being minute vestiges borne upon the peduncle, with no suggestion of fusion having taken place.

of the dorsal coxal plates to the pereonites appears to be in error in many cases. Our observations indicate that many assumptions of coxal plate fusion can be more correctly interpreted as coxal plate reduction or loss (see discussion below). This phylogenetic trend in the Idoteinae is best seen when the genera are arranged in a series of increasing fusion of pleonites and reduction in maxillipedal palp articles (see table 1, Menzies and Miller, 1972:2). We agree that these data rather convincingly suggest that the more primitive genera in the subfamily may be distinguished by a pleon comprised of 2 to 4 complete pleonites (plus 1 to 2 additional, partly fused pleonites, indicated by incomplete lateral suture lines), and a maxillipedal palp of 4 to 5 articles. The genera distinguished by these plesiomorphic character states are: *Zenobiana, Cleantis, Cleantioides, Idotea, Cleantiella, Engidotea,* and the extinct *Proidotea.* Genera possessing the presumably most derived, or apomorphic character states (all pleonites fused into a single piece, with no or a single pair of partial lateral suture lines; maxillipedal palp of 3–4 articles) are: *Moplisa, Colidotea, Synidotea, Synisoma, Erichsonella, Eusymmerus, Parasymmerus,* and *Edotea.*[1] *Parasymmerus* is one of the most derived taxa in the Idoteinae, in having only a single partial pleonal suture and a maxillipedal palp of 3 articles. If a decreased number of flagellar articles in

[1] Note that Menzies and Miller's (*op. cit.*) table incorrectly states that *Synisoma* has 2–3 partial pleonal suture lines (it actually has only 1), and that *Edotea* has a second antennal flagellum of a single article (it actually has 1–4 rudimentary flagellar articles).

antenna 2 is also considered an apomorphic attribute, *Parasymmerus* appears as a highly derived taxon indeed in its reduction to a single flagellar article.

If the characters of Menzies and Miller (above) are used, the most recently derived genera of Idoteinae are seen to be members of the New World fauna, particularly the New World tropics, *Parasymmerus* apparently being derived from *Eusymmerus* or a common ancestor. These two genera, in turn, appear to be at or near the apex of a lineage that also produced *Erichsonella, Colidotea, Edotea,* and possibly the unusual southwest Atlantic genus *Moplisa.* A geographic trend is also apparent. *Eusymmerus* and *Parasymmerus* are monotypic genera known only from the tropical east Pacific. *Edotea,* on the other hand, is a polytypic New World genus, comprised of 5 species known from the temperate Pacific Southern Hemisphere, and 2 from the temperate Northern Hemisphere (*E. sublittoralis* [Pacific] and *E. triloba* [Atlantic]).[2] In order for this distributional pattern to exist one must assume, if the above phylogenetic hypothesis is accepted, that the genus *Edotea* evolved as part of the Transisthmian Track fauna (see Croizat, Nelson, and Rosen, 1974) of the Central American waterway. Some early ancestor(s) of the west Atlantic species must have once flourished in the tropical Caribbean region, later to become extinct (at least locally), leaving as its descendant the single temperate northwest Atlantic species *Edotea triloba* (Say). In the northeast Pacific only *Edotea sublittoralis* persists today—restricted to temperate offshore benthic waters, in subtidal depths to 64 m (Brusca *et al.,* ms.). One may speculate that competition in the intertidal and shallow subtidal regions of the northeast Pacific, at the time of *E. sublittoralis*' (or its ancestor's) early colonization efforts was made severe by the presence of the already more speciose shallow-water genera *Idotea, Synidotea,* and *Colidotea* (also possibly *Cleantis* and *Cleantioides*). Thus, we find that *Edotea,* although apparently evolving in the New World tropics, was promptly excluded from this region, its modern species being successful only in the temperate latitudes of North and South America. For a review of the distribution of the northeast Pacific Idoteidae see Brusca and Wallerstein, 1979.

Parasymmerus annamaryae, new species
Figs. 1–2

Etymology.—The specific name is the genitive singular of Anna Mary [Mackey]; it is named in Miss Mackey's honor for her assistance on the expedition during which this new species was collected, as well as her collection of a great deal of other material upon which this and other isopod studies have been based.

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[2] *Edotea acuta* and *Edotea montosa* were synonymized with *E. triloba* by Wallace (1919).

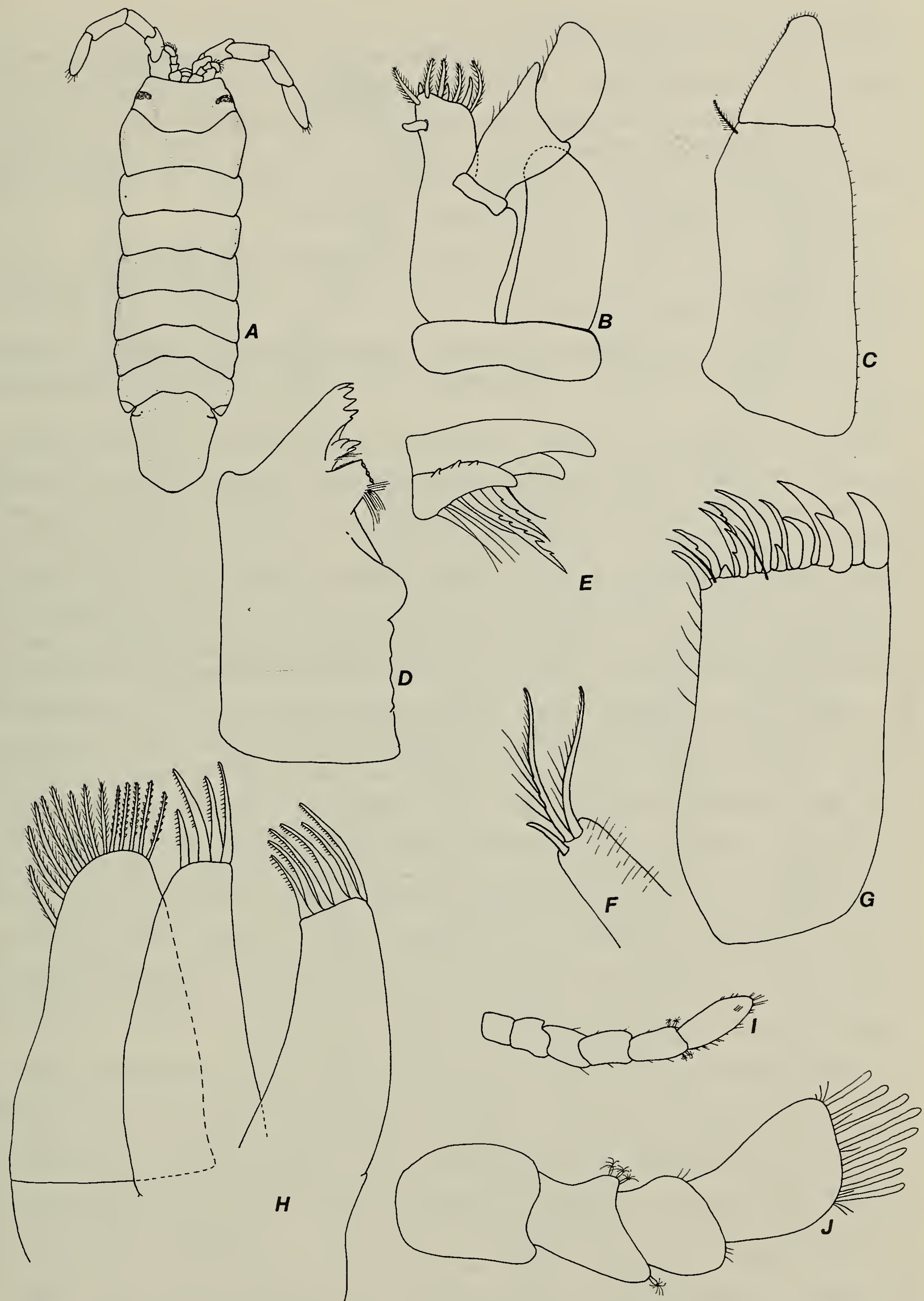


Fig. 1. *Parasymmerus annamaryae*. **A,** Dorsal view; **B,** Maxilliped; **C,** Uropod; **D,** Left mandible; **E,** Lacina mobilis of left mandible; **F,** Maxilla 1, endopod; **G,** Maxilla 1, exopod; **H,** Maxilla 2; **I,** Antenna 2; **J,** Antenna 1.

Holotype.—AHF 765; male.

Type-locality.—Mexico, Colima, Manzanillo, Bahía Audíencia, north shore of bay, approximately 1 m below high tide mark in algae (*Choonospora minima* and *Dermonema frappieri*), dead barnacle shells (*Tetraclita* sp.), and mussel beds. Water (surf) temperature 30°C; air temperature (early afternoon) 27°C; overcast; light rain; 3–4 August 1977; A. M. Mackey, R. C. Brusca, B. Wallerstein, and P. Pepe (collectors).

Allotype.—AHF 765a; female. From same sample as holotype.

Paratopotypes.—28 specimens; same sample as holotype. Deposited: AHF, USNM, NMC, AMNH.

Paratypes.—1 nonovigerous female; Mexico, Sinaloa, Mazatlán; small "reef" 2 mi. north of town; 8 December 1946; E. Yale Dawson. Deposited AHF.

Description.—Head at least 1.75 times wider than long, sides strongly produced laterally (Fig. 1a); supra-antennal line strongly concave; frontal process wide and truncate, extended almost to anterior margin of frontal lamina 1; frontal lamina 1 medially produced, wider than frontal process; frontal lamina 2 broadly rounded, visible in dorsal aspect. Eyes transversely elongate and wide, rarely subovoid. Antenna 1 short, at best reaching article 3 of antenna 2, and of 4 articles, the fourth being the single flagellar article bearing terminal esthetascs (Fig. 1j). Antenna 2 of 6 articles, the sixth being the single, large, flagellar article bearing short setae (Fig. 1i). Maxillipedal palp of 3 articles, distal 2 articles with simple setae; endite with 1 coupling hook, 2 to 4 terminal spines, and 1 to 6 plumose setae along terminal margin (Fig. 1b). Maxilla 1 endopod with 2 to 3 long setae; exopod with 13 spines and 2 robust, simple setae (Fig. 1f,g). Maxilla 2 trilobate, endopod heavily setose, with 13–14 long setae, the outermost being plumose; inner lobe of exopod with 4 to 5 comb setae along distal margin; outer lobe of exopod with 4 to 6 comb setae (Fig. 1h). Mandible with 5-cuspate incisor process, robust molar process, and lacina mobilis of 3 cusps and a complex setation as figured; lacina mobilis of right and left mandibles subequal, although slight differences in setation do occur (Figs. 1d,e).

Pereon broad, 1.7 to 2.1 times longer than pleon; lateral margins subparallel or slightly convex. Coxae of pereonites II to IV reduced, not forming dorsal coxal plates; dorsal coxal plates of pereonites V and VI very small, anteriolaterally directed, and visible only in ventrolateral aspect; dorsal coxal plates of pereonite VII larger, triangular, posteriorly direct, with dorsally visible sutures (Fig. 1a). Pereopods 1 to 7 slender, ambulatory; dactyl with accessory claw. Pereopod 1 with comb setae on inner surface of propus, and weak setation on ventral margin (Fig. 2f). Pereopods 2–7 subsimilar, without comb setae but with weak setation on ventral margin (Fig. 2g).

Pleotelson with posterolateral angles obtuse, tapering posteriorly to truncate tip. Uropod uniramous, with single, large, plumose seta on lateral distal

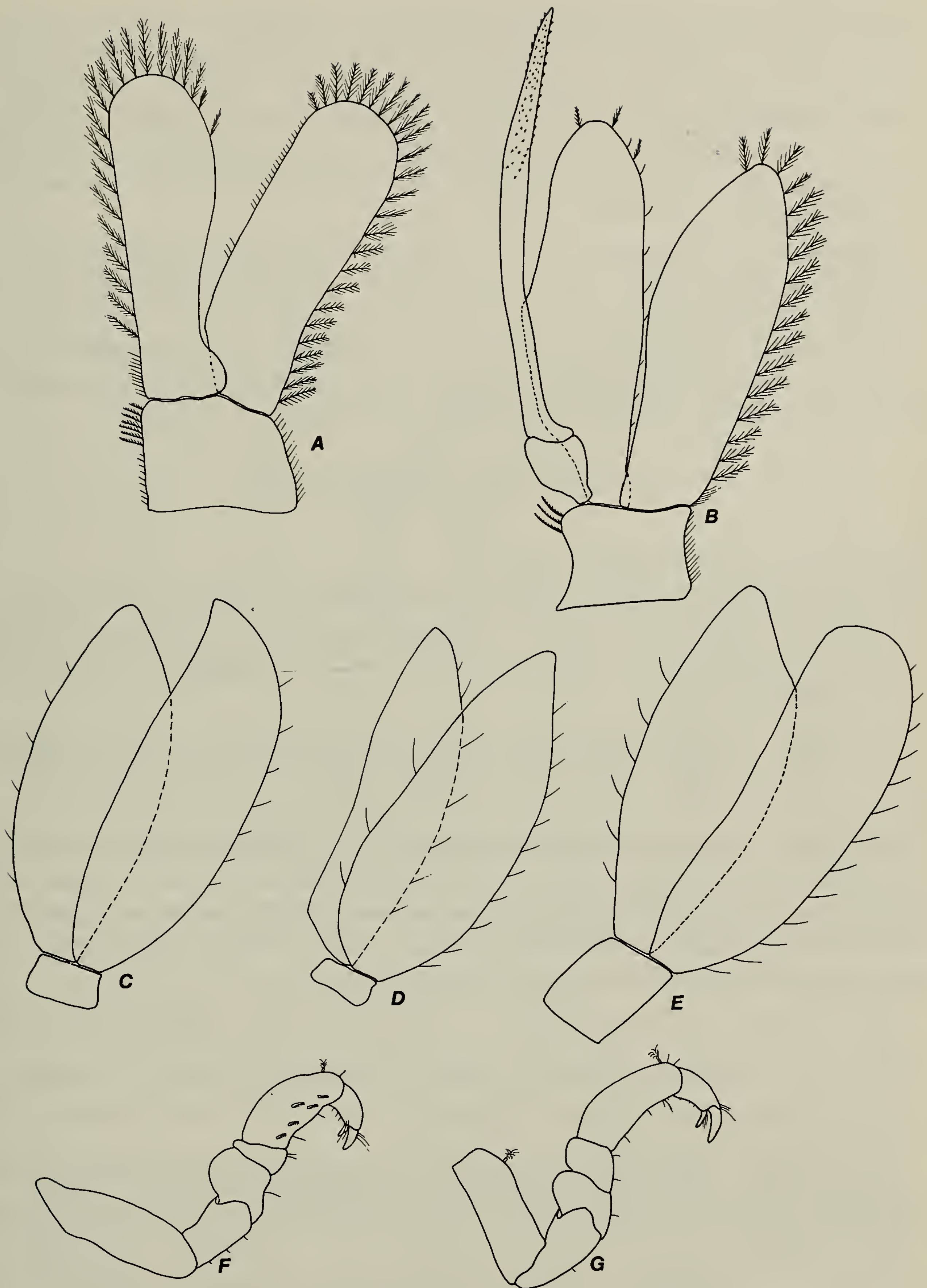


Fig. 2. *Parasymmerus annamaryae.* **A,** First pleopod; **B,** Second pleopod; **C,** Third pleopod; **D,** Fourth pleopod; **E,** Fifth pleopod; **F,** First pereopod; **G,** Fifth pereopod.

angle of basis (Fig. 1c). Pleopods all bilamellar. Pleopod 1 strongly setose; lower lamella with plumose setae on medial margin; upper lamella with plumose setae on lateral margin and apex (Fig. 2a). Pleopod 2 with upper lamella subsimilar to that of pleopod 1; lower lamella with a few plumose setae on apex; appendix masculina of male extended beyond tip of lamella and acuminate, with tracts of minute spines distally (Fig. 2b). Pleopods 3 to 5 with simple setae (Figs. 2c,d,e).

Distribution.—Although we have examined extensive collections from throughout northwestern Mexico, particularly the Gulf of California, these are the only two localities from which this isopod has been recorded. *Parasymmerus annamaryae* is a tropical species and its range is expected to be extended considerably southward when more intensive collecting is accomplished on southern Mexico and Central American rocky shores.

Synidotea harfordi Benedict 1897
Fig. 3

Idotea marmorata Harford, 1877:117.

Synidotea harfordi Benedict, 1897:402; Richardson, 1899a:849; Richardson, 1905:387; Gurjanova, 1936:163; Johnson and Snook, 1955:290; Schultz, 1969:67; Menzies and Miller, 1972:16; Miller (in Smith and Carlton), 1975:288, 289, 306.

Diagnosis.—(After Menzies and Miller, 1972) Cephalon without preocular horns; frontal margin transverse or slightly convex, with no median emargination. Dorsal surface of pereon smooth, lacking rugae, tubercles, or scales (under light microscope); pereonites 1 to 3 with lateral margins evenly rounded; borders of pereonites 4 to 7 straight. Pleotelson about one-fourth longer than its greatest width, posterior border medially excavate. Appendix masculinum straight, apex bluntly pointed, lateral margin spined (Fig. 3a; for additional figures see Menzies and Miller, 1972).

New records.—Mexico, Golfo de California, Baja California Sur (east coast), Punta Chivato, about 20 mi. south Santa Rosalia; subtidal; 12 August 1976; A. M. Mackey.—Mexico, Golfo de California, Sonora, Guaymas, Estero Soldado; near entrance to Estero; 20 April 1973, from University of Arizona Ichthyology Collection, UA 73-43.

Distribution.—Although formerly known from Morro Bay, California, to Magdalena Bay on the west coast of Baja California Sur, this discontinuous range extension into the Gulf of California is not unexpected, and follows a pattern seen in at least two other members of the family Idoteidae (Brusca and Wallerstein, 1977): *Idotea* (*Idotea*) *urotoma* Stimpson and *Idotea* (*Pentidotea*) *aculeata* Stafford. *Synidotea harfordi* is hereby established as the southernmost ranging species of this principally cold water genus in North America. It is the only intertidal species in the genus known to occur in

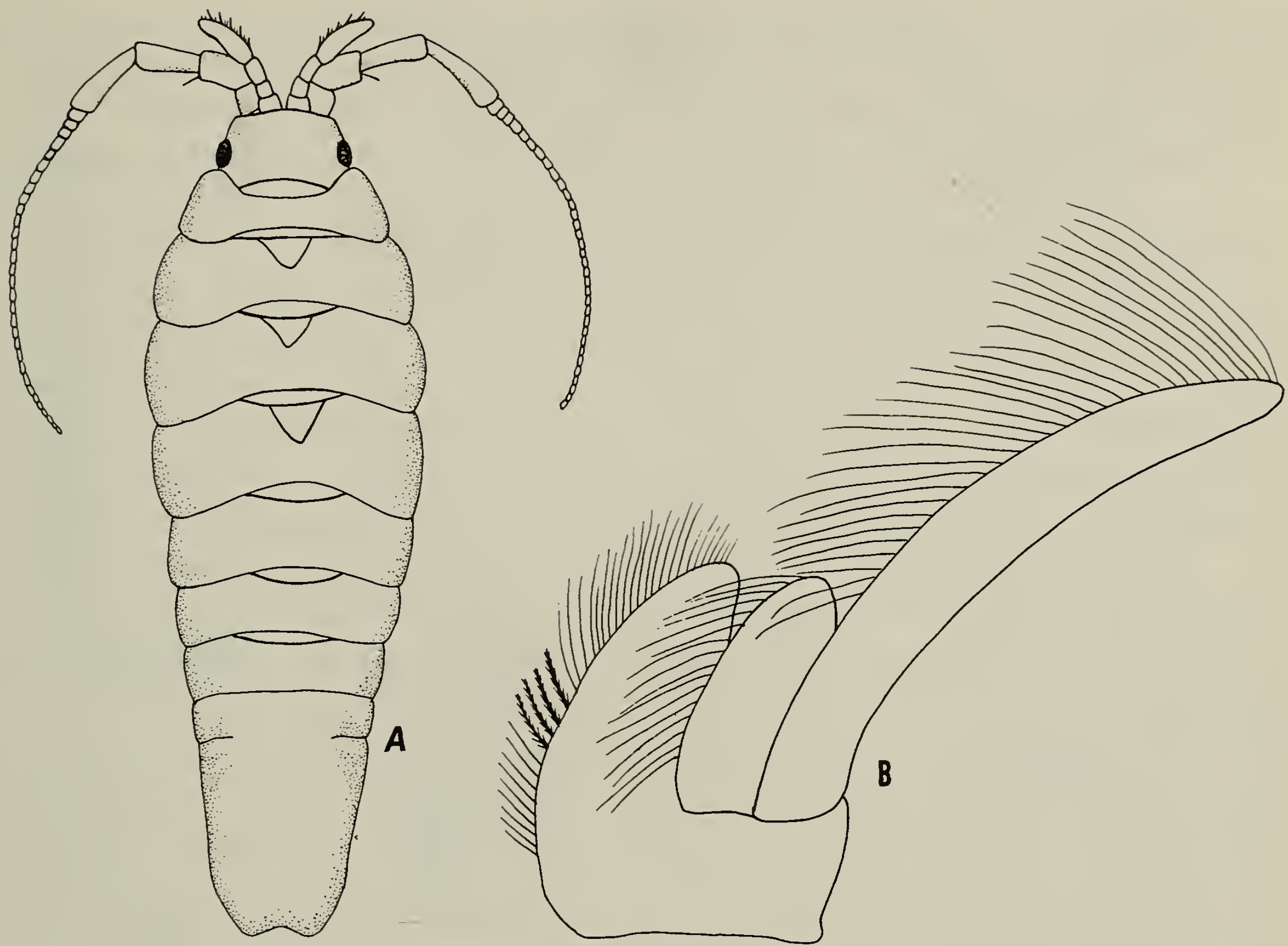


Fig. 3. *Synidotea harfordi.* **A,** Dorsal view; **B,** Maxilla 2 (from Guaymas, Sonora, Mexico).

southern California and Baja California, and the only species of *Synidotea* known to occur in the Gulf of California.

Remarks.—Although the specimen from Punta Chivato is not unusual in any regard, the specimen from Guaymas differs from the normal morphology in having a greatly enlarged outer lobe on the exopod of the second maxilla (Fig. 3b).

Cleantioides occidentalis (Richardson 1899)
Figs. 4–5

Cleantis occidentalis Richardson, 1899a:850; Richardson, 1899b:270; Richardson, 1905:406; Richardson, 1912:28; Tattersall, 1921:426; Nierstrasz, 1941:265; Menzies, 1962:95; Menzies and Frankenberg, 1966:23; Schultz, 1969:83.

Cleantioides occidentalis: Kensley and Kaufman, 1978:658.

Diagnosis.—Body parallel sided, nearly 6 times longer than wide. Supra-antennal line with a small median emargination; apex of frontal process broadly rounded; frontal lamina 1 and 2 visible in dorsal aspect; lamina 1

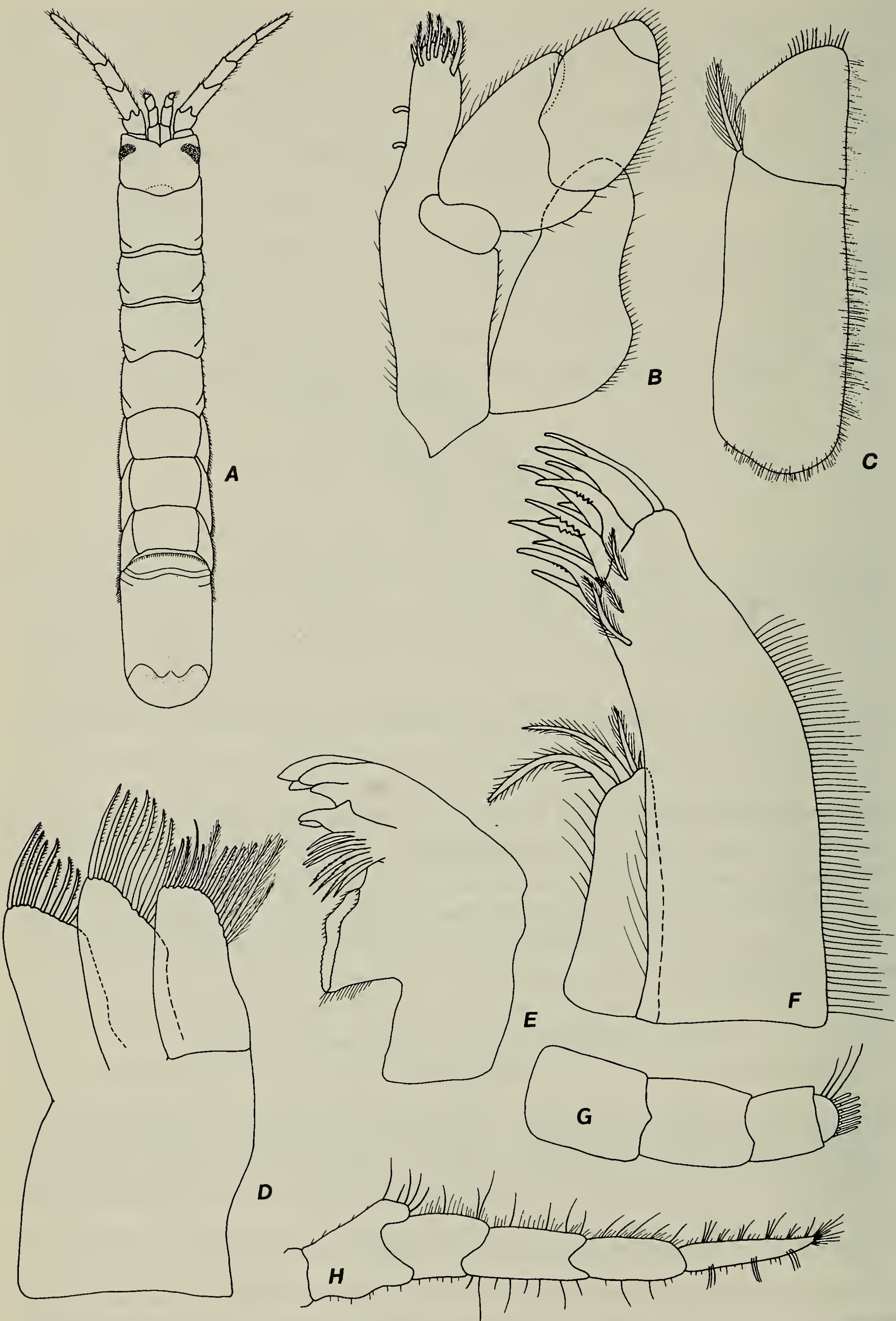


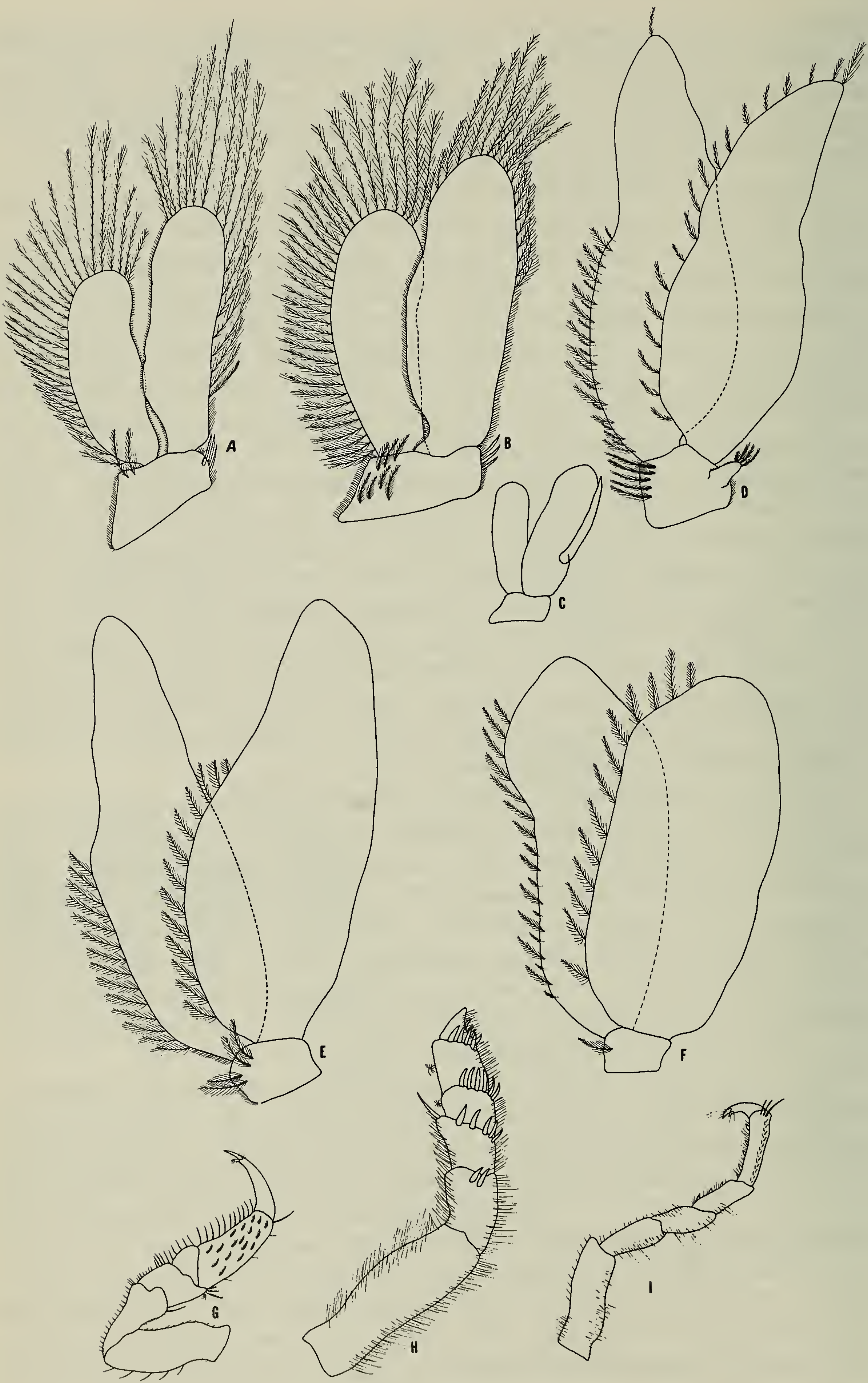
Fig. 4. *Cleantioides occidentalis*. **A,** Dorsal view; **B,** Maxilliped; **C,** Uropod; **D,** Maxilla 2; **E,** Left mandible; **F,** Maxilla 1; **G,** Antenna 1; **H,** Antenna 2.

produced medially; lamina 2 truncate. Maxillipedal palp of 4 articles, endite with 2–4 coupling hooks. Lateral margins of body with dense tufts of plumose setae. Pleotelson with a pair of dorsal humps; uropods uniramous; appendix masculinum of male arises medially on endopod of pleopod 2. Pereopod IV greatly reduced and non-ambulatory.

Description.—Body parallel sided, nearly 6 times longer than wide. Head wider than long; supra-antennal line with a small median emargination or notch; frontal process small, rounded apically, not extended to anterior margin of frontal lamina 1; frontal lamina 1 produced medially, extended almost to anterior margin of lamina 2; frontal lamina 2 wide and truncate. Eyes transversely (dorsoventrally) elongate, medial portion produced posteriorly (Fig. 4a). Antenna 1 of 4 articles, the fourth being the single flagellar article bearing terminal esthetascs (Fig. 4g). Antenna 2 of 6 articles, the sixth being the single flagellar article; all articles with 2 tracks of setae along ventral margin; articles 2–4 with scalloped distal margins (Fig. 4h). Maxillipedal palp of 4 articles, distal 3 with simple setae; endite with 2–4 coupling hooks, numerous plumose setae and spines along terminal margin (Fig. 4b). Endopod of maxilla 1 with 3 plumose setae; exopod with 12 spines and 3 plumose setae (Fig. 4f). Maxilla 2 trilobate, endopod heavily setose, with at least 14 setae, the outermost being plumose; inner lobe of exopod with 6 to 9 comb setae; outer lobe of exopod with 8 to 12 comb setae (Fig. 4d). Left mandible with 4-cuspate incisor, robust molar processes, and lacina mobilis of 3 cusps and complex setation (Fig. 4e); incisor and lacina mobilis of right mandible somewhat reduced in size.

Pereon 2 to 3.2 times longer than pleon; lateral margins parallel and heavily setose (Fig. 4a). Free dorsal coxal plates present on pereonites II to VII; those of V to VII occupying entire lateral margin, posterior angles acute; II and III occupying ½ lateral margin; IV occupying ½ to ⅔ lateral margin. Pereopods 1 to 3 slender, ambulatory, increasing in size posteriorly; pereopod 4 greatly reduced and non-ambulatory, row of spines along terminal margin of last 4 articles, basis as long as 5 distal articles together (Fig. 5h); pereopods 5 to 7 increasing in size posteriorly (Fig. 5i). All pereopods biungulate. Pereonites I–V, of female, bear oostegites.

Pleon composed of 4 segments (including the pleotelson) plus one pair of partial sutures. Apex of pleotelson broadly rounded, with a pair of elevated, submedian, dorsal humps (Fig. 4a). Uropods uniramous, medial margins covered by dense setae, distolateral angle with single, large, plumose seta; distal margin with about 12 large, plumose setae (Fig. 4c). Pleopods all with plumose setae on outer margin of lamellae and on basis (Figs. 5a–f); pleopods 3–5 considerably less setose than 1–2 (Figs. 5d–f); marginal setae of exopods of pleopods 3 and 5 arise in 2 distinct tracks, one on the upper and one on the lower surface (Figs. 5d,f). Basis of pleopod 3 with distinct setose lobe (Fig. 5d). Appendix masculinum of male second pleopod arises not from basis, but medially from endopod (Fig. 5c).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New records.—Mexico, Sonora, SW of Punta Peñasco; 12 m; 5–6 April 1960; from Scripps cruise, SB 25b; A. Flechsig.—Mexico, Baja California Sur, Santa Maria Bay (24°43′N 112°14′W); 35–50 m; 19 Jan. 1940; "Velero III," station No. 1031–40.—Mexico, Michoacan, Punta Lizardo (18°6.7′N 102°56′W); 40′ otter trawl, 20–25 m; 4 April 1974; from Scripps cruise, MV 73-I-22; C. Hubbs and S. Luke.—Guatemala, off San Jose lighthouse (13°52′N 91°10′W); 15–22 m; black sand; 11 Jan. 1930; "Velero III," station No. 77-38.—Costa Rica, Gulf of Dulce (8°23′N 83°16′W); 20–44 m; coarse sand; 26 March 1939; "Velero III," station No. 939-39.—Ecuador, off Cape San Francisco (0°37′N 80°0′W); 30 m; mud and rock; 23 Feb. 1938; "Velero III," station No. 850-38.—Ecuador, Galapagos Islands, Charles Island, Black Beach (1°16′S 90°29′W); rocky intertidal; 18 Jan. 1934; "Velero III," station No. 163-34.

Distribution.—Although this species was previously known only from the type-locality (Magdalena Bay, Baja California Sur), and Culebra Is., Panama, our studies have revealed it to be a widely ranging tropical-subtropical species occurring through 4 zoogeographic provinces: the Cortez, Mexican, Panamanean, and Galapagos (Briggs, 1974; Brusca and Wallerstein, 1979). Collection data indicate that *C. occidentalis* has a preference for shallow, subtidal, sandy habitats (records are from the littoral region to 50 m). In addition, two of the collections were made on black sand substrates. Kensley and Kaufman (1978) report a salinity range of 26–33‰ in its habitat at Culebra Island.

Remarks.—Richardson's (1899a, 1899b) description of *Cleantioides occidentalis* was based on a single individual, and was subsequently reproduced in her 1905 monograph. In neither of these treatments was this species adequately figured. Kensley and Kaufman's (1978) redescription was, in turn, based upon 3 ovigerous females and 5 immature females, all from the same locality (Culebra Island, at the west entrance of the Panama Canal). Again, many of the appendages were not figured or described, and for these reasons an entirely new description and new figures have been prepared, based on males, females, and juveniles from west Mexico and Central America.

Tattersall (1921) described the state of confusion that exists in the genera *Cleantis* and *Zenobiana*. Little has occurred in the subsequent 60 years to rectify this situation, and now *Cleantioides* Kensley and Kaufman (1978) must be included in this problem. These three closely related genera are in

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Fig. 5. *Cleantioides occidentalis*. **A**, First pleopod; **B**, Second pleopod, female; **C**, Second pleopod, male (setation not figured); **D**, Third pleopod; **E**, Fourth pleopod; **F**, Fifth pleopod; **G**, First pereopod; **H**, Fourth pereopod; **I**, Seventh pereopod.

need of overall reexamination, although Kensley and Kaufman did "provisionally" (sic) separate them based on examination of type species. They point out that *Cleantis planicauda* would seem to belong to the newly erected genus *Cleantioides,* yet *C. planicauda* possesses a maxillipedal palp of 5 articles, rather than 4 as they have defined *Cleantioides.* If *C. planicauda* is indeed to be considered a *Cleantioides,* then the definition of this genus must be expanded to accomodate those species with a maxillipedal palp of 5 articles, and in doing so reducing the number of differences between *Cleantis* and *Cleantioides* to a single feature, a biramous vs. uniramous uropod. The only other genus in the Idoteinae to show variation in this maxillipedal character state is *Idotea,* but as Menzies and Waidzunas (1948) and Menzies (1950) have shown, species with a palp of 5 articles develop the fifth, small terminal article as they mature to adulthood. It was on this basis that Menzies reduced the genus *Pentidotea* to a subgenus of *Idotea,* and the number of articles in the maxillipedal palp remains the only character distinguishing these two subgenera. The variation in palp article number between *C. occidentalis* and *C. planicauda,* however, follows quite a different pattern. Regardless of whether the palp is comprised of 4 or 5 articles, the small terminal article is always present, the additional article in *C. planicauda* apparently arising in the middle of the palp, between articles 2 and 3.

In having only females to examine, Kensley and Kaufman (1978) were unaware of another important feature of *C. occidentalis*; in males the appendix masculina of the second pleopod arises not from the basis, or even proximally on the endopod, but from the medial margin of the endopod (Fig. 5c). The significance of the unusual positioning of this structure is difficult to appraise, as other workers have failed to describe or figure the pleopods for other *Cleantis* species. Is this unusual configuration of the appendix masculina associated with a lineage in which the maxillipedal palp bears 4, rather than 5, articles?

Due to the poor state of knowledge concerning the genera *Cleantis, Cleantioides,* and *Zenobiana,* the phyletic relationships of *C. occidentalis* are impossible to assess at this time.[3] Although *C. occidentalis* and *C. planicauda* are very similar in many regards, and are the only species of *Cleantioides* (or *Cleantis*) known from North America, they differ in several fundamental ways and cannot be considered twin or gemminate species. Further, we have a single record of *C. planicauda* from Oaxaca, Mexico, establishing this species as a probable amphi-American form, sympatric with *C. occidentalis* in the west American tropics.

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[3] Note that Menzies (1962) mistakenly stated that he had shown *Cleantis occidentalis* to be a juvenile of *Idotea urotoma* (Menzies, 1950). In fact, Menzies (*op. cit.*) synonymized *C. heathii* (not *C. occidentalis*) with *I. urotoma.*

Remarks on the Coxal Plates and Their Use in Idoteid Systematics

The following discussion uses a broad interpretation of Moore and McCormick's (1969) definition of a coxal plate: the lateral expansion of a pereopodal coxa joined broadly to the lateral margin of the tergite. As Sheppard (1957) has pointed out, however, in many valviferans the coxae may also be expanded ventrally, to form ventromedial plates (*e.g. Edotea* and *Synidotea*). These ventral plates are not, however, the structures upon which valviferan genera are traditionally diagnosed and separated. As Sheppard (1957) and Bowman (pers. comm.) have noted, perhaps the time has come to begin discriminating between these two types of coxal structures by referring to them as dorsal coxal plates and ventral coxal plates (as we have done in this paper).

Menzies and Miller (1972) gave considerable weight to the degree of supposed fusion of the dorsal coxal plates with their respective pereonites. Unfortunately, their table is based principally upon whether or not the plates ("epimeres" *sic*) and sutures are visible in the dorsal aspect, NOT whether or not the coxae are actually expanded to form true dorsal coxal plates. We have found considerable variability in this character in several idoteid genera. In at least one species of *Erichsonella* (*E. pseudoculata* Boone) coxal plates are dorsally visible only on pereonites V to VII, but are actually present on II to VII. In our studies of *Colidotea* (Brusca and Wallerstein, 1977; Brusca *et al.*, ms.) we have found that, in *C. findleyi* Brusca and Wallerstein, dorsal coxal plates are actually present on pereonites II to VII, although not dorsally visible on ANY segments (all bear distinct suture lines); in *C. edmondsoni* Miller coxal plates are dorsally visible on pereonites IV to VII; and in *C. rostrata* (Benedict) they are present on V to VII but dorsally visible on V to VII or VI to VII.

In many idoteids the dorsal coxal plates may be quite small, particularly on the anterior pereonites, and visible only in ventrolateral view, with strong illumination. In *Parasymmerus*, for example, coxae V are only slightly expanded, VI somewhat more expanded, and VII fully expanded and visible in the dorsal aspect. This gradually increasing expansion (or reduction) in coxal size makes interpretation of coxal plate presence difficult. In other genera and species the trend towards reduction in the size of certain coxae is such that no true dorsal coxal plates are even formed. This reduction has mistakenly been interpreted as a fusion of the coxal plates to the terga of their respective pereonites by most workers (see, for example, Sheppard's [1957] clarification of the genus *Edotea* in this regard). Hence, it is apparent from the literature that various workers have interpreted the concept of a "coxal plate" in a variety of ways, some considering a slightly swollen coxa as representing a coxal plate, others assuming lack of an obvious suture line meant the plate had fused with its respective pereonite (when in fact the coxa may be so reduced that a dorsal coxal plate simply does not exist). These specific and generic variations are apparently not restricted to the valviferan isopods. Iverson (1978) has recently found that, in the sphaeromatid *Exosphaeroma inornata,* adult males lack coxal plate sutures entirely, while juvenile males and females bear distinct plates and sutures on pereonites II through VII.

The significant point these discrepancies illustrate is to suggest that the taxonomic value of "dorsally visible coxal plates" or "dorsally visible coxal plate sutures" is highly questionable, particularly when relying on the literature. Yet, this character is one that has traditionally been used, often rather casually, in isopod species diagnoses, descriptions, and keys for at least 150 years. Brusca (1977, 1978a, and 1978b) has pointed out that, in the family Cymothoidae, this and similar characters of the coxal plates are of little taxonomic value and often misleading. In the cymothoids the visibility of the plates (in the dorsal view) is often a function of the general body shape, convexity, twisting of the body to the right or left, and state of female gravidness.

In our opinion, coxal development can be used as a credible taxonomic character within the Idoteidae only when these structures are considered in their totality: presence or absence of dorsal coxal plates (*i.e.* dorsolaterally expanded coxae); shape or degree of development; and relative fusion of the coxae with their respective pereonites. We further feel that caution should be exercised in the continued use of the visibility of the coxal plate "in the dorsal aspect" as a reliable taxonomic character, and we urge workers to distinguish clearly between ventral and dorsal coxal plates.

It is impossible to determine from the literature, for most species, just how many pereonites actually bear coxal plates and/or plate sutures (whether visible in the dorsal aspect or not), and until this particular problem is resolved we do not feel that this character can be considered when elucidating a phylogenetic lineage in the higher taxa of idoteid isopods. In the case of *Eusymmerus, Parasymmerus,* and *Colidotea* we have been able to examine all but one of the known species (*C. edmondsoni*) ourselves. We have found that in order to determine adequately whether dorsal coxal plates are actually present, and whether a suture persists, the specimen must often be examined in lateral, ventrolateral, and dorsal aspects, under intense illumination (we have had considerable success using a quartz-halogen lamp with a flexible fiber light cord).

Key to the Species of Idoteidae Known from the Gulf of California

1. Pleon composed of more than one distinct segment 2
– Pleon composed of one segment 7
2. Pleon composed of 4 segments, plus 1 pair of partial suture lines; flagellum of antenna 2 uniarticulate .... *Cleantioides occidentalis*

– Pleon composed of 3 segments, plus 1 pair of partial suture lines; flagellum of antenna 2 multiarticulate 3
3. Maxillipedal palp of 4 articles .... *Idotea* (*Idotea*) *urotoma*
– Maxillipedal palp of 5 articles 4
4. Eyes transversely (dorsoventrally) elongate and narrow; maxilliped with 1, 2, or 3 coupling hooks .... *Idotea* (*Pentidotea*) *stenops*
– Eyes not transversely elongate and narrow; maxilliped with 1 coupling hook 5
5. Posterior border of pleotelson strongly concave; frontal process extended beyond frontal lamina 1 ...... *Idotea* (*Pentidotea*) *resecata*
– Posterior border of pleotelson convex, with small median lobe; frontal process not extended beyond margin of frontal lamina 1 .. 6
6. Length less than 3.7 times width; eyes reniform; males with distinct tufts of setae on pereopods .... *Idotea* (*Pentidotea*) *wosnesenskii*
– Length more than 3.7 times width; eyes circular; males without tufts of setae on pereopods .... *Idotea* (*Pentidotea*) *aculeata*
7. Flagellum of antenna 2 of a single article 8
– Flagellum of antenna 2 multiarticulate 10
8. Lateral margins of pleon expanded posteriorly; pleon without suture lines .... *Erichsonella cortezi*
– Lateral margins of pleon smooth and gently convex; pleon with one pair of partial anterolateral suture lines 9
9. Maxillipedal palp of 4 articles; cephalon with a mediodorsal hump; coxal plates of pereonite 6 distinct in dorsal view .... *Eusymmerus antennatus*
– Maxillipedal palp of 3 articles; cephalon without mediodorsal hump; coxal plates of pereonite 6 NOT distinct in dorsal view ... . *Parasymmerus annamaryae*, n. sp.
10. Maxillipedal palp of 4 articles; posterior margin of pleotelson acuminate .... *Colidotea findleyi*
– Maxillipedal palp of 3 articles; posterior margin of pleotelson concave .... *Synidotea harfordi*

Note: The Atlantic species *Idotea metallica* has not previously been reported from the northeastern Pacific; we have, however, a record of a single specimen from the Gulf of California and a second individual, collected by M. Ninos, from Catalina Island, California. This species is commonly found on drifting seaweeds throughout the Atlantic Ocean and elsewhere, and its occurrance in the northeast Pacific is not totally unexpected.

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