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POLYCHÆTOUS ANNELIDS FROM LOWER CALIFORNIA WITH DESCRIPTIONS OF NEW SPECIES[1]

By Aaron L. Treadwell

The following taxonomic paper refers to a collection of polychætous annelids made by the U. S. S. 'Albatross' off the coast of Lower California. The specimens were in most cases poorly preserved, so that determination of species was sometimes uncertain and in a few cases not possible. The families certainly represented and the number of species found in each are shown in the following table.

Family	Old Species	New Species
Amphinomidæ	1	
Polynoidæ	5	1
Sigalionidæ	1	
Aphroditidæ	2	
Nephthydidæ	1	
Nereidæ	3	
Leodicidæ	8	
Cirratulidæ	?	
Maldanidæ	1	1
Terebellidæ	2	

With two exceptions each species is represented by only a very few individuals. These exceptions are *Onuphis (Nothria) hiatidentata* Moore, and *Hyalinœcia tubicola* (Müller) Malmgren subspecies *stricta* Moore, which together make up more than half the bulk of the collection. In connection with these two species the following ecological note is of interest.

In his original description Moore comments on the "remarkable example of associative resemblance" which *Onuphis (Nothria) hiatidentata* exhibits, for it lives in close association with *Hyalinœcia tubicola* Malmgren subspecies *stricta* Moore and superficially looks more like *Hyalinœcia* than like *Onuphis*. I find that it appears to be developing the habit of occupying *Hyalinœcia* tubes instead of making some of its own. A considerable number were found in what are evidently the normal form of tubes for this species of *Onuphis*. These tubes are oval in cross-section, have a groundwork of a thin whitish material that looks like wet tissue paper but is extremely tough, and have on the outside more or less foreign matter, the most abundant of which consists of much-worn

[1]Scientific Results of the Expedition to the Gulf of California in charge of C. H. Townsend, by the U. S. Fisheries Steamer, 'Albatross,' in 1911; Commander G. H. Burrage, U. S. N., Commanding. X. Published by permission of the U. S. Commissioner of Fisheries.

cylindrical shells of foraminifera. *Hyalinœcia tubicola* (Müller) Malmgren subspecies *stricta* Moore, like other species of this genus, builds a quill-like tube of very hard, tough chitin, slightly narrower at one end than at the other, open at both ends, and slightly curved. Rarely cœlenterates or barnacles are attached to the surface. Small tubes are translucent white, older ones are brown.

As stated above, many of the *Onuphis* were in the tubes I have described as typical. Others had attached bits of *Hyalinœcia* tubes to the outside of their own. In other cases the *Onuphis* was living inside a *Hyalinœcia* tube of which one side had broken away and the break was repaired with characteristic *Onuphis* material. Still others were living in complete *Hyalinœcia* tubes and there was no trace of the characteristic *Onuphis* tube-material. This occurred often so that I very soon learned that it is not safe to assume that the animal in a *Hyalinœcia* tube is really *Hyalinœcia* and not *Onuphis*. Obviously, *Onuphis* may construct a tube of its own, but it frequently uses instead an empty one of *Hyalinœcia*.

Amphinomidæ

Chloeia flava (Pallas)

Aphrodita flava Pallas, 1766, p. 97, Pl. viii, figs. 7–11.

One specimen. Beach at Francisquito Bay, Lower California.

Polynoidæ

Lagisca multisetosa Moore

Lagisca multisetosa Moore, 1902, pp. 267–269, Pl. xiv, figs. 29–36; 1908, p. 335.
Harmothoë multisetosa Moore, 1910, pp. 340 and 341.

Through an error in locality labels, Moore first described this species as from Greenland, but he later corrected this and showed that it is really an Alaskan form. In the last of the above references, Moore reports on the study of a number of individuals and concludes that it is a highly variable species whose limits can be accurately ascertained only if a large number are available for study.

The present collection contains a single specimen lacking the median tentacle and with only a fragment of an elytron left. In many respects it agrees with Moore's description but it does not show cilia on the palps or on the peristomial cirri. The fragment of the elytron is thickly studded with conical spines, but not enough of it is left to enable me to determine whether the papillæ described by Moore are present. In view of the similarities between this and Moore's description, I have tentatively located it here.

Station D. 5682; 491 fathoms; bottom temperature F. 40.8°.

Admetella hastigerens Chamberlin

Admetella hastigerens CHAMBERLIN, 1919, pp. 64–67, Pl. IX, figs. 6–8.

Chamberlin described this species from one specimen collected off Panama in 581 fathoms. The Albatross collection contains five specimens, none of which is complete, but it is possible by a comparison of the five to get a fairly complete description. The largest was 100 mm. long and 8 mm. wide, thus a trifle larger and narrower than Chamberlin's specimen. The individual which is in most respects the best preserved is 50 mm. long.

The prostomium agrees in general with Chamberlin's description, but the "lateral extensions" are much more delicate than one would infer from that description, being extremely thin, scale-like structures, which, if the preservation has not been good, look very much like flakes of epidermis that have loosened from the surface. The median tentacle has a large ceratophore inserted into the dorsal middle line of the prostomium and with a diameter about one-fourth that of the latter. It has a length about equal to twice its diameter. The style is extremely delicate and slender, extending to about somite 9. It broadens near the end and then abruptly narrows to an acute apex. In the 50 mm. specimen the ceratophores of the lateral tentacles are hidden under the scale mentioned above, while the styles are very short and slender, hardly longer than the scale. In a specimen of twice this size the styles are relatively longer, slightly swollen toward the end and with a sharp-pointed apex. There is a faint trace of pigment around the swollen portion. The palps are more slender than in Chamberlin's specimen and have acute apices.

The dorsal and ventral cirri of the first parapodium resemble the median tentacle in form and size and are larger than the palps. The ventral cirrus of the third parapodium is similar to these in form and size but that of the fourth is much shorter and hardly longer than the parapodium. Succeeding ventral cirri are progressively shorter and the eighth is a slender, sharp-pointed structure attached to the ventral face of the parapodium and not reaching the apex. The dorsal cirri are broken in nearly all specimens, but those that remain agree in all respects with those of the first two somites. The pharynx is protruded in a 100 mm. specimen. It is 12 mm. long, smooth throughout the greater part of its length, but with roughenings toward the end. At the apex, above and below, is a row of about fourteen soft papillæ and three light-brown teeth.

A single elytron, the first or second, remains on the 100 mm. animal. It is of sufficient size to cover, with its mate, the dorsal surface of the body

and probably did so during life. It is too poorly preserved for accurate description, but is apparently nearly circular in outline and of a very delicate texture. In the preserved condition the color is gray, deepening into black on the margin near the point of attachment of the elytrophore. From this point a colorless band runs diagonally to the margin of the elytron.

In addition to the broad flat type of setæ described by Chamberlin in Pl. IX, figs. 7 and 8, I find another type having long slender stalks, flattened and with serrated margins toward the ends.

Station D.5676; 645 fathoms; bottom temp., F. 39°.
Station D.5677; 735 fathoms; bottom temp., F. 38.6°.
Station D.5685; 645 fathoms.
Station D.5692; 1076 fathoms; bottom temp., F. 37.1°.

Halosydna brevisetosa Kinberg

Halosydna brevisetosa KINBERG, 1855, p. 385.

Station D.5678; 13½ fathoms. One specimen.

Lepidasthenia curta Chamberlin

Lepidasthenia curta CHAMBERLIN, 1919, pp. 61–63, Pl. v, figs. 4–9.

Station D.5683; 630 fathoms; bottom temp., F. 39.1°.

Polynoë lordi (Baird)

Lepidonotus lordi BAIRD, 1863, p. 107.

Pichilingue Bay, Lower California. Three specimens.

Eunoë exoculata, new species

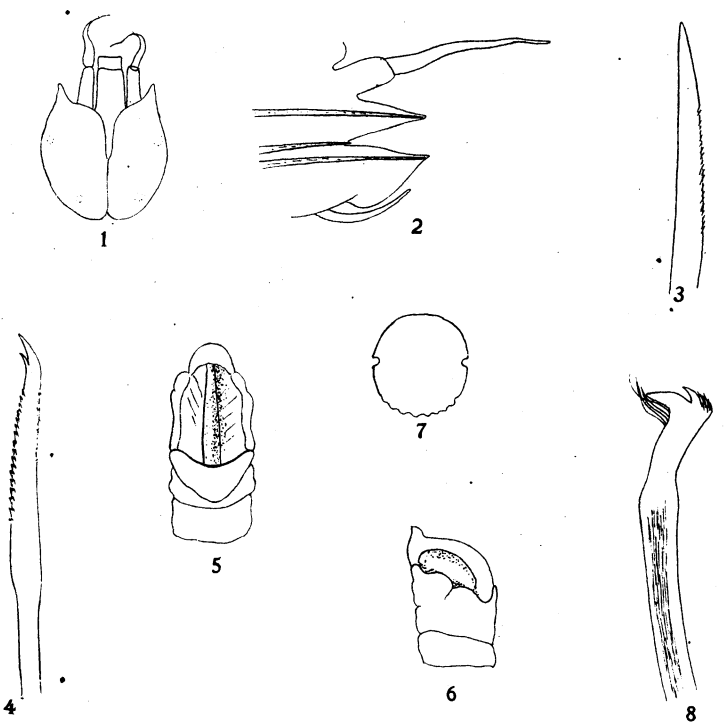
Figures 1 to 4

Two specimens, one incomplete. The entire specimen is 30 mm. long and 7 mm. in greatest body width. The body narrows somewhat abruptly toward the anterior end, and much more gradually posteriorly. There are 38 somites in the body and 15 pairs of elytrophores. No elytron remains in the complete specimen, but the other retains one which is much wrinkled.

The prostomium is a trifle longer than wide, its greatest width being about in the middle (Fig. 1). Posteriorly it narrows gradually to a base that is not more than one-third the greatest diameter. Anteriorly the narrowing is very slight, each half terminating in a peak which is placed well toward the outer margin and at a considerable distance from the median tentacle. The median groove is prominent and the ceratophore of the median tentacle is inserted into it to about the middle of the prostomium. On either side of the prostomium are two spots which evidently are eyes, though they are not pigmented. I am uncertain if this is normal or if the pigment may not have been removed in the preservation. The posterior pair of these lie on the dorso-lateral surface of the prostomium near its posterior end, the anterior on the ventro-lateral surface at the region of its greatest width, and are not visible in a dorsal view of the head region.

The ceratophore of the median tentacle is about one-third as wide as the prostomium, and the length of its free portion is about equal to its width. The style is absent in both specimens. The ceratophores of the lateral tentacles arise at some distance from the peaks, are shorter than that of the median tentacle, and about one-third its diameter. The style is slender and about three times as long as the ceratophore (foreshortened in the drawing). Only one palp remains. This is slender and about four times as long as the prostomium. Most of the dorsal cirri are lost but the larger of the two specimens retains a few at the posterior end. These are slender and longer than the transverse diameter of the body. They do not have any swelling at the ends.

A parapodium from near the middle of the body (Fig. 2) has neuropodium and notopodium of approximately equal length, each with an acute apex into which an acicula extends. Another acicula reaches the surface at the middle of the parapodium. The aciculæ are dark brown at the bases but have slender colorless apices. The dorsal cirrus has a heavy ceratophore and a slender style, the ventral cirrus is more slender



Figs. 1 to 4. *Eunoë exoculata*, new species.

Fig. 1, prostomium × 10; 2, middle parapodium × 7; 3, seta × 45; 4, seta × 45.

Figs. 5 to 8. *Maldane cristata*, new species.

Fig. 5, anterior end, dorsal view × 5; 6, anterior end lateral view × 5; 7, anal plate × 5; 8, uncinus × 185.

than the dorsal and does not reach the apex of the parapodium. Except for variations in length, the notopodial setæ are all alike, with moderately acute apices and poorly defined denticulations along one face (Fig. 3). The neuropodial setæ (Fig. 4) are all longer than the notopodial and are all alike in form, except that some near the dorsal face of the tuft are much longer than the others. Each suddenly widens toward the end and then gradually narrows, ending in a large terminal and a smaller subterminal tooth. Along the widened region are rows of toothed plates which appear most clearly in profile but apparently extend entirely around the seta.

No elytra are retained on the type. The paratype has one very much shriveled elytron, with a circular outline but with no fimbriations or surface markings.

Station D.5698; 475 fathoms; bottom temp., F. 39.9°.

Type in The American Museum of Natural History.

Sigalionidæ

Sthenolepis areolata (McIntosh)

Leanira areolata McIntosh, 1885, p. 151, Pl. xxi, fig. 3; Pl. xxv, figs. 8, 9; Pl. xiii,*a* fig. 1.

Sthenolepis areolata Chamberlin, 1919, p. 90.

Station D.5695; 534 fathoms; bottom temp., F. 38.9°.

Aphroditidæ

Aphrodita defendens Chamberlin

Aphrodita defendens Chamberlin, 1919, pp. 80–81.

Station D.5699; 659 fathoms; bottom temp., F. 37.9°.

Station D.5676; 645 fathoms; bottom temp., F. 39.0°.

Lætmonice pellucida Moore

Lætmonice ["*Lætmatonice*"] *pellucida* Moore, 1903, p. 420, Pl. xxiii, figs. 19, 20.

Two specimens, which I have assigned to this species because of their general resemblance to Moore's description. Lack of agreement is shown in the subapical barbs of the arrow-pointed setæ, which are symmetrical instead of unequal in number on different sides of the shaft, and I could find no papillæ on the anterior ventral surface.

Station D.5695; 534 fathoms; bottom temp., F. 38.9°.

Nephthydidæ

Nephthys ectopa Chamberlin

Nephthys ["*Nepthys*"] *ectopa* Chamberlin, 1919, pp. 94–97, Pl. xv, figs. 1–7.

Probably of this species, but too poorly preserved to allow of positive identification.

Station D.5698; 475 fathoms, bottom temp., F. 39.9°.

Nereidæ

Nereis mediator Chamberlin

Nereis mediator CHAMBERLIN, 1919*a*, page 11.

One specimen. Labeled as from Lower California.

Platynereis integer Treadwell

Nereis (Platynereis) integer TREADWELL, 1920, p. 595, figs. 1–4.

One specimen. Labeled as from Lower California.

Nereis kobiensis McIntosh

Nereis (Platynereis) kobiensis McINTOSH, 1885, pp. 210–212, Pl. XXXIV, figs. 3, 4, 5, 6; Pl. XVI*a*, figs. 2, 3, 4.

One specimen. Labeled as from Lower California.

Leodicidæ

Leodice segregata Chamberlin

Leodice segregata CHAMBERLIN, 1919, p. 237–240, Pl. LIV, figs. 1–5.

Station D.5695; 534 fathoms; bottom temp., F. 38.9°.

Station D.5682; 491 fathoms; bottom temp., F. 40.8°.

Onuphis litabranchia Chamberlin

Onuphis litabranchia CHAMBERLIN, 1919, pp. 274–279, Pl. L, fig. 7; Pl. LI, figs. 1–10; Pl. LII, fig. 1.

Chamberlin described the ceratophores as smooth. In the single incomplete specimen of this collection these are ringed. Each of the median and the outer paired ceratophores has seven rings, while each of the inner paired ones has twelve or thirteen. The gill structure agrees more closely with Chamberlin's paratype than with his type, for many are branched. The specimen is a female with eggs.

Station D.5673; 1090 fathoms.

Onuphis lepta Chamberlin

Onuphis lepta CHAMBERLIN, 1919, pp. 290–295, Pl. XLV, figs. 1–7; Pl. XLVI, figs. 3–12.

A small and evidently immature specimen living in a mud tube attached to the outer wall of a *Hyalinœcia* tube was collected at Station D.5691. At Station D.5684 were collected a considerable number of these tubes, most of which were empty but one contained the anterior end of an individual which agrees in all respects with Chamberlin's description.

Station D.5684; 1760 fathoms.

Station D.5691; 868 fathoms; bottom temp., F. 37.2°.
Station D.5692; 1076 fathoms; bottom temp., F. 37.1°.

Onuphis vexillaria Moore

Onuphis vexillaria MOORE, 1911, pp. 266–269, Pl. XVII, figs. 69–76.

These agree with Moore's description in every respect except that the frontal tentacles are closer together and in no somite are there more than four gill filaments. Four specimens.

Station D.5690; 1101 fathoms; bottom temp., F. 38.1°.

Onuphis iridescens (Johnson)

Northia iridescens JOHNSON, 1901, p. 408, Pl. VIII, figs. 86, 87; Pl. IX, figs. 88–92.
Nothria iridescens MOORE, 1911, p. 255.

Station D.5698; 475 fathoms, bottom temp., F. 39.9°.

Onuphis hiatidentata (Moore)

Nothria hiatidentata MOORE, 1911, pp. 259–262, Pls. XVI and XVII, figs. 41–50.

In his description of this species Moore comments on the resemblance which it bears to *Hyalinœcia tubicola*, with which it is commonly associated. I have already mentioned the relations of the two in the matter of tube construction. See above, p. 2.

Station D.5673; 1090 fathoms.
Station D.5686; 930 fathoms; bottom temp., F. 37.3°.
Station D.5689; 879 fathoms.
Station D.5692; 1076 fathoms; bottom temp., F. 37.1°.
Station D.5691; 868 fathoms; bottom temp., F. 37.2°.
Station D.5690; 1101 fathoms; bottom temp., F. 38.1°.
Station D.5697; 485 fathoms; bottom temp., F. 39.8°.

Hyalinœcia tubicola (Müller) Malmgren subspecies **stricta** Moore

Hyalinœcia tubicola (Müller) MALMGREN subspecies *stricta* Moore, 1911, p. 280, Pl. XVIII, figs. 96, 97.

Station D.5673; 1090 fathoms.
Station D.5683; 630 fathoms; bottom temp., F. 39.1°.
Station D.5686; 930 fathoms; bottom temp., F. 37.3°.
Station D.5687; 480 fathoms; bottom temp., F. 41.1°.
Station D.5690; 1101 fathoms; bottom temp., F. 38.1°.
Station D.5691; 868 fathoms; bottom temp., F. 37.2°.
Station D.5692; 1076 fathoms; bottom temp., F. 37.1°.

Lumbrinereis bifilaris Ehlers

Lumbriconereis bifilaris Ehlers, 1901, pp. 139–144, Pl. xviii, figs. 1–10.
Lumbrinereis bifilaris Moore, 1911, pp. 291–294, Pl. xx, figs. 135–142.

Station D.5694; 640 fathoms.

Cirratulidæ

A fragment of a cirratulid of indeterminable species was collected at Station D.5694; 640 fathoms.

Maldanidæ

Maldane similis Moore

Maldane similis Moore, 1906, pp. 233–236, Pl. xi, figs. 26–30.

The only deviation from Moore's description which these show is that on the lateral margins of the cephalic plate the lobes are more definitely toothed.

Station D.5683; 630 fathoms; bottom temp., F. 39.1°.

Maldane cristata, new species

Figures 5 to 8

Distinguished by the prominence of the cephalic crest and the smooth margins of the cephalic and anal plates. The type is 130 mm. long and has a cephalic width of 2.5 mm. It is entire, though the median region is very poorly preserved.

The prostomium makes an angle of about 45° with the body axis (Figs. 5 and 6). The cephalic plate is roughly triangular in outline, and is surrounded by a definite raised margin, which, possibly as a result of the preservation, is thrown into folds but shows no trace of lobings or denticulations. On either side at the postero-lateral angle is a notch separating the margin into a basal and two lateral lobes. The basal lobe is the more prominent and is bent caudad near its middle. The lateral lobes decrease in height anteriorly and are separated by a constriction from the hemispherical palpode. The crest is narrow, elevated and prominent, extending from the posterior margin of the cephalic plate into the base of the palpode (Fig. 6). Numerous fine grooves extend outward from the side of the ridge at an angle of 45 degrees, but these may be due to shrinkage after preservation. The mouth is a narrow elongated slit with no prominent lips.

The first two setigerous somites have thick body-walls; on succeeding somites the dorsal wall becomes thinner while the ventral wall remains thick; on the seventh setigerous somite only a small portion of the ventral wall is thick, while in the following somites the thickening is restricted to the line of insertion of the setæ. In the type there is not much difference between the preanal somites and those in the middle of the body, but in another specimen the five somites in front of the pygidium are short and thick-walled, while those through the middle of the body are long and thin-walled. These variations are doubtless due to differences in the degree of contraction.

The anal plate is circular in outline (Fig. 7). On either side is a rounded notch, whose ventral margin lies at the equator of the circle, thus dividing the circle into a dorsal and ventral portion, the ventral being the larger. The margin of the dorsal part is smooth, that of the ventral part is six- to eight-lobed. The anus is situated

dorsally near the margin of the plate, and has a dorsal and ventral lip, the latter the larger and with radiating lines.

Uncini (Fig. 8) appear on the second setigerous somite, only slender setæ appearing on the first. The rows of uncini are at first short but soon lengthen. Each uncinus has a long, gently curved shaft, of which I have figured only the terminal portion. At the apex is a single tooth with a much larger one ventral to it. Dorsal to the apical tooth are a series of fine denticulations, hardly large enough to be called teeth, which extend laterally around the end of the uncinus. Ventral to the larger tooth are a series of fine hair-like processes. In the tuft dorsal to the uncinus-row are two kinds of setæ. One has rather heavy brown-colored bases, which are bilimbate just outside the body wall but distally to this narrow into an extremely long delicate white apical portion with two marginal rows of minute denticulations. The second kind are smaller and not so dark in color as the first; they widen slightly toward the end and narrow abruptly asymmetrically to form a long, slender, needle-like apex which forms an angle with the main axis of the seta.

Station D.5698; 475 fathoms; bottom temp., F. 39.9°.

Terebellidæ

Terebella robusta (Johnson)

Amphitrite robusta JOHNSON, 1901, pp. 425–426, Pl. XVI, figs. 164–168.

Station D.5698; 475 fathoms; bottom temp., F. 39.9°. One specimen.

Thelepus crispus Johnson

Thelepus crispus JOHNSON, 1901, p. 428, Pl. XVII, figs. 175–178*b*.

One imperfectly preserved and evidently immature individual. In form of gills, setæ, and uncini this agrees with Johnson's description, but it does not show the eye spots which Moore describes in the young individuals.

Station D.5693; 451 fathoms.

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