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THREE NEW SPECIES OF *MAGELONA* (ANNELIDA, POLYCHAETA) AND A REDESCRIPTION OF *MAGELONA PITELKAI* HARTMAN

Meredith L. Jones

Abstract.—*Magelona pitelkai* Hartman from central California is redescribed and *M. hobsonae* n. sp., from Washington and British Columbia, *M. hartmanae* n. sp., from central and southern California, and *M. dakini* n. sp., from Australia, are described. These four species, along with *M. filiformis* Wilson, from England, form a discrete morphological group within the genus; a sixth species, *M. capensis* Day, from South Africa, may also be included.

Recent studies concerned with the redescription of *Magelona papillicornis* F. Müller, the type-species of the genus, showed that three additional species appeared to be closely related (Jones, 1977:254). One of the common characters of this group of four species (*M. papillicornis*, *M. californica*, *M. minuta*, and *M. pettiboneae*) is the presence of a single, invariably smaller, hooded hook adjacent to the pedicels of the lateral lamellae of the posterior region. Other than size, the small hooks are identical to the more numerous large ones.

In carrying out observations on other magelonids, a similar situation has come to light involving yet four more species. In this case, however, the smaller hooks, while having the same dentition as the larger ones, are of a somewhat different structure. The presence of this small hook has not been commented upon in the literature, but, due to Olga Hartman's faithful rendering of her observations, it appears in one of her figures in the description of *Magelona pitelkai* (Hartman, 1944a:pl. 19, fig. 3); it was further illustrated in the figure of Berkeley and Berkeley (1952:fig. 16), taken from Hartman.

The present paper is concerned with four related species, three of which are new:

Magelona pitelkai Hartman from central and southern California
Magelona hobsonae, new species, from Washington and British Columbia
Magelona hartmanae, new species, from southern California
Magelona dakini, new species, from Australia

In all cases parapodia have been individually mounted in glycerine jelly; drawings were prepared with the aid of a Wild drawing tube, a modification of the classical camera lucida.

Identified and/or type-material has been deposited in the collections of the following: Allan Hancock Foundation, Los Angeles (AHF); Australian Museum, Sydney (AM); British Columbia Provincial Museum, Victoria (BCPM); British Museum (Natural History), London (BMNH); Museum National d'Histoire Naturelle, Paris (MNHNP); National Museum of Canada, Ottawa (NMC); National Museum of Natural History, Smithsonian Institution, Washington (USNM); National Museum of Victoria, Melbourne (NMV); National Science Museum, Tokyo (NSMT); Rijksmuseum van Natuurlijke Histoire, Leiden (RNHL); Universitetets Zoologiske Museum, Copenhagen (UZMC); Zoological Institute, Academy of Sciences, Leningrad (ZIL); Zoologische Museum, Amsterdam (ZMA); and Zoologisches Museum, Hamburg (ZMH).

Magelona pitelkai Hartman
Figs. 1–25

Magelona pitelkai Hartman, 1944a:260–261, pl. 19, figs. 1–9; 1944b:320.—Berkeley and Berkeley, 1952:figs. 15–17, only.—Hartman *in* Light, 1954: 73.—Hartman, 1959:393; 1961:30.—Allan Hancock Foundation, 1965: 328.—Hartman, 1969:195–196, figs. 1–7.—Blake *in* Light, 1975:216, figs. 257–258.

Not *Magelona pitelkai*.—Berkeley and Berkeley, 1950:53; 1952:13 (text only, not figs. 15–17, see above).—Jones, 1963:24–25, fig. 60.—Kitamori, 1967:52, fig. 4.—Chew, et al., 1973:14 and 17.—Armstrong, et al., 1976: 282.

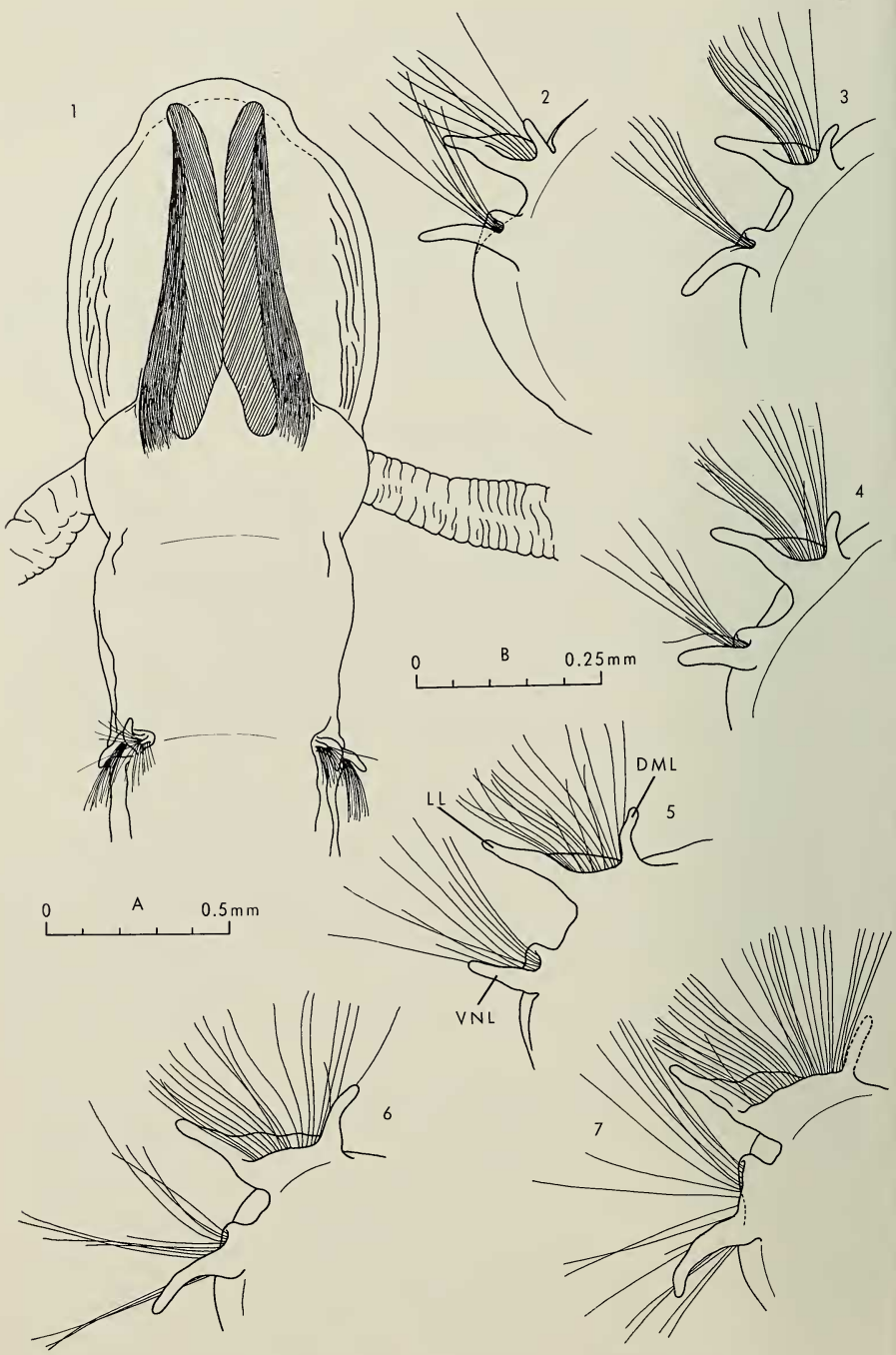
[?] *Magelona longicornis*.—Light, 1941:61. [Not Johnson, 1901.]

Differential diagnosis.—*Magelona* with rounded discrete anterior prostomial margin, lacking horns; with dorsal medial lobes on setigers 1–8; anterior notopodial lateral lamellae broadly attached from setiger 5 on; neuropodial lateral lamellae beginning on setiger 7; pennoned setae of setiger 9 with asymmetrically bilimbate tips; first few setigers of posterior region with interlamellae.

Type-locality.—"Tomales Bay [California], northern end; at low water line" (Hartman, 1944a:261).

Type disposition.—Holotype, AHF POLY 0590.

Material examined.—CALIFORNIA: Tomales Bay, clam flats, 30 May 1941. F. A. Pitelka collector (?)—(holotype, AHF 0590); White Gulch, Tomales Bay (Stat. I, 2-2), S. Obretski and W. Shepherd collectors—1 specimen (USNM 55215); Bodega Bay Harbor, intertidal sand flats, 1 September 1970, J. Cornell collector—41 specimens (USNM 55216, 55217); Doran Beach, Bodega Bay, 12 June and 9 August 1972, J. A. Blake collector—3 specimens (USNM 55218) and 2 specimens (USNM 55219), respectively. Two specimens each, from USNM 55217, have been deposited as follows: AHF,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AM, BCPM, BMNH, MNHNP, NMC, NMV, NSMT, RNHL, UZMC, ZIL, ZMA, and ZMH.

Description.—The holotype is posteriorly incomplete and is not ovigerous. It is 38 mm long for 54 setigers and 0.6 mm wide in the anterior region. Its palps extend posteriorly as far as setiger 28 and are papillated over their distal four-fifths; basally, there are 4 transverse rows of papillae and, distally, 2 rows. There are no lateral pouches anywhere along the length of the body. The specimen from Bodega Bay Harbor (USNM 55216), figured herein (Figs. 2–25), is also incomplete and is 74 mm long for 102 setigers and 0.75 mm wide in the anterior region. Other specimens from Bodega Bay Harbor (USNM 55217), all incomplete, are 57 mm long for 83 setigers, 51 mm long for 80 setigers, 49 mm long for 69 setigers, 43 mm long for 62 setigers; all are 0.75 mm wide in the anterior region. The specimen from White Gulch, Tomales Bay (USNM 55215), is incomplete and is 27 mm long for 52 setigers and 0.8 mm wide in the anterior region.

The prostomium (Fig. 1) agrees with the figure by Hartman (1944a: pl. 19, fig. 1); it is somewhat longer than wide (L:W = 1.2:1.0). The anterior margin is slightly rounded and is set off from the basal portion by paired slight indentations, suggesting a distinct anterior region, but not so well developed as to be considered "horns" (cf. Jones, 1963:figs. 1, 12, 61; 1971:1, 2, 20–25). Palps may extend posteriorly as far as setiger 28 and are papillated over their distal four-fifths. In most cases there are 4 transverse rows of papillae proximally and 2 rows distally, although there may be as many as 8 and 4, respectively. The papillae of preserved specimens retain brown pigment spots at their bases.

The anterior 8 setigers are basically similar, having notopodial lateral lamellae, dorsal medial lobes, and ventral neuropodial lobes (Figs. 2–9). Notopodial lateral lamellae are postsetal, flattened, and transversely oriented. In the first 3 setigers they are rather narrowly attached (Figs. 2–4), but from setigers 4–8, they become increasingly more broadly attached (Figs. 5–9). Further, the number of notosetae increase from about 7 in setiger 1 to about 35 in setiger 8. These setigers bear presetal, cirriform, dorsal medial lobes, closely associated with the notopodial lateral lamellae. The main structure of the first 8 neuropodia is a ventral neuropodial lobe which increases slightly in length along the anterior region and also moves from a strictly ventral to a ventral-presetal position (Figs. 2–9). The number

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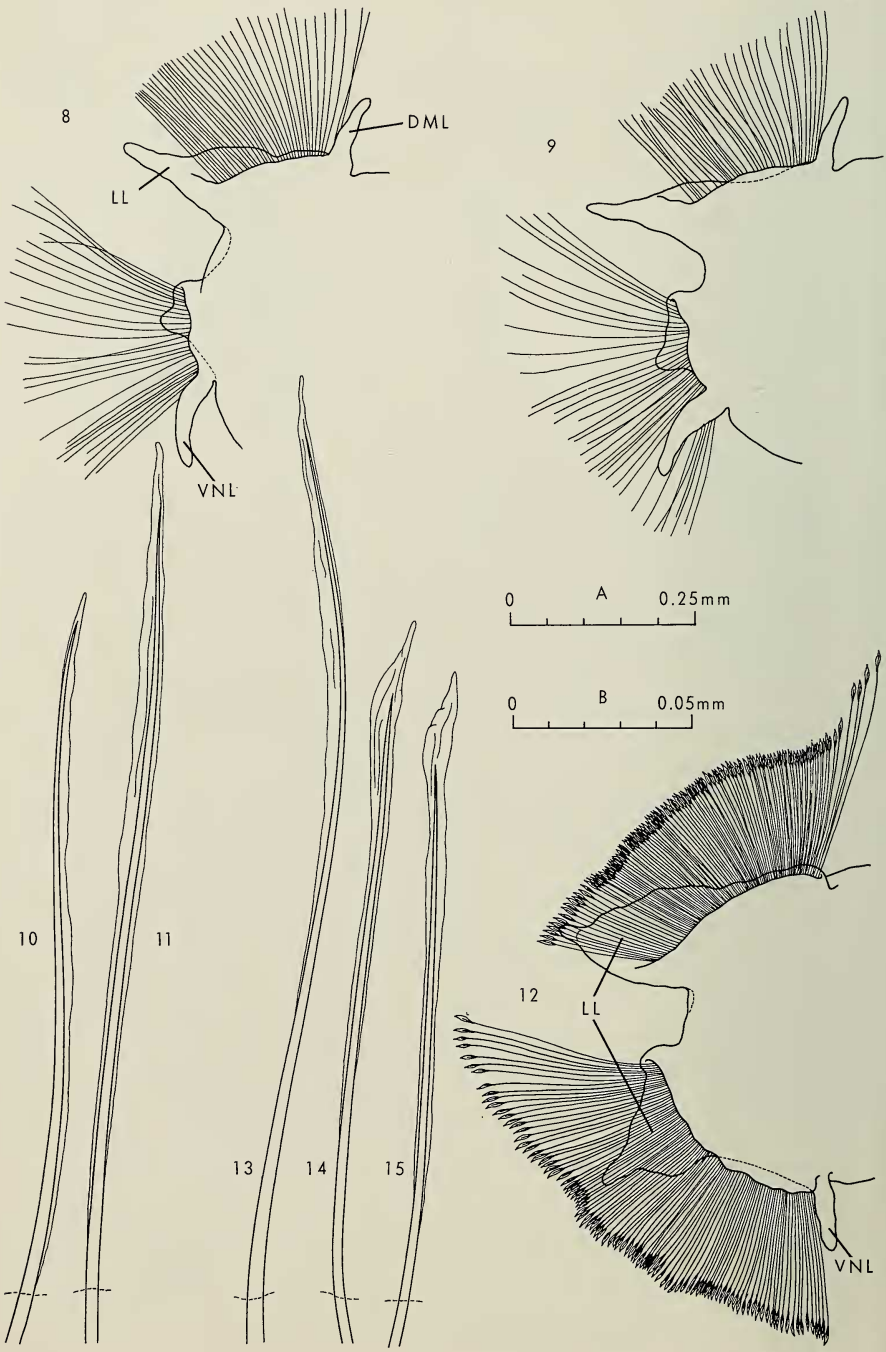
Figs. 1–7. *Magelona pitelkai* (Fig. 1, USNM 55217; Figs. 2–7, right parapodia, anterior views, USNM 55216): 1. Dorsal view of anterior end; 2. Setiger 1; 3. Setiger 2; 4. Setiger 3; 5. Setiger 4; 6. Setiger 5; 7. Setiger 6 (dorsal medial lobe dotted, lost during preparation). Fig. 1, scale A; Figs. 2–7, scale B. DML, dorsal medial lobe; LL, lateral lamella; VNL, ventral neuropodial lobe.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of neurosetae increases from about 7 in setiger 1 to about 35 in setiger 8, with a corresponding increase in the transverse extent of the setal fascicles. The neuropodia of setigers 1–6 bear no suggestion of lateral lamellae, but beginning with setiger 7 (Fig. 8), there is a low, postsetal lamellar structure; it is somewhat better developed on setiger 8 (Fig. 9). All setae of the first 8 setigers are uni- or bilimbate capillaries whose limbations are rather irregular and extend nearly the total length (Figs. 10, 11).

Setiger 9 lacks a dorsal medial lobe, bears a further enlarged postsetal notopodial lateral lamella, with an acute distal tip, and a subsetal, digitate, ventral neuropodial lobe (Fig. 12). The setae are all "pennoned," i.e., bilimbate, with narrow basal limbations which broaden distally and culminate in an apical area which narrows to an acute tip beyond the end of the setal shaft. In the case of *M. pitelkai* the pennoned setae are distally asymmetrical (Figs. 13–15).

From setiger 10 on, parapodia bear dorsal and ventral medial lobes and dorsal and ventral lateral lamellae (Figs. 16–19). The medial lobes are cirriform throughout and the lateral lamellae are asymmetrically lanceolate to ovate and may have truncated tips; they are borne on narrow pedicels. On the notopodia of the first few setigers of the posterior region there is a low, subtriangular, postsetal interlamella between the lateral lamella and the dorsal medial lobe (Fig. 16); the interlamella becomes reduced by setiger 18 (Fig. 17). Hooded hooks are all tridentate, but of 2 types. The larger, more numerous type is a typical magelonid hook (Figs. 20–23); these are arranged in 2 groups, vis-à-vis, in both the notopodial and neuropodial series (Figs. 16–19). The second type is much smaller than the first (Figs. 24, 25); they occur singly at the bases of the smaller pedicels (Fig. 16, arrow). The hoods of the larger hooks are elongated and more or less teardrop-shaped; those of the smaller hooks are usually nearly spherical. The shafts of the larger hooks are smooth and narrow below the main fang; those of the smaller hooks are drawn out and upward to form a cusp just below the fang, the hood appearing to arise as an upward extension of the cusp (Figs. 24, 25).

Lateral pouches are lacking in the anterior part of the posterior region, but they do occur in more posterior setigers where they are found just anterior to a given parapodium, with a posterior opening in line with

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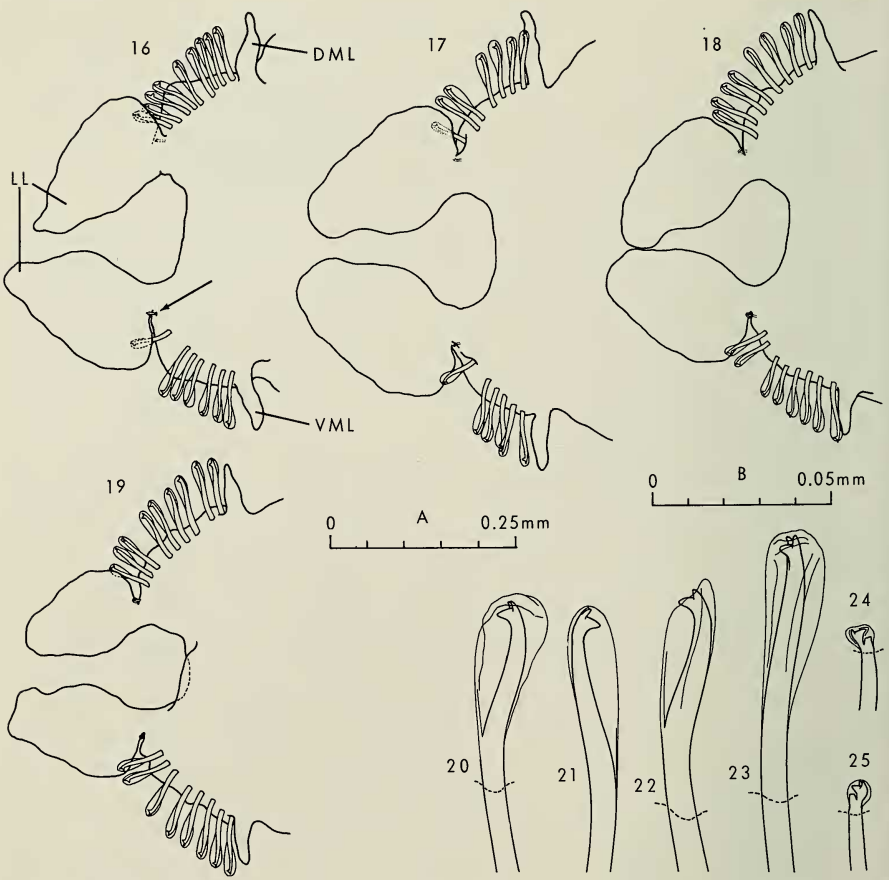
Figs. 8–15. *Magelona pitelkai* (right parapodia, anterior views, USNM 55216): 8. Setiger 7; 9. Setiger 8; 10. Notoseta from setiger 5; 11. Notoseta from setiger 8; 12. Setiger 9; 13. Neuroseta from superior part of fascicle of setiger 9; 14. Neuroseta from inferior part of fascicle, same; 15. Notoseta from superior part of fascicle, same. Figs. 8, 9, 12, scale A; Figs. 10, 11, 13–15, scale B. DML, dorsal medial lobe; LL, lateral lamella(e); VNL, ventral neuropodial lobe.



Figs. 16–25. *Magelona pitelkai* (right parapodia, anterior views, USNM 55216): 16. Setiger 10; 17. Setiger 18; 18. Setiger 38; 19. Setiger 63; 20. Near-profile view of hooded hook from setiger 18; 21. Profile view of developed, non-emergent hooded hook, same; 22. Profile view of hooded hook from setiger 38; 23. Three-quarter view of hooded hook, same; 24. Profile view of small notopodial hooded hook, same; 25. Three-quarter view of small neuropodial hooded hook, same. Figs. 16–19, scale A; Figs. 20–25, scale B. DML, dorsal medial lobe; LL, lateral lamellae; VML, ventral medial lobe; arrow indicates position of small hooded hook.

the space between the notopodial and neuropodial lateral lamellae. In four specimens in which lateral pouches have been observed, the first pouches arise between the left setigers 64–65, the right 68–69, the left 74–75, and the right 84–85. Posterior to the first pouch, subsequent ones arise in a regular pattern, alternating right and left. In the first case, above, the second pouch is between the right setigers 66–67, the third, between the left 68–69, etc.

Magelona pitelkai may be found in what appear to be sandy tubes. They are, however, fortuitously formed by the adherence of sand grains to mucus secreted by the worms as they burrow through the sand; they are not permanent tubes, such as has been described for *M. polydentata* (Jones, 1963:9).

Distribution.—*M. pitelkai* is found in low intertidal and shallow subtidal sandy beaches and flats of the central California coast and in subtidal sands (5–31 m depth) off southern California.

Discussion.—The shape of the prostomium, the distribution and form of parapodial lobes and lamellae of the anterior region, the form of the setae of setiger 9, the presence of interlamellae on the first few posterior setigers, and the presence of small hooded hooks on all posterior setigers, all serve to differentiate *Magelona pitelkai* from all other magelonids.

The previous northern records of *M. pitelkai* for Washington and British Columbia by Berkeley (1950, 1952), Jones (1963), Chew, et al. (1973) and Armstrong, et al. (1976) have been determined to represent a new species (see below, *M. hobsonae* n. sp.). Although I have not been able to examine Kitamori's material, I question his determination of *M. pitelkai* from Japan on the basis of the pronounced horns shown in his illustration of the prostomium (1967:fig. 4A). The questionable reference to *M. longicornis* is by deduction only, since no specimens identified as such by S. F. Light have been located. Light (1941:61) lists the locality for this as ". . . found in upper end of Tomales Bay near Dillon Beach . . . ," as well as ". . . found at Moss Beach, San Mateo County, or other ocean beaches of the vicinity . . . ." The former area includes the type locality of *M. pitelkai*, for the "clam flats" noted on the label of the holotype are about 2 km south of Dillon Beach and were routinely collected by his classes during his sea side courses (*fide* M. H. Pettibone and F. O. Paulson, former students of Light, personal communications). This area was studied and mapped by F. A. Pitelka and R. E. Paulson in May–June 1941. Their results, otherwise unpublished, have been reproduced as a map by Hedgpeth, as revisor of Ricketts and Calvin (1952:300, 315–316) and by Emery and Stevenson (1957:719, fig. 24). The polychaete collections of Pitelka, Paulson, and other members of the class of 1941, were given to Dr. Hartman by Dr. Light and formed the basis for the publication by Hartman (1944a) that includes the original description of *M. pitelkai*. Conjecture concerning the Moss Beach locality is not possible at this time.

As part of a summer course held at the University of California's Bodega Marine Laboratory, Mr. Bruce W. Gaspar (personal communication) carried out a series of observations on living *Magelona pitelkai*. Among these he confirmed that the method of burrowing in this species, including the movements of the prostomium and the use of the proboscis as an anchor, was the same as has been reported for *Magelona* sp. from near Woods Hole, Massachusetts (Jones, 1968). Further, he noted complete

specimens of up to 125 setigers and one specimen, in a burrow adjacent to the glass of an aquarium, with a length of 155 mm and a diameter of 1.0 mm.

In spite of the intervening time since I commented upon the lateral pouches of *Magelona* sp. (Jones, 1968:275–6), I have nothing new to offer concerning their function; I *can* state that they are widespread among the Magelonidae, but not universal.

Magelona hobsonae, new species
Figs. 26–46

Magelona pitelkai.—Berkeley and Berkeley, 1950:53; 1952:13 (text only, not figs. 15–17).—Jones, 1963:24–25, fig. 60.—Chew, et al., 1973:14, 17.—Armstrong, et al., 1976:282 [Not *Magelona pitelkai* Hartman, 1944].

Differential diagnosis.—*Magelona* with nearly circular prostomium with anterior area set apart by anterolateral marginal indentations, lacking horns; with dorsal medial lobes on setigers 1–8; anterior notopodial lateral lamellae with cirriform tips; neuropodial lateral lamellae beginning on setiger 9 and continuing, in different form, on posterior setigers; pennoned setae of setiger 9 with symmetrically bilimbate tips; posterior setigers lacking interlamellae.

Type-locality.—Eagle Cove, southwest shore of San Juan Island, Puget Sound, Washington (48°27.6′N; 123°01.8′W).

Material examined.—WASHINGTON (SAN JUAN ISLAND): Eagle Cove, low intertidal sand beach, salinity 26.5‰, 25 August 1976, H. W. Kaufman collector—4 specimens, holotype (USNM 55222), figured paratype (USNM 55223), 2 paratypes (USNM 55224); Eagle Cove, low intertidal and shallow subtidal sandy beach, 24 August 1976, H. W. Kaufman collector —2 paratypes (USNM 55225); False Bay (48°29.3′N; 123°04.2′W), summer 1937, M. Miller collector—1 specimen (USNM 55226); (PUGET SOUND) North Richmond Beach, north of Seattle (47°46′40″N; 122°23′38″W), low intertidal sand, September 1974, J. W. Armstrong, et al., collectors—2 paratypes (USNM 53328); Carkeek Park, north of Seattle (47°42′45″N; 122°22′43″W), low intertidal sand, September 1974, J. W. Armstrong collector—3 paratypes (USNM 53327); West Point Beach, Seattle (47°39′45″N;

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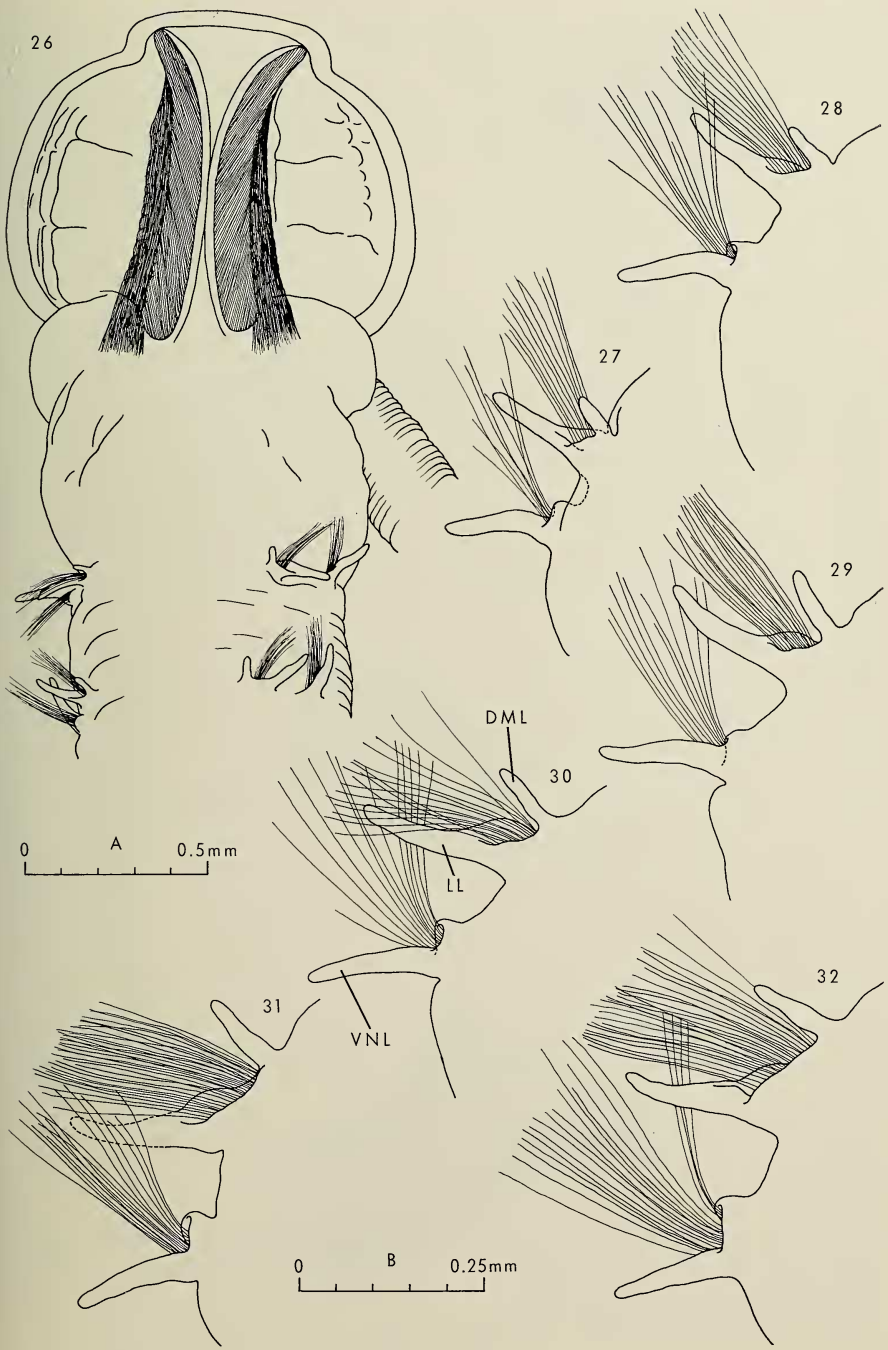
Figs. 26–32. *Magelona hobsonae* (Fig. 26, paratype, USNM 55225; Figs. 27–32, paratype, right parapodia, anterior views, USNM 55223): 26. Dorsal view of anterior end, left palp missing; 27. Setiger 1; 28. Setiger 2; 29. Setiger 3; 30. Setiger 4; 31. Setiger 5 (tip of lateral lamella dotted, lost during preparation); 32. Setiger 6. Fig. 26, scale A; Figs. 27–32, scale B. DML, dorsal medial lobe; LL, lateral lamella; VNL, ventral neuropodial lobe.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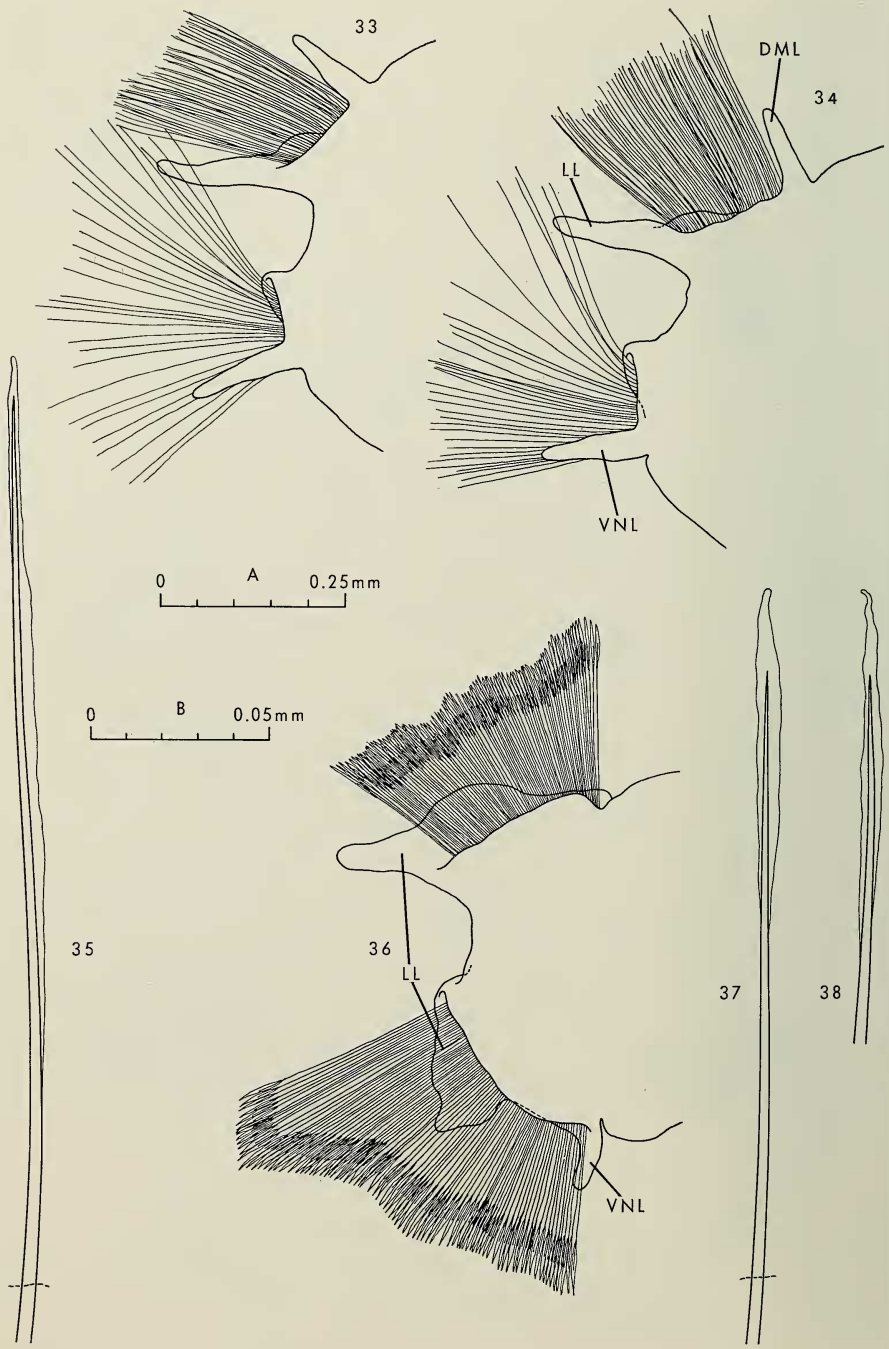
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122°26′04″W), low intertidal sand, September 1974, J. W. Armstrong collector—9 paratypes (USNM 53326). BRITISH COLUMBIA [CANADA]: Departure Bay Beach, Vancouver Island (49°13′N; 123°58′W), 26 March 1936, E. and C. Berkeley collectors—4 specimens (USNM 55227).

Description.—All specimens comprising type material are incomplete posteriorly. The holotype (USNM 55222) is 33.5 mm long for 73 setigers and 0.8 mm wide in the anterior region. The figured paratype (Figs. 27–46, USNM 55223) is 18.0 mm long for 33 setigers and 0.8 mm wide. Other representative paratypes are 58.0 mm long for 87 setigers, 1.0 mm wide (ovigerous); 56.0 mm for 68 setigers, 1.0 mm wide; 51.0 mm for 60 setigers, 1.0 mm wide; and 37.0 mm for 56 setigers, 0.9 mm wide.

The prostomium (Fig. 26) is somewhat wider than long (L:W = 0.8:1.0). The anterior margin is rather truncated and set off sharply from the otherwise subcircular major portion of the prostomium by pronounced indentations of the anterolateral margin, giving a "squared" appearance to the outer corners of the anterior area; they can not be considered to be horns. Palps may extend posteriorly as far as setiger 26. There may be as many as 8 transverse rows of papillae basally, and as many as 4 rows distally; the papillated area of the palps occupies the distal five-sixths of the length of the palp.

The anterior 8 setigers are similar; each parapodium is provided with a notopodial dorsal medial lobe, a lateral lamella, and a ventral neuropodial lobe (Figs. 27–34). Notopodial lamellae are cirriform extensions of the postsetal lamellar bases, becoming longer in the posterior part of the anterior region; notosetae increase in number from about 10 on setiger 1 to about 50 on setiger 8, with simultaneous broadening of the setal fascicle. The cirriform dorsal medial lobes increase slightly in length in the later setigers. The ventral neuropodial lobes are all cirriform, subequal in length, and usually presetal. Neurosetae increase in number from about 8 in setiger 1 to about 30 in setiger 8. Beginning with setiger 5 (Fig. 31), there is a transverse lengthening of the setal fascicle and the enclosed area from which it arises. The distal postsetal margins adjacent to the setae are not drawn out to form neuropodial lateral lamellae. All setae of the first 8 setigers are limbate capillaries, unilimbate for the most part, but bilimbate at their tips (Fig. 35).

Setiger 9 lacks a dorsal medial lobe; it bears a postsetal notopodial lat-

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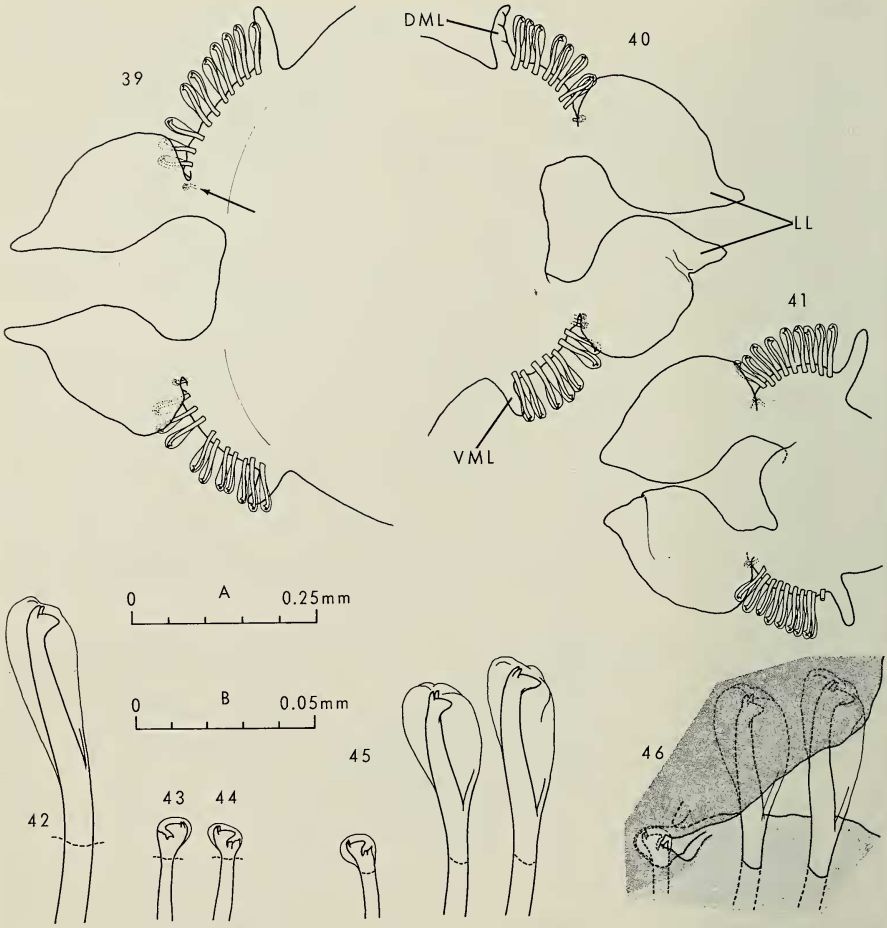
Figs. 33–38. *Magelona hobsonae* (paratype, right parapodia, anterior views, USNM 55223): 33. Setiger 7; 34. Setiger 8; 35. Seta from setiger 5; 36. Setiger 9; 37. Notoseta from central part of fascicle of setiger 9; 38. Tip of most lateral notoseta, same. Figs. 33, 34, 36, scale A; Figs. 35, 37, 38, scale B. DML, dorsal medial lobe; LL, lateral lamella(e); VNL, ventral neuropodial lobe.



Figs. 39–46. *Magelona hobsonae* (paratype, USNM 55223): 39. Right setiger 10, anterior view; 40. Left setiger 17, anterior view; 41. Right setiger 33, anterior view (distorted due to dorsoventral compression during preparation; parapodial structures unaffected); 42. Near-profile view of hooded hook from setiger 33; 43. Near-profile view of small neuropodial hooded hook of setiger 33; 44. Near-profile view of small notopodial hooded hook of setiger 33; 45. Small and two adjacent normal notopodial hooded hooks of setiger 10, in situ (surrounding tissue and structures omitted); 46. Same, including tissue of parapodial ridge (lighter stippling) and of lateral lamella and its pedicel (darker stippling), showing pocket in which small hooded hook lies. Figs. 39–41, scale A; Figs. 42–46, scale B. DML, dorsal medial lobe; LL, lateral lamellae; VML, ventral medial lobe; arrow indicates position of small hooded hook shown in Figs. 45 and 46.

eral lamella which is flattened and somewhat acuminate distally, a rather triangular postsetal neuropodial lateral lamella, and a postsetal cirriform ventral neuropodial lobe (Fig. 36). Rarely (one of 25 specimens examined), there may be a dorsal medial lobe on setiger 9; in the single exception, the lobe was on the right side only and was similar to the lobes of the anterior region. Setae of setiger 9 are symmetrically pennoned (Figs. 37, 38).

From setiger 10 on, posterior setigers bear dorsal and ventral medial lobes and dorsal and ventral lateral lamellae (Figs. 39–41). The medial lobes are cirriform, the dorsal ones being somewhat longer than those ventral. The lateral lamellae are asymmetrically lanceolate with acuminate tips. There are no interlamellae. The entire parapodial array, including medial lobes, lateral lamellae, and hooks, are borne on narrow transverse ridges. Hooded hooks are of two types: a more numerous, larger, typical magelonid hook with a teardrop-shaped hood (Figs. 42, 45, 46); and a smaller, shorter hook, with a cusp below the fang from which arises a subspherical hood (Figs. 43–46). The later hooks may be found singly in "pockets" at the bases of the lamellar pedicels (Figs. 39, arrow; 46); rarely, a pair of such small hooks are found (Fig. 40, in neuropodium). All hooks are tridentate and arranged in two groups in a fascicle, vis-à-vis.

No lateral pouches were observed in the posterior regions of any of the 25 incomplete specimens examined.

Magelona hobsonae was frequently collected in fortuitous sandy "tubes."

Etymology.—It is a bittersweet pleasure to name this species for Katherine D. Hobson, late of the British Columbia Provincial Museum, Victoria. Sweet, as a just honor to a respected colleague with a promising future; bitter, that such promise was cut short in so untimely a manner.

Type disposition.—The holotype (USNM 55222) and selected paratypes (USNM 55223, 55224, 55225) are deposited in the collections of the National Museum of Natural History, Smithsonian Institution. Other paratypes are deposited in the following collections: AHF, AM, BCPM, BMNH, NMC, NSMT, UZMC, ZIL, and ZMH.

Distribution.—Magelona hobsonae is found in the low intertidal levels of sandy beaches and flats throughout the Puget Sound region of Washington and British Columbia.

Discussion.—The shape of the prostomium, the distribution and form of parapodial lobes and lamellae of the anterior region, the form of the setae of setiger 9, and the presence of small hooded hooks on all posterior setigers, all serve to differentiate *Magelona hobsonae* from all other megalonids.

Certain identified specimens were not selected as paratypes. The single specimen from False Bay (USNM 55226) is in poor, but determinable, condition. The specimens from Departure Bay (USNM 55227) are distorted due to having been dried at some time; indeed, there is a note in

the vial in the handwriting of E. Berkeley (*fide* M. H. Pettibone) to this effect.

The specimen from False Bay was the basis for my earlier erroneous determination of *M. pitelkai* (Jones, 1963:24–25). The upwardly curved anterior margin of the prostomium gave the appearance of horns, and critical comparisons with California specimens of *M. pitelkai* were not made. It should further be noted that figure references in the text of that earlier account differ by one from the actual figure numbers of all of the illustrations on that page (Jones, 1963:26, figs. 60–69).

Magelona hartmanae, new species
Figs. 47–68

Magelona sacculata.—Allan Hancock Foundation, 1965:138 (Station 4842-57, in part) [Not *Magelona sacculata* Hartman, 1961].

Differential diagnosis.—*Magelona* with proximal sides of prostomium nearly straight and parallel, with anterior margin sharply delimited with more or less pointed corners, rudimentary horns; with dorsal medial lobes on setigers 1–8; anterior notopodial lateral lamellae with cirriform tips; neuropodial lateral lamellae lacking on setiger 9; posterior lateral lamellae lanceolate, arising asymmetrically from their pedicels.

Type-locality.—Velero IV station 4842-57 (34°11′10″N; 119°15′50″W). Off Port Hueneme/Oxnard, California.

Material examined.—SOUTHERN CALIFORNIA: Stat. 4842-57, 45 ft. (= 12.7 m), fine olive green sand, temperature 55.0°F (= 12.8°C), salinity 33.8‰, 7 February 1957—holotype (AHF POLY 1221), figured paratype (USNM 55228), 43 paratypes (AHF POLY 1222, USNM 55229). CENTRAL CALIFORNIA: Offshore from Pajaro River, Monterey Bay (36°50.8′N; 121°49.4′W), fine sand, 15 m depth, 22 April 1977, Moss Landing Marine Laboratories collector—4 paratypes (USNM 55319).

Description.—All but one of the specimens examined are incomplete posteriorly. The holotype (AHF POLY 1221) is 9 mm long for 28 setigers and 0.3 mm wide in the anterior region. The figured paratype (USNM 55228) is 12 mm long for 38 setigers and 0.3 mm wide. The single complete paratype (USNM 55319) is ovigerous and 66 mm long for 116 setigers and

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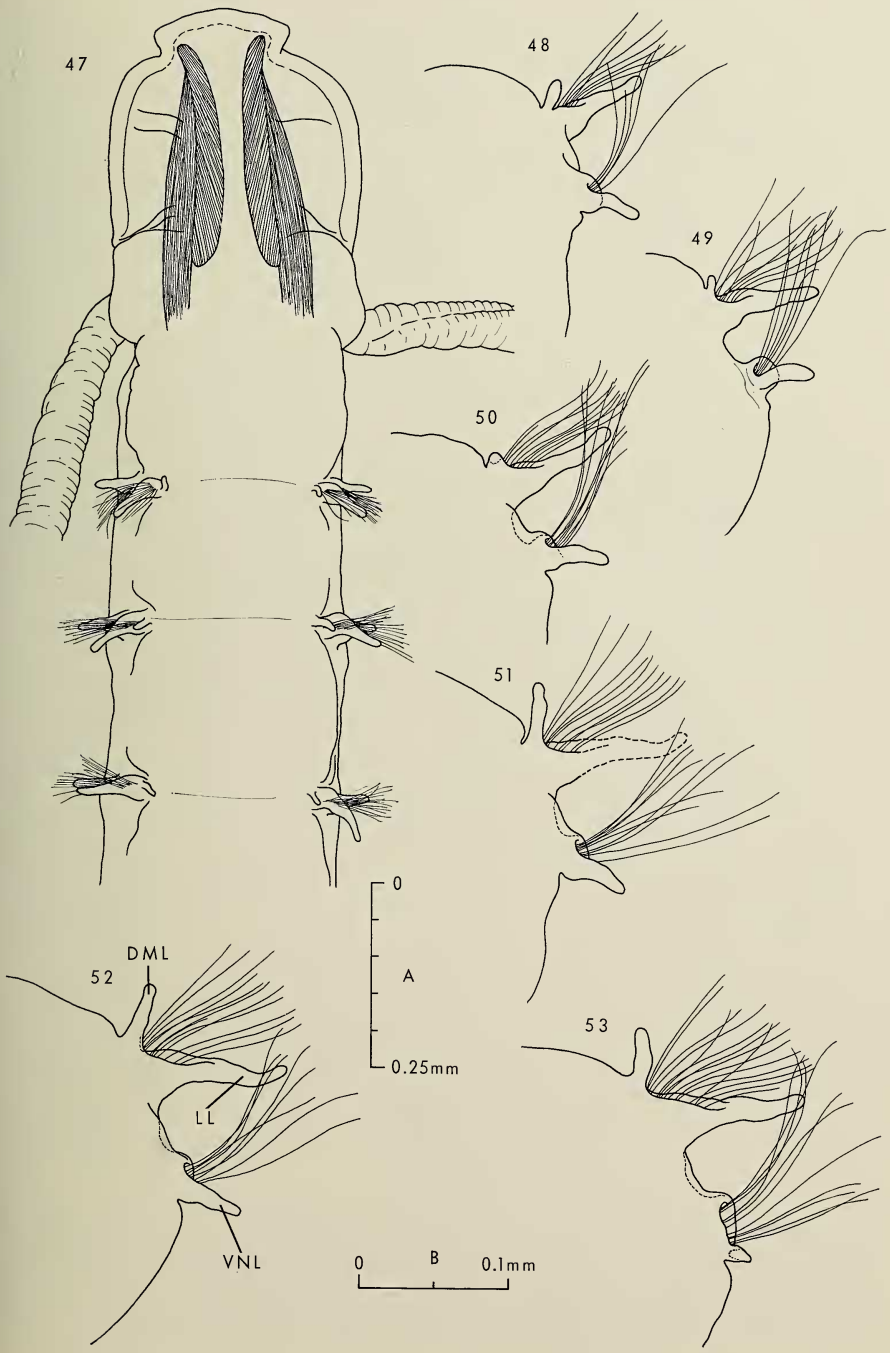
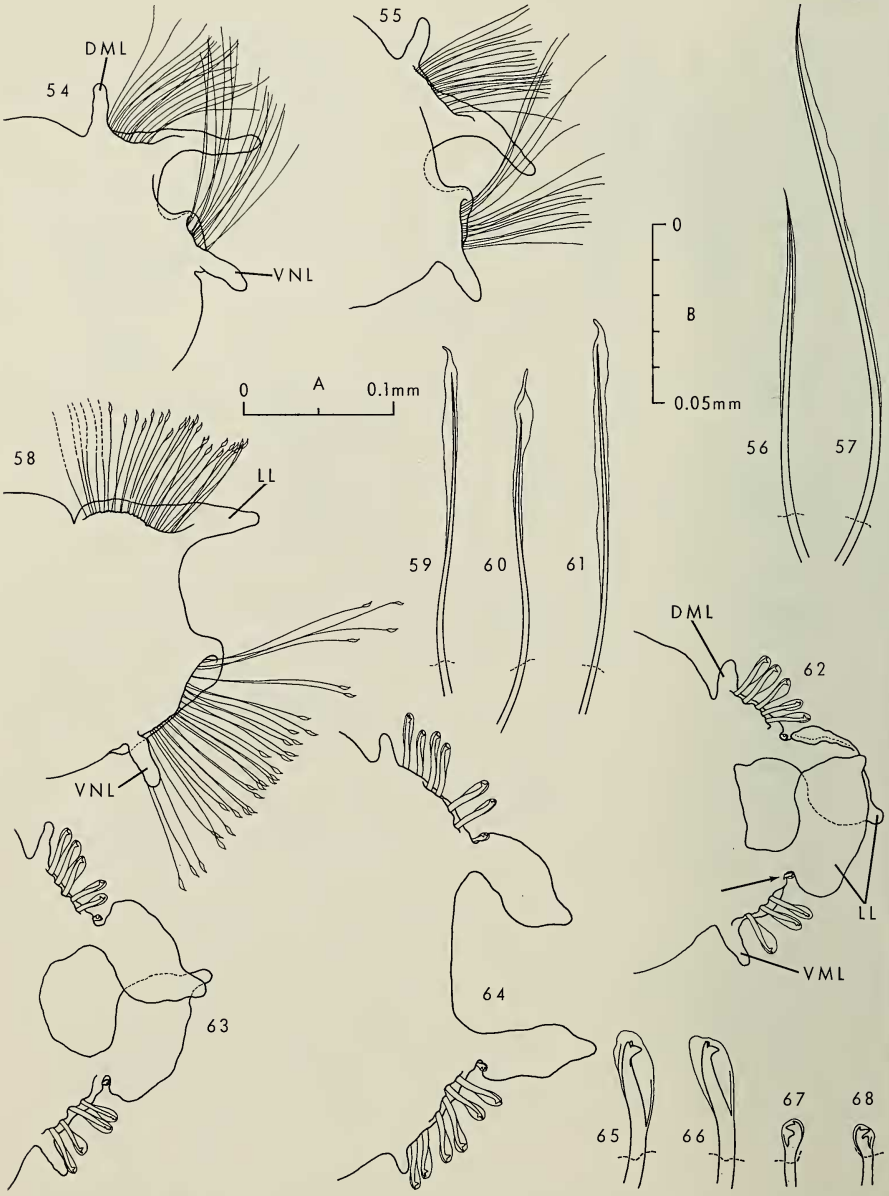
Figs. 47–53. *Magelona hartmanae* (Fig. 47, holotype, AHF POLY 1221; Figs. 48–53, paratype, left parapodia, anterior views, USNM 55228): 47. Dorsal view of anterior end; 48. Setiger 1; 49. Setiger 2; 50. Setiger 3 (dorsal medial lobe bent posteriorly); 51. Setiger 4 (tip of lateral lamella dotted, lost during preparation); 52. Setiger 5; 53. Setiger 6 (ventral neuropodial lobe bent posteriorly). Fig. 47, scale A; Figs. 48–53, scale B. DML, dorsal medial lobe; LL, lateral lamella; VNL, ventral neuropodial lobe.


47
48
49
50
51
53
52
DML
LL
VNL
0
A
0.25mm
0
B
0.1mm



Figs. 54–68. *Magelona hartmanae* (paratype, left parapodia, anterior views, USNM 55228): 54. Setiger 7; 55. Setiger 8; 56. Notoseta from same; 57. Neuroseta from same; 58. Setiger 9 (dotted lines indicate setal tips lost during preparation); 59. Most lateral notoseta from setiger 9; 60. Central neuroseta from same (apical limbation folded to right); 61. Third most medial neuroseta from same; 62. Setiger 10 (dorsal lateral

0.4 mm wide; another paratype from Monterey Bay is 36 mm long for 69 setigers and 0.4 mm wide. Other paratypes from off southern California are 10 mm long for 24 setigers and 0.4 mm wide, and 7 mm long for 19 setigers and 0.3 mm wide.

The prostomium is slightly longer than wide (L:W = 1.1:1.0) and its lateral margins are nearly parallel (Fig. 47). The anterior region is set off sharply from the remainder of the prostomium, and its outer corners are sufficiently acute to be called "rudimentary" horns (cf. Jones, 1963: figs. 1, 61; 1971, figs. 20–25), but not so well-differentiated as to be called "well-developed" horns (cf. Jones, 1963:fig. 12; 1971:figs. 1, 2). Palps may extend posteriorly as far as setiger 26, and bear 4 transverse rows of papillae proximally, and 2 rows distally. In some cases there are irregular black pigment patches at the bases of the papillae and along the sides of the palp, proper.

The anterior 8 setigers are similar and provided with notopodial lateral lamellae, dorsal medial lobes, and ventral neuropodial lobes (Figs. 48–55). Notopodial lateral lamellae are postsetal, somewhat flattened frontally, with cirriform distal tips; their length increases from setigers 3–8. The postsetal area is not developed as a lamella, per se. Notosetae number about 7–21 per fascicle from setigers 1–8; the fascicle elongates transversely with increased numbers of setae. Dorsal medial lobes are presetal, cirriform, and are relatively short in the anterior setigers, then gradually become somewhat longer in later setigers. Neurosetae increase from about 5 in setiger 1 to about 17 in setiger 8. The ventral neuropodial lobes are all presetal, cirriform, and subequal in length, with a slight increase in length, posteriorly. There are no neuropodial postsetal lateral lamellae. Setae of the first 8 setigers are uni- or bilimbate capillaries (Figs. 56, 57).

The ninth setiger has no dorsal medial lobe; it bears a rather well-developed notopodial lateral lamella, somewhat flattened transversely, distally tapered, with a postsetal lamellar base (Fig. 58). The ventral neuropodial lobe is presetal; there is no neuropodial lateral lamella, merely a well-developed postsetal flange. The setae of the ninth setiger are arranged in broad fascicles of asymmetrically pennoned setae (Figs. 59, 60) or nearly symmetrically pennoned setae (Fig. 61). The former comprise the central and lateral setae; the latter is represented by the few most medial setae.

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lamella folded at base); 63. Setiger 21; 64. Setiger 37; 65. Near-profile view of normal-sized notopodial hooded hook of setiger 10; 66. Profile view of normal-sized neuropodial hooded hook of setiger 37; 67. Profile of small notopodial hooded hook of same; 68. Profile of small neuropodial hooded hook of same. Figs. 54, 55, 58, 62–64, scale A; Figs. 56, 57, 59–61, 65–68, scale B. DML, dorsal medial lobe; LL, lateral lamella(e); VML, ventral medial lobe; VNL, ventral neuropodial lobe; arrow indicates position of small hooded hook.

The posterior parapodia from the tenth setiger on, are borne on elevated transverse ridges. They bear relatively short, stout, medial lobes, as well as lateral lamellae on narrowed pedicels; the lamellae range from patently to slightly asymmetrically lanceolate in shape (Figs. 62–64). Hooded hooks are all tridentate and of 2 types: a longer, typical hook with a teardrop-shaped hood with an unadorned shaft below the fang (Figs. 64–66); and a shorter hook, confined to the base of the pedicel, with a rounded hood and a poorly developed cusp arising from the shaft below the fang (Figs. 67, 68). The hooded hooks are arranged in 2 groups in each series, vis-à-vis (Figs. 62–64). There is, at best, only a slight suggestion of a postsetal interlamella.

In the case of several paratypes (USNM 55319), of sufficient length, lateral pouches were observed in the posterior region. First lateral pouches were present between left setigers 46 and 47, right 42 and 43, and right 48 and 49. In the first case, the only complete specimen examined (116 setigers), the second pouch was between right 48 and 49, then left 50 and 51, and so on, with regular alternations until the pouch between left 86 and 87; subsequent pouches were irregular in occurrence, i.e., between left 86 and 87, right 87 and 88, right 90 and 91, left 92 and 93, right 94 and 95, left 95 and 96, right 97 and 98, left 99 and 100, right 101 and 102, left 102 and 103, right 104 and 105, left 105 and 106, right 107 and 108, left 108 and 109, and, the last visible pouch, between right 110 and 111. In the second case, there was a regular alternation throughout the remainder of the incomplete specimen, to the last visible pouch between left 56 and 57. In the last case there was regular alternation up to the pouch between right 64 and 65; then left 65 and 66, right 67 and 68, and, finally, left 68 and 69 of this incomplete specimen. It would appear that in the farther posterior setigers, i.e., the younger segments, relative to their formation in the pygidial region, the rigorous control over pouch appearance tends to break down.

Etymology.—It is with great pleasure that I name this species in honor of Olga Hartman, as a small posthumous gesture of thanks for her years of contributions to our understanding of the polychaetes and their classification.

Type disposition.—The holotype (AHF POLY 1221) and some paratypes (AHF POLY 1222) are deposited in the collections of the Allan Hancock Foundation, University of Southern California; the figured paratype (USNM 55228) and other paratypes (USNM 55229, 55319) are deposited in the collections of the National Museum of Natural History, Smithsonian Institution. Other paratypes have been deposited in the following collections: AM, BCPM, BMNH, MNHNP, NMC, NMV, NSMT, RNHL, UZMC, ZIL, ZMA, and ZMH.

Distribution.—Magelona hartmanae is known from the type-locality, off the southern California coast, near Port Hueneme and Oxnard, in 12.7 m

depth and the central California coast, near Moss Landing, Monterey Bay, in 15 m depth.

Discussion.—The shape of the prostomium, the distribution and form of parapodial lobes and lamellae of the anterior region, the form of setae of the ninth setiger, and the presence of small hooded hooks on all posterior setigers, all serve to differentiate *Magelona hartmanae* from all other magelonids.

The literature account of Station 4842-57 (Allan Hancock Foundation 1965:138) lists "*Magelona sacculata* 108 [specimens]." By actual count 62 specimens of *M. sacculata* and 45 specimens of *M. hartmanae* were present.

It must be admitted that the discussion of "rudimentary" and "well-developed" horns, above, leaves much to be desired. A more rigorous definition of "horns" is necessary, but must await a thorough survey of the many named and unnamed magelonids on my shelves.

Magelona dakini, new species
Figs. 69–90

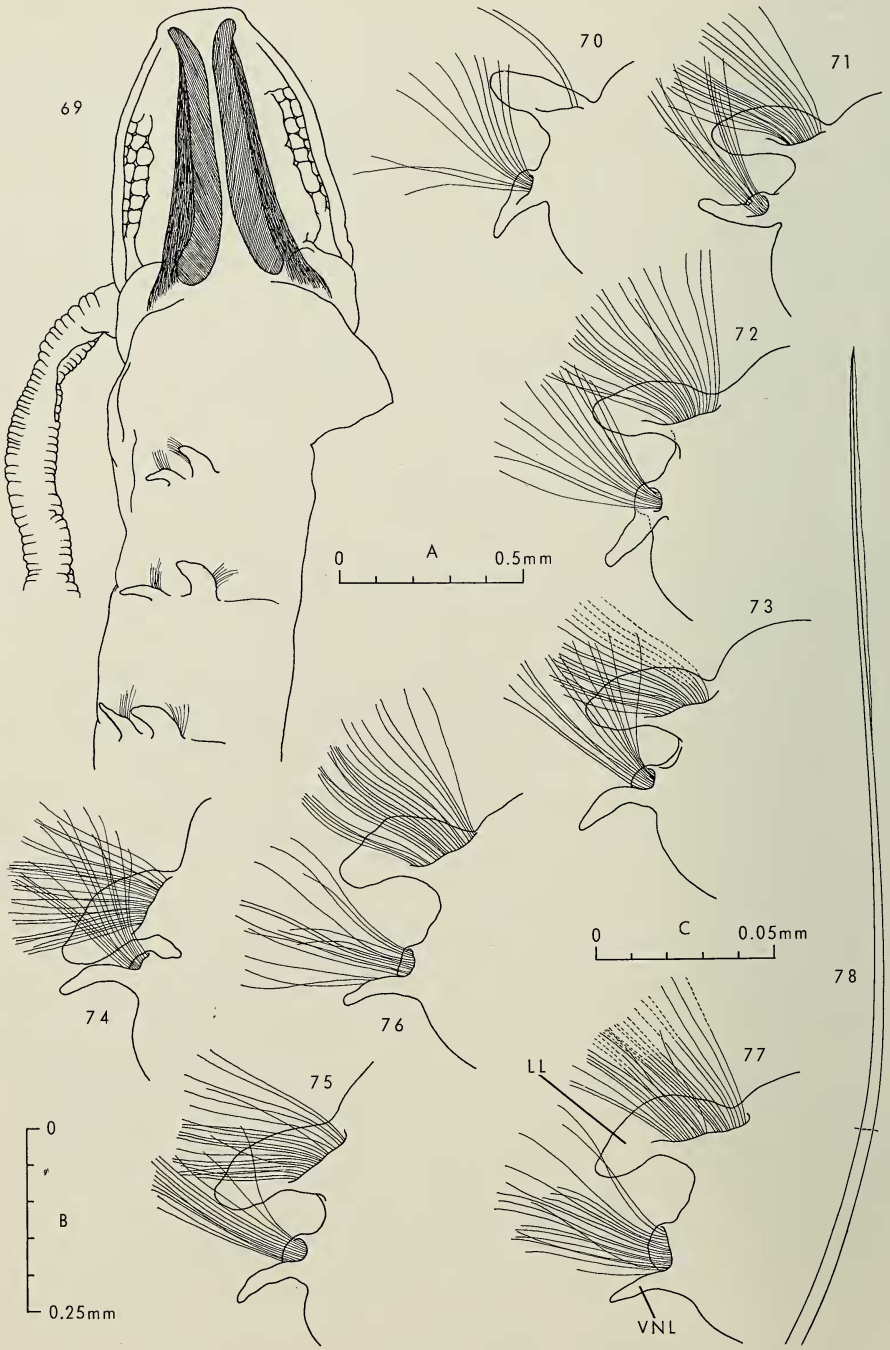
Magelona sp.—Hutchings and Recher, 1974:105, 109.

Magelona sp. 2 and sp. 4 (species numbers 254 and 352, respectively).—Poore, et al., 1975:29, 56.

Differential diagnosis.—*Magelona* with truncated anterior margin barely set off from remainder of prostomium, lacking horns; dorsal medial lobes lacking on setigers 1–8; anterior notopodial lateral lamellae flattened and broadly attached; setiger 9 lacking dorsal medial lobe, with flattened, rounded notopodial and neuropodial lateral lamellae, and cirriform ventral neuropodial lobes; setae of setiger 9 slightly pennoned; posterior parapodia with oval lateral lamellae and interlamellae.

Type-locality.—Careel Bay, southeast shore of Pittwater, Broken Bay, New South Wales, Australia (33°37′S; 151°20′E).

Material examined.—NEW SOUTH WALES, AUSTRALIA: Careel Bay, sandy beach, 6 February 1973, P. A. Hutchings collector—holotype (AM 13263), figured paratype (USNM 55230), paratype (AM W8241); Careel Bay, *Zostera*, 2 February 1972, P. A. Hutchings and H. F. Recher collectors —paratype (AM W8240); George's River, subtidal mud, L. Collett collector —Kogarah Bay, 3 (AM W7603) and 6 paratypes (AM W7619)—Tom Ugly's Bridge, 2 (AM W7521) and 1 paratype (AM W7643)—Como Bridge, 1 paratype (AM W7669)—Soily Bottom Point, 1 paratype (AM W7687); Ku Ring Gai, Pittwater Basin, *Zostera*, *Posidonia*, and sand along shoreline, 4 May 1973, P. A. Hutchings collector—1 paratype (unregistered). QUEENSLAND, AUSTRALIA: Tin Can Bay, mangrove mud flats, 30 March 1972, P. A. Hutchings collector—8 paratypes (AM W4979); Jackson Creek, Moreton Bay, Brisbane, sand flats, 12 July 1973, P. A. Hutchings collector—2 paratypes (AM W6037); Quarentine Station, Brisbane River, August


69
70
71
72
0
A
0.5mm
73
0
C
0.05mm
78
74
76
75
77
LL
0
B
0.25mm
VNL

1971, D. F. Boesch collector—3 paratypes (AM W7469); Gladstone, 9–12 February 1976, P. Saenger collector—Calliope River, 28 paratypes (AM W10237–40, AM W10243–46), Auckland Creek, 1 paratype (AM W10241), 7–9 October 1976, P. Saenger collector—1 paratype (AM W10242). VICTORIA, AUSTRALIA: Port Phillip Bay, northwest portion, offshore from Werribee, sand and silty sand, less than 10 m, Poore, et al. collectors—16 stations, 12 February 1970, 7 June and 18, 19 November 1971, 409 specimens (37 paratypes selected, USNM 55220, Marine Pollution Studies Group Cat. Nos. 4042 and 4091); Mallacoota Inlet, sandy mud, 26 April 1975, J. Kudenov collector—13 paratypes (USNM 55221).

Description.—All the specimens examined were incomplete posteriorly. The holotype (AM W13263) is 17.0 mm long for 40 setigers and 0.7 mm wide in the anterior region. The palps extend to about setiger 26; they are papillated over their distal five-sixths and bear rows of 8 papillae basally and 2 rows distally. The figured paratype (USNM 55230) is 21.0 mm long for 60 setigers, 0.6 mm wide; other paratypes from the type locality are 22.0 mm for 38 setigers, 0.5 mm wide (AM W8241) and 46 mm long for 98 setigers, 0.8 mm wide (AM W8240). Among other paratypes, from Port Phillip Bay, are the following: 18.0 mm long for 36 setigers, 0.6 mm wide (Stat. 920), 24.0 mm long for 61 setigers, 0.5 mm wide and 21.0 mm long for 54 setigers, 0.4 mm wide (Stat. 940), 11.0 mm long for 37 setigers, 0.4 mm wide and 12.0 mm long for 32 setigers, 0.3 mm wide (Stat. 1245), and 16.0 mm long for 32 setigers, 0.5 mm wide, 28.0 mm long for 53 setigers, 0.5 mm wide, and 20.0 mm long for 56 setigers (ovigerous), and 0.5 mm wide (Stat. 1236).

The prostomium is slightly longer than wide (L:W = 1.1:1.0) and its lateral margins are gently curved toward the narrowed anterior margin which is rather straight and set off from the basal portion of the prostomium by slight but perceptable paired indentations (Fig. 69). Palps may extend as far posteriorly as setiger 28 and are papillated over their distal five-sixths. Papilla are arranged in as many as 8 transverse rows, proximally, and as many as 4 rows, distally.

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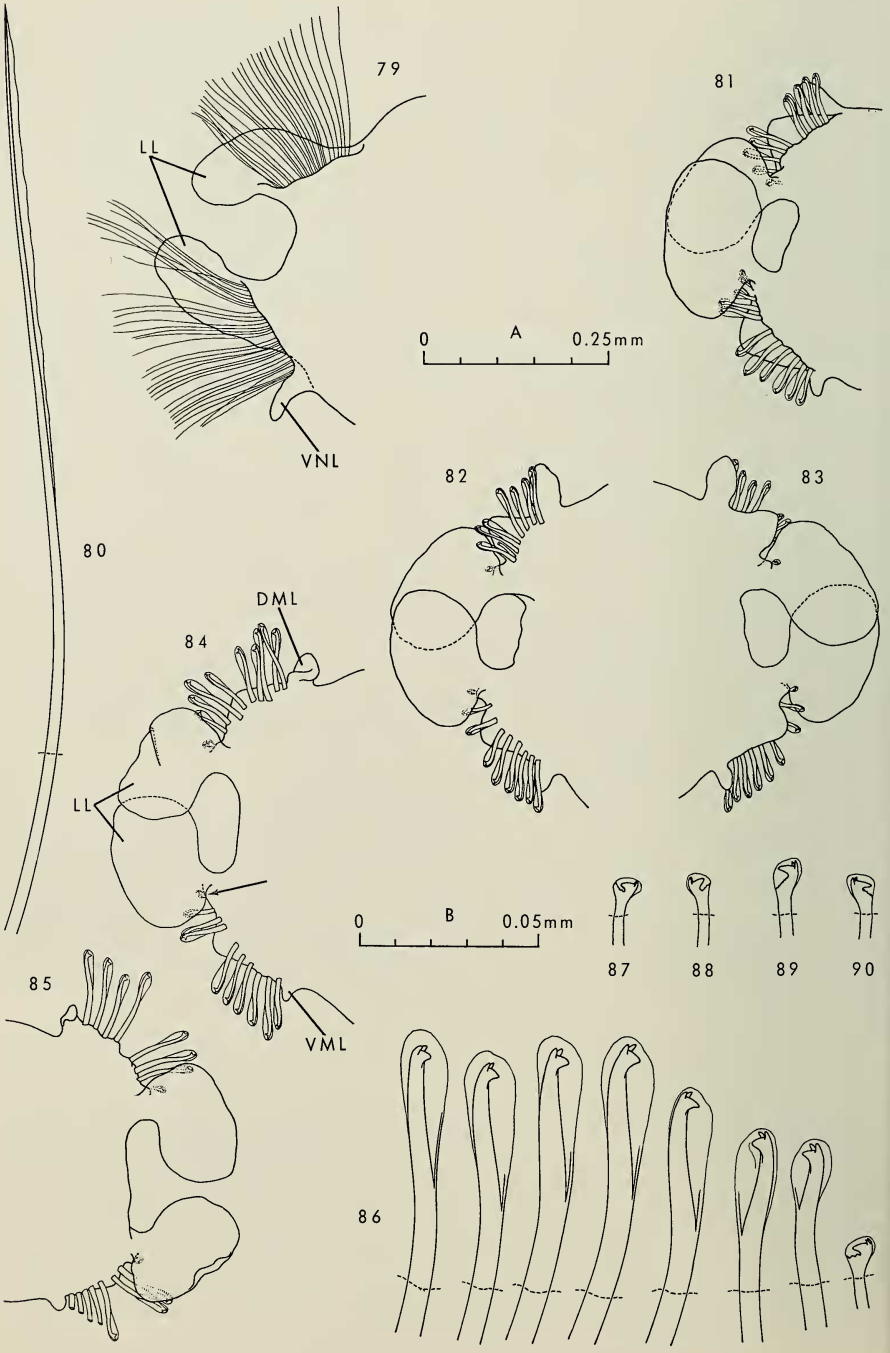
Figs. 69–78. *Magelona dakini* (paratype, right parapodia, anterior views, USNM 55230): 69. Dorsal view of anterior end (excision of right parapodia has caused a twisting of setigerous segments; right palp missing); 70. Setiger 1 (no notosetae were lost during preparation; left setiger 1 with about 10 notosetae); 71. Setiger 2; 72. Setiger 3; 73. Setiger 4 (dotted lines indicate setal tips lost during preparation); 74. Setiger 5 (slight distortion due to dorsoventral expansion during preparation); 75. Setiger 6; 76. Setiger 7; 77. Setiger 8 (dotted lines indicate setal tips lost during preparation); 78. Notoseta from same. Fig. 69, scale A; Figs. 70–77, scale B; Fig. 78, scale C. LL, lateral lamella; VNL, ventral neuropodial lobe.


79
LL
VNL
81
0
A
0.25mm
82
83
80
DML
84
LL
0
B
0.05mm
87
88
89
90
85
VML
86

The anterior 8 setigers are similar and bear notopodial lateral lamellae and ventral neuropodial lobes (Figs. 70–77). There are no dorsal medial lobes. The foliaceous lateral lamellae are postsetal with their tips rounded to somewhat lanceolate. The neuropodial lobes are cirriform and, depending upon their orientation, ventral to presetal. The setae of the first 8 setigers are all finely unilimbate capillaries (Fig. 78). Notosetae increase from about 10 in setiger 1 to 26 in setiger 8; neurosetae increase from about 10–20. Notosetae are arranged in consistently elongated fascicles, while neurosetae are in more compact, rounded fascicles.

Setiger 9 is provided with both noto- and neuropodial lateral lamellae, as well as a ventral neuropodial lobe (Fig. 79). The lateral lamellae are postsetal, rounded, and foliaceous. The neuropodial lobe is cirriform and presetal. There are approximately 30 setae in each transversely elongated fascicle; all setae of the ninth setiger are finely unilimbate, with the limbation restricted to the distal two-thirds of the setal length, suggesting a narrowly pennoned aspect, although the limbation does not extend beyond the tip of the setal shaft (Fig. 80).

The posterior parapodia, from the tenth setiger on, are on reduced transverse ridges, with oval lateral lamellae borne on narrow pedicels (Figs. 81–85). Dorsal medial lobes are somewhat larger than their ventral counterparts; there are well-developed triangular postsetal interlamellae between the lateral lamellae and the medial lobes in both the noto- and neuropodia (Figs. 81–84). The interlamellae become reduced more posteriorly (Fig. 85). Hooded hooks are all tridentate and are disposed in two series in noto- and neuropodia, vis-à-vis. There are 2 types of hooks: a longer, larger, typical hook with a teardrop-shaped hood (Fig. 86); and a shorter, smaller hook with a short rounded hood and a cusp arising from the shaft, beneath the main fang (Figs. 86–88). Those of more posterior setigers bear a much-reduced cusp and have a more typical appearance, except for their size and the shape of the hood (Figs. 89, 90). The larger hooded hooks, adjacent to the pedicels of both noto- and neuropodia, tend to be shorter than those nearer the medial lobes (Figs. 81–86).

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Figs. 79–90. *Magelona dakini* (paratype, USNM 55230): 79. Right setiger 9, anterior view; 80. Notoseta from same; 81. Right setiger 10, anterior view; 82. Right setiger 18, anterior view; 83. Same, posterior view; 84. Right setiger 38, anterior view; 85. Left setiger 48, anterior view; 86. Eight of nine neuropodial hooded hooks from setiger 18, not in situ; 87. Profile of neuropodial small hooded hook from setiger 38; 88. Same, from notopodium of same; 89. Small notopodial hooded hook from setiger 48; 90. Same, from neuropodium of same. Figs. 79, 81–85, scale A; Figs. 80, 86–90, scale B. DML, dorsal medial lobe; LL, lateral lamellae; VML, ventral medial lobe; VNL, ventral neuropodial lobe; arrow indicates position of small hooded hook shown in Fig. 87.

As mentioned earlier, all specimens examined were incomplete posteriorly. Only in the case of material from Mallicoota Inlet (USNM 55221) were the anterior fragments long enough to observe lateral pouches. In one case (63.0 mm for 118 setigers, 0.5 mm wide), a single pouch was found between right setigers 117 and 118; in another (66.0 mm for 116 setigers, 0.5 mm wide), the single pouch was between left setigers 115 and 116; in the third case (75.0 mm for 122 setigers, 0.6 mm wide), the regularity of alternation of left and right pouches, as observed in *M. pitelkai*, above, was confirmed, but there were inconsistencies in linear arrangement—the first between left 101 and 102, then right 103 and 104, left 105 and 106, right 108 and 109, left 114 and 115, right 116 and 117, left 118 and 119, and right 121 and 122.

Etymology.—I am pleased to name this species in honor of W. J. Dakin, whose studies and writings have done much to make known the biota of Australian shores to the rest of the world.

Type disposition.—The holotype (AM W13263) and many paratypes (see "*Material examined*," above) are deposited in the collections of the Australian Museum, Sydney. Other paratypes (USNM 55220, 55221, 55230–55232) are in the collections of the National Museum of Natural History, Smithsonian Institution and AHF, BCPM, BMNH, MNHNP, NMC, NMV, NSMT, RNHL, UZMC, ZIL, ZMA, and ZMH.

Distribution.—Magelona dakini is found in sandy beaches, *Zostera* beds, mangrove mud flats, and subtidal sands, silty sands, and muds of Australia, in Queensland, New South Wales, and Victoria.

Discussion.—The shape of the prostomium, the distribution and form of parapodial lobes and lamellae of the anterior region, the form of setae of setiger 9, and the presence of small hooded hooks on all posterior setigers, all serve to differentiate *Magelona dakini* from all other magelonids.

Of the four species considered herein, *M. dakini* exhibits the widest tolerance to diverse habitats, and it has the longest latitudinal distribution, from 24°S (Gladstone, Queensland) to 38°S (Port Phillip Bay, Victoria). Further, it appears to be less closely related to the others than they among themselves. Although it has the small hooded hook of the pedicels in common with them, the shape of the anterior prostomial margin, the structure of the notopodial lateral lamellae of the anterior region, as well as that of the lateral lamellae, and the aspect of the setae of setiger 9, all suggest a more distant relationship of *M. dakini* from Australia to *M. pitelkai*, *M. hobsonae*, and *M. hartmanae* from the coast of the eastern Pacific.

General Discussion

Yet another species of *Magelona* possesses the small hooded hooks associated with the pedicel. Although I have not examined the holotype, as

yet, specimens of *Magelona filiformis* Wilson, identified by D. P. Wilson, possess these singular hooks. These, then, in addition to the prostomium, the forms of setiger 6 and anterior setigers of the posterior region (Wilson shows setiger 13), and the structure of the setae of setiger 9 (Wilson, 1959:figs. IA, IG, II, and IJ, respectively) are similar to the prostomium of *M. pitelkai* and the setigers and setae of *M. hobsonae*. The morphology of setiger 9 of *M. filiformis* appears to differ from those of all species herein considered (Wilson, 1959:fig. IH).

A final species which may prove to be closely allied to the four species described above, as well as to *M. filiformis*, is *M. capensis* Day. I have examined material identified by Day, not type-specimens, and find a single, small, tridentate hooded hook at the base of pedicels of the posterior region. The small hooks lack the cusp beneath the main fang, and the hood is teardrop-shaped; indeed, they are identical to the accompanying normal hooks, except for size. This would appear to be the next step beyond (or short of?) the condition in *M. hartmanae* and *M. dakini*, where the cusp of the small hooks may be less well-developed in some setigers (Figs. 67, 89, 90). The prostomium of *M. capensis* is somewhat similar to those of *M. pitelkai* and *M. filiformis*; setiger 5, with its dorsal medial lobe, suggests a relationship to *M. pitelkai*, *M. hobsonae*, *M. hartmanae*, and *M. filiformis*, but the notopodial lateral lamella differs from those of the other species in its foliaceous aspect; and setiger 9 shows a morphological similarity to *M. pitelkai* and *M. hobsonae* (Day, 1961:495–496, fig. 6a, b, c). Setae of setiger 9, however, resemble those of *M. dakini* in that they are narrowly pennoned (Fig. 80).

Acknowledgments

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