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POLYCHAETOUS ANNELIDS OF THE PACIFIC  
COAST IN THE COLLECTIONS OF THE  
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BY

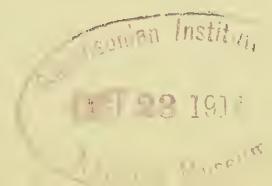
AARON L. TREADWELL

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The following paper contains a list of old, and a description of a few new species of Pacific polychaetous annelids belonging to the University of California which, through the courtesy of Professors W. E. Ritter and C. A. Kofoid, were submitted to me for study. As a result of the earlier papers of Johnson, and the later elaborate work of Moore, our knowledge of the Pacific coast Polychaeta is very complete and I was prepared to find, what proved to be actually the case, that the greater number of the specimens submitted to me had already been described.

Twelve new species were found in the collections and are here described: *Panthalis pacifica*, *Nereis notomacula*, *Spio acuta*, *Scolecolepis alaskensis*, *Polydora californica*, *Streblosoma crassibranchia*, *Trophonia minuta*, *T. inflata*, *Ophelina magna*, *O. mucronata*, *Laonome oculifera*, and *Branchiomma disparoculatum*.

While it was not my original intention to do more than publish a description of these new species, I have, at the request of Professor Kofoid, included all of the old, with the intention of thus securing a more complete and easily accessible list of the localities from which the various species were collected, as well as a record of whatever data concerning depth of water and character of bottom were available. The collections included some material from Honolulu and from localities along the coast as far north as Alaska, as well as



material obtained with trawl and tow-net during the explorations of the Marine Biological Station of San Diego. Localities relative to the former are entered in sequence from north to south and those relative to the latter according to the haul numbers under which the collections are accessioned (see Ritter, 1914).

### Family SYLLIDAE

#### **Syllis heterochaeta** Moore

*Syllis heterochaeta* Moore (1909b), p. 322, pl. 15, figs. 1-4.

Moore described six eyes for this species. These, which agreed with his description in other respects, had only four. Another difference from Moore's description was that the setae instead of being simply rounded had a subterminal depression.

Collected from Bolinas Bay.

#### **Syllis alternata** Moore

*Syllis alternata* Moore (1908b), p. 323, and (1909b), p. 321.

Collected from Ocean Cape, Yakutat Bay, Alaska; near Black Point, San Francisco Bay; Pacific Grove; and San Pedro.

#### **Syllis armillaris** Oersted

*Syllis armillaris* Oersted (1843b), p. 24, figs. 90, 94, 102.

Collected from Point Loma; and San Diego.

#### **Syllis (Pionosyllis) elongata** Johnson

*Pionosyllis elongata* Johnson (1901), p. 403, pl. 6, figs. 67-70; pl. 7, fig. 71.

Collected from Dillon's Beach; Black Point, San Francisco Bay; Pacific Grove; Monterey; San Pedro; and Pillar Point, Calif.

#### **Pionosyllis gigantea** Moore

*Pionosyllis gigantea* Moore (1908b), p. 325.

Collected from Bolinas Bay; and in haul LXVII, off San Diego in 19 to 31 fathoms on grayish-yellow sand; one specimen from an unknown locality.

**Trypanosyllis intermedia** Moore*Trypanosyllis intermedia* Moore (1909a), p. 236, pl. 7, figs. 1, 2.

Collected from San Pedro and San Diego, and also in haul LXXVIII, from the piles of the Santa Fé wharf in San Diego Bay.

**Trypanosyllis gemmipara** Johnson*Trypanosyllis gemmipara* Johnson (1901), p. 405, pl. 7, figs. 72-76.

Locality unknown.

**Odontosyllis phosphorea** Moore*Odontosyllis phosphorea* Moore (1909b), p. 327, pl. 15, figs. 8-10.

Collected from Bolinas Bay; Monterey; Pacific Grove; Avalon, Santa Catalina Island; and Coronado.

One mutilated specimen, from an unknown locality, agreed in general with Moore's description, but had five prominent longitudinal lines on the dorsal surface. Notopodial setae from the middle of the body are very long, delicate, flat, gently tapering to the end.

**Odontosyllis sp. (?)**

Collected from San Pedro.

## Family HESIONIDAE

**Podarke pugettensis** Johnson*Podarke pugettensis* Johnson (1901), p. 397, pl. 3, figs. 23-25.

Collected from Port Orchard and Alki Point, Puget Sound.

**Podarke sp. (?)**

Collected from San Diego.

## Family APHRODITIDAE

**Aphrodita refulgida** Moore*Aphrodita refulgida* Moore (1910), p. 376, pl. 32, figs. 76-84.

Collected in haul VI-1, off San Pedro in 10 to 24 fathoms on gray sand and mud, and in haul XIX-1, off San Pedro in 30 to 102 fathoms on soft mud, sand, and pebbles.

**Aphrodit a castanea** Moore

*Aphrodit a castanea* Moore (1910), p. 380, pl. 32, figs. 85-97; pl. 33, fig. 98.  
Collected at 160 fathoms (locality?).

**Aphrodit a parva** Moore

*Aphrodit a parva* Moore (1905a), p. 529, pl. 34, figs. 3-7.

Collected in the following hauls: XIV-1, off San Pedro in 40 to 155 fathoms on soft, sticky mud; XXVII-2, off Santa Catalina Island in 16 to 40 fathoms on fine gray sand and green mud; XLIII-1, in San Diego Bay in 3 to 7 fathoms on soft, black mud; LV-1, off San Diego in 23 to 26 fathoms on mud and sand; LXV, in San Diego Bay in 3 fathoms on sand and eel-grass.

**Aphrodit a negligens** Moore

*Aphrodit a negligens* Moore (1905a), p. 526, pl. 34, figs. 1-2; pl. 35, fig. 31.

Collected in haul LVIII, off the Coronado Islands in 15 to 18 fathoms on sand and shells; and in haul 6, off San Diego in a net towed at 90 fathoms.

## Family AMPHINOMIDAE

**Euphrosyne heterobranchia** Johnson

*Euphrosyne heterobranchia* Johnson (1901), p. 402, pl. 6, figs. 60-66.

Collected from Kodiak Island, Alaska.

**Euphrosyne aurantiaca** Johnson

*Euphrosyne aurantiaca* Johnson (1897), p. 157, pl. 5, figs. 1-4.

Collected from Santa Monica; Portuguese Bend; and San Diego.

**Euphrosyne hortensis** Moore

*Euphrosyne hortensis* Moore (1905a), p. 534, pl. 34, figs. 13-16.

Collected from Blunt's Reef; and in haul LXVII, off San Diego in 19 to 31 fathoms on grayish-yellow sand.

**Euphrosyne arctica** Johnson

*Euphrosyne arctica* Johnson (1897), p. 159, pl. 5, figs. 5-7.

Collected from San Pedro; and in haul LXX-2, off La Jolla in 51 to 98 fathoms on rocky shale.

**Eurythoe californica** Johnson*Eurythoe californica* Johnson (1897), p. 159, pl. 5, figs. 8-14.

Collected from Pacific Grove; San Pedro; La Jolla; and San Clemente Island.

**Amphinome rostrata** Pallas*Amphinome rostrata* Pallas (1766), p. 106, pl. 8, figs. 14-18.*Amphinome rostrata*, McIntosh (1885), p. 21, pl. 1, fig. 7; pl. 4, fig. 1; pl. 1a, fig. 16; pl. 2a, figs. 8-12.

Locality unknown.

**Chloeia euglochis** Ehlers var.?*Chloeia euglochis* Ehlers (1887), p. 18, pl. 1, figs. 1-2; pl. 2, figs. 1-8; pl. 3, figs. 1-4.

Locality unknown.

**Hermodice pennata** Treadwell*Hermodice pennata* Treadwell (1906), p. 1165, fig. 41.

Locality unknown.

## Family PALMYRIDAE

**Chrysopetalum occidentale** Johnson*Chrysopetalum occidentale* Johnson (1897), p. 161, pl. 5, figs. 15, 16; pl. 6, figs. 17-19.

Johnson's type-specimen was collected from San Pedro. Another specimen in the collection came from San Diego.

## Family POLYNOIDAE

**Halosydna interrupta** v. Marenzeller*Halosydna interrupta* v. Marenzeller (1902), p. 570, pl. 1, fig. 2.*Polynoe semierma*, Moore (1903), p. 402, pl. 23, figs. 2-3.*Halosydna interrupta*, Moore (1910), p. 331.

Collected from San Pedro and also in the following hauls: LXX-7, off La Jolla in 55 to 125 fathoms on soft black shale; LXXXIII, off Point Firmin in 60 to 130 fathoms on sand and broken shells.

**Halosydna pulchra** Johnson*Polynoe pulchra* Johnson (1897), p. 177, pl. 7, figs. 34, 43, 43a; pl. 8, figs. 50, 50a, 50b.

Collected from Pacific Grove, San Pedro, Ballast Point (San Diego), and in the following hauls: XIV-3, off San Pedro in 40 to

150 fathoms on gray mud; XLVII-1, off Coronado in 8 to 10 fathoms on sand and eel-grass; LXVI, in San Diego Bay in 7 to 9 fathoms on sand and broken shells; LXXII-1, off San Diego in 46 to 48 fathoms on soft, green mud; 1092, off La Jolla in 40 fathoms on sand and shells.

### ***Halosydna insignis* Baird**

*Lepidonotus insignis* Baird (1863), p. 106.

*Halosydna insignis*, Baird (1865), p. 188.

*Polynoe brevisetosa*, Johnson (1897), p. 167, pl. 6, fig. 24; pl. 7, figs. 31, 40, 40a; pl. 8, figs. 46, 46a.

*Halosydna insignis* Moore (1910), p. 329.

Collected north of San Francisco from Kodiak Island, Alaska; Alki Point, Puget Sound; Trinidad; Cape Mendocino; Point Arena; Dillon's Beach; Tomales Bay; Duxbury Reef. Collected in San Francisco Bay from Fort Point, Point Cavallo, Lime Point, Black Point, Sausalito, San Antonio (Oakland) Creek, and Session's Basin. Collected south of San Francisco from Point San Pedro (11 miles south of Golden Gate); Pillar Point, California; Monterey; Pacific Grove; Avalon, Santa Catalina Island; La Jolla. Collected also in the following hauls: XVII, off San Pedro in 4 to 10 fathoms of fine sand; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand; 1166, off La Jolla in 5 to 13 fathoms on sand.

### ***Halosydna californica* Johnson**

*Polynoe reticulata* Johnson (1897), p. 170, pl. 7, figs. 32, 41, 41a; pl. 8, figs. 47, 47a, 47b.

*Polynoe californica* Johnson (1901), p. 387.

Collected from Humboldt Bay; Pacific Grove; Santa Barbara; Deadman's Island near San Pedro; Portuguese Bend; San Pedro; Avalon, Santa Catalina Island; La Jolla; Zuninga Point, Ballast Point, and Coronado in San Diego Bay. Collected also in the following hauls: XIII, off San Pedro in 35 to 36 fathoms on coarse sand; XIV-1, off San Pedro in 9 fathoms on small rocks; XVII-2, off San Pedro in 4 to 10 fathoms on fine sand; XLVII-2, off San Diego in 8 to 11 fathoms on hard sand and pebbles; LVI, in the mouth of San Diego Bay in 5 to 9 fathoms on sand and eel-grass; LVIII, off the Coronado Islands in 15 to 18 fathoms on sand and broken shells; LXII, off San Diego in 16 to 18 fathoms on fine gray sand; LXIII, off San Diego on a rocky bottom in 20 fathoms; LXIV, off San Diego on a sandy bottom in 11 to 19 fathoms; LXVII, off San Diego in 19

to 31 fathoms on grayish-yellow sand; LXXVIII, from the piles of the Santa Fé wharf in San Diego Bay; 4, off San Diego in a tow-net hauled from 65 fathoms to the surface; 5-6, off San Diego in a tow-net hauled from 90 fathoms to the surface; 1165, off La Jolla in 4 to 8 fathoms on sand.

#### **Halosydna carinata** Moore

*Halosydna carinata* Moore (1903), p. 417, pl. 23, figs. 16-17.

Collected in haul L-1, off San Diego in 21 to 28 fathoms on rock. Other specimens, from an unknown locality, agreed with Moore's description except with respect to the structure of the notopodial setae. Dorsally there are a few of the forms described by Moore (1903), but ventrally there is a tuft of much longer delicate sharp-pointed setae, with comb-shaped teeth in two rows throughout the greater part of the seta, but not extending to the tip.

#### **Halosydna lordii** Baird

*Halosydna lordii* Baird (1865), p. 190.

*Polynoe lordii* Johnson (1897), p. 175, pl. 7, figs. 35, 44; pl. 8, figs. 51-51a-b.

Collected from Yakutat, Alaska; Alki Point, Puget Sound; Anacortes, Wash.; Cape Mendocino; and San Pedro.

#### **Polynoe fragilis** Baird

*Lepidonotus fragilis* Baird (1863), p. 108.

*Halosydna fragilis* Baird (1865), p. 191.

*Polynoe fragilis* Johnson (1897), p. 179, pl. 7, figs. 36, 45; pl. 8, figs. 52, 52a-b.

Collected from Pleasant Beach, Port Orchard, Salmon Bay, and Seattle, Wash.

The collection contained one bottle with a single specimen labeled *Polynoe commensalis*, but with no record of the identifier. It may have been identified as the species to which Webster (1879, p. 10) gave the name *Lepidametria commensalis*, but as it had lost all elytra and cirri, I was unable to be certain as to its position.

#### **Lepidonotus squamatus** Linnaeus

*Aphroditia squamata* Linnaeus (1776), p. 1084.

*Polynoe squamata* Johnson (1897), p. 166, pl. 7, fig. 30.

Collected from Point Cavallo and Black Point in San Francisco Bay; Monterey Bay; and Santa Monica.

**Lepidonotus robustus** Moore

*Lepidonotus robustus* Moore (1905a), p. 544, pl. 36, figs. 32-35.

Locality unknown.

**Lepidonotus coeloris** Moore

*Lepidonotus coeloris* Moore (1903), p. 412, pl. 23, fig. 12.

Collected from Ballast Point, San Diego Bay, and in the following hauls: XVIII, off San Pedro in 17 to 33 fathoms on sand and mud; LXIX-2, off San Diego on a rocky bottom in 29 to 32 fathoms; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand; 1541, off San Clemente Island in 135 to 500 fathoms on gray mud; 1552, off San Clemente Island in 48 fathoms on coarse sand.

**Harmothoe hirsuta** Johnson

*Harmothoe hirsuta* Johnson (1897), p. 182, pl. 6, figs. 27-29; pl. 7, fig. 38; pl. 8, figs. 53, 53a-c.

Collected from Pillar Point, California; Pacific Grove; Santa Barbara; San Pedro Harbor; Portuguese Bend and White's Point near San Pedro; La Jolla; and San Diego Bay.

**Harmothoe imbricata** Linnaeus

*Aphrodisia imbricata* Linnaeus (1788), p. 1084.

*Harmothoe imbricata* Malmgren (1865), p. 66.

Collected from Yakutat, Muir Inlet, and Kodiak Islands, Alaska; Alki Point, Puget Sound; Trinidad; Humboldt Bay; Shelter Cove, Mendocino County; Point Arena; Dillon's Beach; Tomales Bay; Fort Point and Point Cavallo, San Francisco Bay; Pacific Grove; La Jolla; and San Clemente Island. Collected also in the following hauls: XIII, off San Pedro on a sandy bottom in 35 to 36 fathoms; XLVII, off San Diego in 8 to 11 fathoms on hard sand and pebbles; LXVII, off San Diego in 19 to 31 fathoms on grayish-yellow sand.

**Harmothoe crassicirrata** Johnson

*Harmothoe crassicirrata* Johnson (1897), p. 183, pl. 6, figs. 25-26, pl. 7, fig. 39; pl. 8, figs. 54, 55a-c.

Collected from Monterey Bay.

**Lepidasthenia gigas Johnson**

*Polynoe gigas* Johnson (1897), p. 172, pl. 7, figs. 33, 42, 42a; pl. 8, figs. 48, 48a-b, 49.

*Lepidasthenia gigas* Moore (1909a), p. 241.

Collected from San Pedro; Point Loma, San Diego; and in haul LXXXIII, off Point Firmin in 60 to 140 fathoms on sand and broken shells.

**Eunoa barbata Moore**

*Eunoa barbata* Moore (1903), p. 334, pl. 28, figs. 1-6.

Collected from Blunt's Reef.

## Family SIGALIONIDAE

**Peisidice aspera Johnson**

*Peisidice aspera* Johnson (1897), p. 184, pl. 9, figs. 56-59;; pl. 10, figs. 63a-d.

Collected from Dillon's Beach; Monterey Beach; and San Diego.

**Sigalion pourtalesii Ehlers**

*Sigalion pourtalesii* Ehlers (1887), p. 57, pl. 15, figs. 1-4; pl. 16, figs. 1-10.

These differed from Ehler's description only in that each had a small median tentacle near the posterior part of the head.

Collected from San Pedro; Ballast Point, San Diego Bay; also in the following hauls: VI-2, off San Pedro in 14 to 20 fathoms on gray sand; XIV-3, off San Pedro in 40 to 150 fathoms on gray mud; LXXIII-2, off San Diego in 59 to 106 fathoms on green mud and sand.

**Sthenelais tertieglabra Moore**

*Sthenelais tertieglabra* Moore (1910), p. 395, pl. 33, figs. 113-120.

Locality unknown.

**Sthenelais fusca Johnson**

*Sthenelais fusca* Johnson (1897), p. 185, pl. 9, figs. 60, 61, 61a, b; pl. 10, figs. 64, 64a-g.

The appearance of preserved specimens varied with the preservative used. Specimens in alcohol had brick-red elytra, while those in formalin were anteriorly quite transparent, with yellowish pigment granules toward the posterior end.

Collected from San Pedro and also in the following hauls: VIII, along shore in the mud near the Southern Pacific Railroad bridge in the inner San Pedro Harbor; XLIII-1, in San Diego Bay in 3 to 7 fathoms on soft black mud; LXXIX-1, off San Diego in 63 to 65 fathoms on green mud and broken shells.

**Sthenelais verruculosa** Johnson

*Sthenelais verruculosa* Johnson (1897), p. 187, pl. 9, figs. 62, 62a; pl. 10, figs. 65, 65a-d.

Collected off White's Point, San Pedro (type specimen); and San Diego.

**Sthenelanella uniformis** Moore

*Sthenelanella uniformis* Moore (1910), p. 391, pl. 33, figs. 105-112.

These showed on posterior somites a tuft of long delicate capillary setae arising from the neuropodium, a structure not mentioned in Moore's description.

Collected in haul X, off San Pedro in 19 to 38 fathoms on green mud.

**Panthalis pacifica** sp. nov.

Pl. 11, figs. 1-7

The head (pl. 11, fig. 1) has its greatest transverse diameter about equal to its antero-posterior diameter measured to the base of the ommatophores. Its basal portion is rather narrow, swelling abruptly on either side and then gradually narrowing to the bases of the ommatophores. These are provided with very large eyes, which occupy more than half their length, while a second pair of much smaller eyes lies just posterior to the bases of the ommatophores. The head is divided longitudinally by a shallow median groove and, at about its center, a median tentacle arises from a very short ceratophore. The median tentacle is rather slender and gradually tapers to an acute tip, its apex extending beyond the eyes. The ventral tentacles, like the median one in size and form, arise close together on the ventral surface of the head. The palps are long and each tapers uniformly to an acute tip. The tentacular cirri are larger than the antennae. While, in preserved material, the surface of the head is light brown in color, all its appendages are colorless.

All elytra are very delicate, with entire margins. The anterior two or three pairs cover the entire dorsal surface of the body. Then,

back to about the twenty-fifth somite, there is a wider uncovered area; this area narrows, at this somite, to less than the width of an elytron and maintains this width to the posterior end. No specimen was entire, the longest fragment having about twenty-five elytra. They are on somites 2, 4, 5, 7, 9, etc., and are more or less pigmented. When the pigment is small in amount it is collected near the elytrophore and spreads from this towards the margin. In one specimen the elytra were almost entirely dark brown, and in some others there was an indication of a median dorsal longitudinal pigmented band on the body wall.

The protruded proboscis is as long as the first twenty somites. On the mid-dorsal line at the apex of the proboscis is a rigid cirrus-like process about equal to a palp in size. A much smaller process is opposite it on the mid-ventral line. Between these two processes the soft margin of the proboscis has about twelve lobes on either side, the apex of each lobe being truncated and having a black pigment spot on its outer surface. Above and below, on either side of the mid-line, is a long, light-brown tooth, with rows of smaller teeth running laterally from it.

The first parapodium (pl. 11, fig. 2) is narrow and elongated, with its presetal lobe longer and narrower than its postsetal one. The postsetal lobe is in two parts, of which the dorsal is the larger. Its ventral portion is apparently continuous with a short cirrus-like lobe which lies in front of it. A spreading tuft of setae comes out between these lobes. Each dorsal seta has a long, smooth base, which suddenly widens at about its middle and then gradually narrows to an acute point. All of the terminal portion of each is armed along one edge with several rows of very sharp spines (pl. 11, fig. 4). The setae at the ventral edge of the tuft are smaller and not so numerous as the others, but are similar to them in form. An aciculum extends into the base of the elytrophore, and another extends into the parapodium. The ventral cirrus is very long.

The subsequent parapodia (pl. 11, fig. 3 of the 8th) are larger and relatively broader than the first, and the ventral cirri become slightly smaller absolutely, and much smaller relatively, than on the first. There are two sorts of setae on these parapodia. Ventrally there is a tuft of sickle-shaped setae (pl. 11, fig. 5), each of which has its central axis longitudinally striated at the bend, where a series of relatively large spines begins. Toward the end of each seta these large spines are replaced by several rows of much smaller ones. The details

of their arrangement are hard to make out, and their appearance varies with the position of the seta. Apparently there are several rows so arranged as to give a double-bordered effect for the greater part of the terminal portion of the seta. Just beyond the bend are a number of very fine spines arranged in transverse rows. Dorsal to these is a vertical row of very stout setae which extend beyond the parapodium to a distance equal to about half the length of the latter. These setae are light brown and the apex of each is prolonged into a long spine with a diminishing series of smaller spines arising from it (pl. 11, fig. 6). The whole terminal portion of each seta is covered with minute spines. Appearing as early as the eighth somite there is a tuft of three or four setae located dorsally to the large ones. Each has a smooth basal portion, narrowed to a symmetrically pointed apex, from either side of which a tuft of fibres is given off which form an irregular fan-like arrangement (pl. 11, fig. 7). These setae are much smaller than the heavy ones and extend only about half as far beyond the parapodium.

Type specimen collected in haul 1497, off San Diego ( $32^{\circ} 50' 7''$  N and  $117^{\circ} 21' 5''$  W) in 50 to 100 fathoms on black sand. Others collected in the following hauls: XII-2, off San Pedro in 35 to 175 fathoms on black asphalt rocks, pebbles, coarse sand, and broken shells; XIV-3, off San Pedro in 40 to 150 fathoms on gray mud; XXI-5, off Santa Catalina Island in 150 fathoms; LXX-6, off La Jolla in 54 to 125 fathoms on mud, sand, and rock; LXXII-3, off San Diego in 45 to 50 fathoms on foul, dark green mud; LXXIII-3, off San Diego in 57 to 106 fathoms on dark green mud and fine sand; LXXIX-1, off San Diego in 63 to 65 fathoms on green mud and broken shells; 1145, inside the kelp near La Jolla in 30 fathoms on sandy mud; 1475, off La Jolla in 50 to 100 fathoms on fine sand.

Type specimen in Museum of the University of California; co-type in American Museum of Natural History.

#### Family PHYLLODOCIDAE

##### **Phyllodoce ferruginea** Moore

*Phyllodoce ferruginea* Moore (1909b), p. 337, pl. 15, figs. 15-18.

Collected from Pacific Grove; Avalon, Santa Catalina Island; also in haul III, off San Pedro in 7 fathoms on dark brown mud.

**Phyllodoce castanea** v. Marenzeller

*Phyllodoce castanea* v. Marenzeller (1897), p. 127, pl. 3, fig. 2.  
*Phyllodoce castanea* Moore (1909a), p. 239.

Collected from Cape Mendocino; San Pedro; also in haul XXVI, off Santa Catalina Island in 46 to 49 fathoms on sand.

**Phyllodoce medipapillata** Moore

*Phyllodoce medipapillata* Moore (1909a), p. 237, pl. 7, figs. 3-4.

While agreeing in all essential respects with Moore's descriptions, these showed a considerable amount of variation. The papillae at the end of the proboscis vary in number from 17 to 19 and the head may vary in form, being in some cases as broad as it is long, while in others the length is less than the breadth. The pygidium had been lost in Moore's specimens. Some in this collection had two very stout anal cirri, tapering at the end to a sharp point.

Collected from Bolinas Cove; Pillar Point, California; San Pedro; Avalon, Santa Catalina Island; La Jolla; and Point Loma, San Diego Bay. Collected also in the following hauls: XIV-2, off San Pedro in 24 to 240 fathoms on greenish-brown mud and fine gray sand; XXVIII-1, off Santa Catalina Island in 12 to 30 fathoms on coarse sand and broken shells; L-1, off San Diego on a rocky bottom in 21 to 28 fathoms; LXII, off San Diego in 16 to 18 fathoms on gray sand; LXX-5, off La Jolla in 54 to 118 fathoms on mud and adobe shale rock; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand.

**Eulalia quinque-lineata** Treadwell

*Eulalia quinquelincata* Treadwell (1900), p. 192, figs. 27-29.

Locality unknown.

**Eulalia longicornuta** Moore

*Eulalia longicornuta* Moore (1906), p. 222, pl. 10, figs. 7-8.

Collected from Pacific Grove.

**Eulalia bifoliata** Moore

*Eulalia bifoliata* Moore (1909b), p. 349, pl. 16, figs. 31-34.

Collected in haul 1555, off San Clemente Island in 50 fathoms on coarse sand.

**Eulalia** sp. (?)

Collected from Black Point, San Francisco Bay.

**Notophyllum imbricatum** Moore

*Notophyllum imbricatum* Moore (1906), p. 217, pl. 10, figs. 1-3.

Collected from Portuguese Bend (near San Pedro), and San Diego.

## Family TOMOPTERIDAE

**Tomopteris septentrionalis** Apstein

*Tomopteris septentrionalis* Apstein (1900), p. 41, pl. 12, figs. 16-17.

Collected in the following hauls: 1680 and 1719, surface tows off La Jolla; 1729, 250 fathom tow made off La Jolla with a Kofoid closing-net; 1769, surface tow off San Clemente Island; 1813, 100 fathom tow made off La Jolla with a Kofoid closing-net; 1848, 75 fathom tow made off La Jolla with an open tow-net.

## Family NEREIDAE

**Nereis vexillosa** Grube

*Nereis vexillosa* Grube (1851), p. 4, pl. 2, figs. 1, 5, 6.

*Nereis vexillosa* Ehlers (1864), p. 573, pl. 23, figs. 3-5.

The animals of this species have in the posterior somites the peculiar pointed setae noted by Johnson (1901, p. 400) as characteristic of *Nereis procera*. On this account it is easy to mistake the young of *N. vexillosa* for *N. procera*, as the form of the head and tentacles vary with the method of preservation.

Collected from Aleutian Islands, Ocean Cape, Yakutat, Prince William Sound, and Kodiak Islands in Alaska; Baker's Beach and Beaver Cove near Vancouver; Orcas Island, Port Orchard, and Alki Point in Puget Sound; Trinidad; Point Arena; Point Reyes; Dillon's Beach; Bolinas; Duxbury Reef; Fort Point, San Antonio Creek, West Berkeley, Session's Basin, and Land's End in San Francisco Bay; Point San Pedro; Pacific Grove; Santa Barbara; Avalon, Santa Catalina Island; La Jolla; and San Diego. Collected also in the following hauls: XXVIII-2, off Santa Catalina Island in 15 to 45 fathoms on coarse sand and broken shells; LVIII, off the Coronado Islands in 15 to 18 fathoms on sand and broken shells; LIX, off the Coronado Islands in 15 fathoms on fine gray sand; LXXVII, in San Diego Bay in 3 fathoms on hard sand and rock.

**Nereis procera Ehlers**

*Nereis procera* Ehlers (1864), p. 557, pl. 23, fig. 2.

Collected from Kodiak Islands and Yakutat, Alaska; Pleasant Beach, Puget Sound; Black Point, San Francisco Bay; Pacific Grove; Portuguese Bend; Avalon, Santa Catalina Island; and San Diego. Collected also in the following hauls: XV, off San Pedro in 4 to 7 fathoms on coarse sand; XVI-2, off San Pedro in 9 fathoms on small rocks; XVII, off San Pedro in 4 to 10 fathoms on fine sand; XIX-2, off San Pedro in 30 to 77 fathoms on soft sandy mud with many pebbles; XLII, in San Diego Bay in 3 to 7 fathoms on soft black mud; XLIII-1, in San Diego Bay in 3 to 7 fathoms on soft black mud; XLVII-2, off San Diego in 8 to 11 fathoms on hard sand and pebbles; 1551, off San Clemente Island in 48 fathoms on coarse sand.

**Nereis agassizi Ehlers**

*Nereis agassizi* Ehlers (1864), p. 542, pl. 23, fig. 1.

This species is numerous and occurs with *Nereis procera*. The two species are similar, but *N. agassizi* has a peculiar hooked seta in the posterior somite, while *N. procera* has, in this region, a peculiar seta whose terminal joint fits into a socket at the end of the basal. *N. agassizi* has in the fifth and immediately following somites, a peculiar swelling on the parapodium. The characters of the head, antennae, etc., vary with the mode and degree of preservation.

Collected from Port Orchard and Channel Rocks in Puget Sound; Trinidad; Humboldt Bay; Cape Mendocino; Duxbury Reef; Fort Point, Lime Point, and Black Point in San Francisco Bay; Pacific Grove; Santa Barbara; San Pedro; Avalon, Santa Catalina Island; San Diego Bay; San Clemente Island; and Honolulu Harbor. Collected also in the following hauls: II-2, in San Pedro Harbor in 2 to 3 fathoms on quantities of sea-weed; VI-2, in the outer San Pedro Harbor in 3 fathoms on gray sand; XV, off San Pedro in 4 to 7 rocks; XVI-2, off San Pedro in 17 fathoms on pebbles and small rocks; XVII, off San Pedro in 4 to 10 fathoms on fine sand; XXVIII-1, off Santa Catalina Island in 12 to 30 fathoms on coarse sand and broken shells; XLIII-2, and 3, in San Diego Bay in 5 to 8 fathoms on soft black mud; XLVI-1 and 2, in San Diego Bay on a sandy bottom in 5 fathoms; XLVII-1 and 2, off San Diego in 8 to 10 fathoms on hard sand; LIX, off the Coronado Islands in 15 fathoms

on fine gray sand; LXII, off San Diego in 16 to 18 fathoms on gray sand; LXIV, off San Diego on a sandy bottom in 11 to 19 fathoms; LXVII, off San Diego in 19 to 31 fathoms on grayish-yellow sand; LXXI, off La Jolla in 15 to 56 fathoms on soft mud; LXXXI-2, off San Diego in 15 to 25 fathoms on sand and rock; LXXXII-2, off Point Firmin in 30 fathoms; 1165, off La Jolla in 4 to 8 fathoms on sand; 1556, off San Clemente Island in 50 fathoms on black mud and coarse sand; 1561, on Cortez Banks in 11 to 16 fathoms on rocks; 1630-31, near Guadalupe Island off the coast of Lower California in 18 fathoms on broken shells; 1632, near Guadalupe Island in 40 fathoms on green mud.

**Nereis cyclurus Harrington**

*Nereis cyclurus* Harrington (1897), p. 214, pls. 16-18.

Collected from Pacific Grove; and Point Loma, San Diego.

**Nereis virens var. brandti Malmgren**

*Alitta brandti* Malmgren (1865), p. 183.

Collected from Pleasant Beach, Puget Sound; Bolinas Bay; and San Pedro.

**Nereis virens Sars**

*Nereis virens* Sars (1835), p. 58, pl. 10, fig. 27.

*Nereis virens* Ehlers (1864), p. 559, pl. 22, figs. 29-32.

Collected from San Pedro.

**Nereis virens var. plenidentata Moore**

*Nereis virens* var. *plenidentata* Moore (1909a), p. 244.

Collected in tide pools at Deadman's Island, San Pedro.

**Nereis tentaculata Kinberg**

*Nereis tentaculata* Kinberg (1865), p. 170.

Collected from Pacific Grove.

**Nereis paucidentata Moore**

*Nereis paucidentata* Moore (1903), p. 430, pl. 23, figs. 28-30.

Collected from Avalon, Santa Catalina Island.

**Nereis notomacula** sp. nov.

Pl. 11, figs. 8-12

The prostomium is bluntly rounded anteriorly, its anterior third being roughly rectangular in outline and its posterior two-thirds rounded (pl. 11, fig. 8). The eyes were not clearly seen, their position being indicated merely by a pair of swellings on either side of the head. The antennae are about as long as the head and gently taper to their apices. The tentacular cirri are unequal in length, the dorsal ones reaching to the eighth setigerous somite while the ventral ones are much shorter. Each has a prominent basal piece and a long tapering terminal joint. The basal part of the jaw is black and the terminal portion is translucent brown. The jaw has eight to ten teeth along its concave edge. There is an oval area of paragnaths near the base of the jaw with eight vertical rows of paragnaths just below it. The head, body, and basal joint of each cirrus are dark brown, while the terminal parts of the cirri and palps are colorless. At the end of the basal joint of each palp is a band of dark-brown spots. Near the apex of the prostomium are a median and two lateral dark patches of pigment with a line extending from each lateral patch nearly to the posterior border of the head. Just behind the anterior border of each somite is a transverse row of dark spots which, throughout the posterior part of the body, terminates in a prominent black spot just dorsal to the parapodium. The first four parapodia show much black pigment in both rami while in the next nine or ten, pigment is present only in the basal portion of the dorsal cirrus. Throughout the posterior part of the body the pigment is arranged in prominent patches, one dorsal and one ventral to the parapodium on the body wall, one on the basal part of the dorsal cirrus, two in the notopodium, and one in the neuropodium.

The first parapodium (pl. 11, fig. 9) has single dorsal and ventral lobes, and narrow postsetal ones. There is a single dense tuft of compound setae of the usual *Nereis* type with rather large terminal joints. The dorsal cirrus extends for more than half its length beyond the parapodium, while the ventral cirrus is hardly longer than the parapodium.

Of the *subsequent parapodia* (pl. 11, fig. 10 of the 8th) those from the fifth to the thirteenth are very thick and fleshy. There are two equal postsetal notopodial lobes, and one large and one very small postsetal neuropodial lobe. In addition; there is an incon-

spicuous presetal cirrus-like lobe. As in the first parapodium, the dorsal cirrus extends for more than half its length beyond the parapodium, while the ventral cirrus is much smaller than that in the first parapodium. The greater number of neuropodial setae each have a short terminal joint provided with a strong apical tooth and a row of sharp spines along one edge (pl. 11, fig. 11), while a few, dorsally located, resemble the notopodial setae in form.

In the type, beginning at about the end of the anterior quarter of the body, each notopodium has a few hooked setae (pl. 11, fig. 12). The posterior parapodial lobes are much more slender than the anterior ones. The anal cirri were absent from the type, but present in a fragment in the same bottle. They are longer than the tentacular cirri, and very slender. On the body wall, at the base of each cirrus, is a very prominent black spot.

Collected from Fort Point, San Francisco Bay.

Type in the Museum of the University of California; co-type in the American Museum of Natural History.

#### Family NEPHTHYDIDAE

I have attempted to distinguish between the species in this collection, though it is probable that Moore (1911, p. 243) is correct in thinking that all of the California species belong to *Nephthys coeca*.

##### ***Nephthys malmgreni* Theel**

*Nephthys longisetosa* Malmgren (1865), p. 106, pl. 12, fig. 20.

*Nephthys malmgreni* Theel (1879), p. 26.

Collected from San Pedro; Point Loma, Ballast Point, Middle Ground, and La Playa in San Diego Bay; also in the following hauls: XLI-1 to 5, in San Diego Bay in 2 to 3 fathoms on coarse sand and broken shells; LXXVI, in San Diego Bay in 2 to 3 fathoms on coarse yellow sand and broken shells; 1632, near Guadalupe Island in 40 fathoms on green mud.

##### ***Nephthys coeca* Fabricius**

*Nereis coeca* Fabricius (1799), p. 185, pl. 4, figs. 24-29.

*Nephthys coeca* Oersted (1843a), p. 41, figs. 73-74, 77, 79-86.

*Nephthys coeca* Malmgren (1865), p. 104, pl. 12, figs. 18-18c.

Collected from Popoff Islands, Alaska; Pleasant Beach, Puget Sound; and Humboldt Bay.

**Nephthys assimilis** Oersted*Nephthys assimilis* Oersted (1843b), p. 33, figs. 93, 100.*Nephthys assimilis* Malmgren (1865), p. 105.

Collected from West Berkeley; Santa Barbara; San Pedro; and Point Loma and Ballast Point in San Diego Bay. Collected also in the following hauls: VI-2, in the outer San Pedro Harbor in 3 fathoms on gray sand; XIII, off San Pedro in 35 to 36 fathoms on sand; LII, in the sand and mud along the shore of San Diego Bay; LXXIII-3, off San Diego in 57 to 106 fathoms on dark-green mud and sand; LXXV, off National City in San Diego Bay on a muddy bottom in 2 to 3 fathoms; LXXIX-1, off San Diego in 63 to 65 fathoms on green mud and broken shells.

**Nephthys incisa** Malmgren*Nephthys incisa* Malmgren (1865), p. 105, pl. 12, figs. 21-21c.

Collected in haul 1165, off La Jolla in 4 to 8 fathoms on soft black shale.

## Family LEODICIDAE

In accordance with the rule of priority, *Eunice* should be replaced by *Leodice* for a generic annelidan term, *Eunice* having been in use for insects prior to its use by Cuvier for annelids. Accordingly *Leodice* will be used in the following descriptions.

**Leodice kobiensis** McIntosh*Eunice kobiensis* McIntosh (1885), p. 278, pl. 38, figs. 12-13; pl. 20a, figs. 1-3.

A single specimen, probably of this species, was collected from Pacific Grove.

**Leodice biannulata** Moore*Eunice biannulata* Moore (1904), p. 484.

Moore states that the nuchal cirri resemble the tentacles. In these specimens they often resemble the dorsal cirri by having no more than three joints. The ventral crochet and aciculum of the middle region of the body are as in figure 13, plate 11, thus not agreeing exactly with Moore's description. These differences, however, do not seem to me to be of specific importance.

Collected from Cape Mendocino; Pacific Grove; White's Point, near San Pedro; and La Jolla. Collected also in the following hauls: II-1, in San Pedro Harbor in 2 fathoms on quantities of sea-weed; XXI-2, off Santa Catalina Island in 43 to 77 fathoms on pebbles and stones; LIX, off the Coronado Islands in 15 fathoms on fine gray sand; LXX-7, off La Jolla in 55 to 125 fathoms on soft black shale; 1155, off La Jolla in 70 fathoms on green mud.

#### **Leodice hawaiiensis Treadwell**

*Eunice hawaiiensis* Treadwell (1906), p. 1166.

Collected in the following hauls: XII-2, off San Pedro in 35 to 175 fathoms on black asphalt rocks, pebbles, coarse sand, and broken shells; XVIII, off San Pedro in 17 to 33 fathoms on sandy mud; LXX-2, off La Jolla in 54 to 98 fathoms on soft black shale; L-5, off La Jolla in 54 to 118 fathoms on mud and soft black shale; LXXX-1, off San Diego in 135 fathoms on greenish-gray mud and sand; 1124, off La Jolla in 160 fathoms on green mud; 1145, off La Jolla in 30 fathoms on sand and mud; 1157, off La Jolla in 160 fathoms on green mud.

#### **Marpphysa californica Moore**

*Marpphysa californica* Moore (1909a), p. 251, pls. 7-8, figs. 13-20.

Moore did not describe the pygidium which was present on some of these forms. Anus dorsally directed, with swollen lips. Two pairs of anal cirri, the dorsal pair being enlarged for about one-third of their length and then, narrowing suddenly, gradually tapering toward their ends. Ventral pair much smaller.

Collected from White's Point, near San Pedro; San Diego; Coronado; and Kakaako Reef, Oahu. Collected also in haul LII. in the mud and sand along the shore of San Diego Bay.

#### **Marpphysa stylobranchiata Moore**

*Marpphysa stylobranchiata* Moore (1909a), p. 249, pl. 7, figs. 8-12.

Apparently the character of the prostomium in this species is subject to considerable variation. The length may be equal to the width, and the groove dividing it into two rings may not be present. Some gills, apparently as an exception, show a bifid character.

Collected from Black Point, San Francisco Bay; Pillar Point, California; Pacific Grove; Deadman's Island, San Pedro; and Coronado.

**Hyalinoecia tubicola** O. F. Müller

*Nereis tubicola* Müller (1787), p. 18, pl. 18, figs. 1–6.

*Hyalinöecia tubicola* Malmgren (1867), p. 181, pl. 9, fig. 49.

Collected in the following hauls: V–1, off San Pedro in 10 to 24 fathoms on gray sand and mud; X, off San Pedro in 19 to 38 fathoms on green mud; XII–2, off San Pedro in 35 to 175 fathoms on black asphalt rocks, pebbles, coarse sand, and broken shells; XIII, off San Pedro in 35 to 36 fathoms on coarse sand; XVIII, off San Pedro in 17 to 33 fathoms on sandy mud; XIX–4, off San Pedro in 30 to 75 fathoms on soft mud, coarse sand, and pebbles; LXXIX–1, off San Diego in 63 to 65 fathoms on green mud and broken shells.

**Diopatra californica** Moore

*Diopatra californica* Moore (1904), p. 484, pl. 37, figs. 1–9.

These differed from Moore's description in that the dorsal cirri of the first somite were always larger, instead of smaller, than the ventral cirri.

Collected from Pacific Grove; Santa Barbara; White's Point, San Pedro; San Diego; and Coronado. Collected also in the following hauls: XIV–1, off San Pedro in 40 to 155 fathoms on soft sticky mud; XIX–1, off San Pedro in 30 to 100 fathoms on soft mud, sand, and pebbles; XLV, about the rocky shore of San Diego Bay; LII, in the mud and sand along the shore of San Diego Bay; 1112, off La Jolla in 45 fathoms on green mud and fine sand; 1632, near Guadalupe Island in 40 fathoms on green mud.

**Northia geophiliformis** Moore

*Northia geophiliformis* Moore (1903), p. 445.

Collected from Bolinas Point; Pacific Grove; and in haul VI–1, in the outer San Pedro Harbor in 3 fathoms on gray sand.

**Northia elegans** Johnson

*Northia elegans* Johnson (1901), p. 406, pl. 8, figs. 77–85.

Collected from Neah Bay, Washington.

**Onuphis parva** Moore

*Onuphis parva* Moore (1911), p. 263, pl. 17, figs. 51–57; pl. 18, figs. 98–99.

Locality unknown.

***Arabella attenuata* Treadwell**

*Arabella attenuata* Treadwell (1906), p. 1172, fig. 62.

Collected from Patrick's Point, California; Pacific Grove; San Pedro; Santa Catalina Island; San Clemente Island; and in haul XLV, along the rocky shore of San Diego Bay.

***Lumbrinereis bifurcata* McIntosh**

*Lumbriconereis bifurcata* McIntosh (1885), p. 241, pl. 36, figs. 10-12; pl. 17a, fig. 16.

Collected in haul X, off San Pedro in 19 to 38 fathoms on mud; and in haul 1102, off La Jolla in 15 to 35 fathoms on sand, mud, and broken shells.

***Lumbrinereis zonata* Johnson**

*Lumbriconereis zonata* Johnson (1901), p. 408, pl. 9, figs. 93-100.

Collected from Tomales Bay; Bolinas Point; Pillar Point, California; Pacific Grove; Moss Beach, Monterey Bay; Santa Barbara; and San Pedro. Collected also in the following hauls; X, off San Pedro in 19 to 38 fathoms on mud; XIV-2, off San Pedro in 25 to 240 fathoms on greenish-brown mud and gray sand; XXXVI-3, off Santa Catalina Island in 60 to 125 fathoms on green mud and sand; LXXII-3, off San Diego in 45 to 50 fathoms on foul, dark-green mud; LXXIV, in San Diego Bay in 1.5 to 2 fathoms on mud and broken shells; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand; 1145, off La Jolla in 30 fathoms on sand and mud.

***Lumbrinereis erecta* Moore**

*Lumbrinereis erecta* Moore (1904), p. 490, pl. 37, figs. 19-22; pl. 38, figs. 23-25.

Following Moore's description I have listed as *Lumbrinereis erecta* all specimens whose heads agreed with the type in structure, and that at the same time showed an unusual development of the dorsal parapodial lobe. In this latter respect there is very great variation. Some specimens have these lobes so large as to overlap the dorsal surface of the body. In others, especially those killed in corrosive, they are much smaller.

Collected from Bolinas Bay; Black Point, San Francisco Bay; Pacific Grove; Santa Barbara; Deadman's Island, San Pedro; La Jolla; San Diego; and Coronado. Collected also in the following

hauls: VI-2, in the outer San Pedro Harbor in 3 fathoms on gray sand; XII-2, off San Pedro in 35 to 175 fathoms on black asphalt rocks, pebbles, coarse sand, and broken shells; XLIII-2, in San Diego Bay in 5 to 8 fathoms on soft black mud; LXX-5, off La Jolla in 54 to 118 fathoms on green mud and soft black shale; LXXV, in San Diego Bay on a muddy bottom in 2 to 3 fathoms; LXXVIII, from the piles of the Santa Fé wharf in San Diego Bay.

**Stauronereis moniloceros** Moore

*Stauronereis moniloceros* Moore (1909a), p. 256, pl. 8, figs. 24-29.

Collected from Point Pinos; and Pacific Grove.

**Ninoe palmata** Moore

*Ninoe palmata* Moore (1903), p. 456, pl. 26, figs. 68-71.

Collected in haul 1112, off La Jolla in 45 fathoms on green mud and fine sand; also one specimen from an unknown locality.

Family GLYCERIDAE

**Glycera rugosa** Johnson

*Glycera rugosa* Johnson (1901), p. 409, pl. 10, figs. 101-102.

Collected from Pleasant Beach, Puget Sound; Tomales Bay; San Pedro; and Point Loma, Zuninga Point, and Coronado in San Diego Bay. Collected also in the following hauls: XXXVI-3, off Santa Catalina Island in 60 to 125 fathoms on green mud and sand; XLI-4 and 5, in San Diego Bay in 2 to 3 fathoms on sand and broken shells; XLIII-1, in San Diego Bay in 3 to 7 fathoms on soft black mud; XLIII-2 and 3, in San Diego Bay in 5 to 8 fathoms on foul black mud; LII, in the mud and sand along the shore of San Diego Bay; LXXIV, in San Diego Bay in 1 to 2 fathoms on mud and broken shells; LXXV, in San Diego Bay on a muddy bottom in 2 to 3 fathoms; 1145, off La Jolla in 30 fathoms on sand and mud.

**Glycera nana** Johnson

*Glycera nana* Johnson (1901), p. 411, pl. 10, figs. 103-103a.

Collected from Salmon Bay and Port Orchard in Puget Sound; San Clemente Island; and in the following hauls: 1112, off La Jolla in 45 fathoms on green mud and fine sand; 1541, off San Clemente Island in 136 to 500 fathoms on green mud.

**Glycera alba Rathke**

*Glycera alba* Rathke (1843), p. 173, pl. 9, fig. 9.  
*Glycera alba* Ehlers (1864), p. 660.

Collected from San Pedro.

**Glycera longipinnis Grube**

*Glycera longipinnis* Grube (1878), p. 182, pl. 8, fig. 9.

Collected from San Pedro.

**Glycera sp.(?) juv.(?)**

Collected in haul LXXVI-2, in San Diego Bay in 2 to 3 fathoms on coarse yellow sand and broken shells.

**Glycera capitata Oersted**

*Glycera capitata* Oersted (1843b), p. 44, pl. 7, figs. 87-88.  
*Glycera capitata* Ehlers (1864), p. 648, pl. 23, figs. 47-49.

Collected from Kodiak Islands and Orca in Prince William Sound, Alaska.

**Goniada brunnea Treadwell**

*Goniada brunnea* Treadwell (1906), p. 1174, figs. 68-70.

Collected from Deadman's Island near San Pedro, and also in haul 1112, off La Jolla in 45 fathoms on green mud and fine sand.

**Goniada annulata Moore**

*Goniada annulata* Moore (1905a), p. 549, pl. 36, figs. 45-48.

Collected in the following hauls: LXX-6, off La Jolla in 54 to 118 fathoms on mud, sand, and adobe shale rock; LXXI, off La Jolla in 15 to 57 fathoms on mud; LXXIII-3, off San Diego in 57 to 97 fathoms on dark green mud and sand; 1112, off La Jolla in 45 fathoms on green mud and sand; 1122, off La Jolla in 100 fathoms on green mud and sand.

**Hemipodia borealis Johnson**

*Hemipodia borealis* Johnson (1901), p. 411, pl. 10, figs. 104-104a.

Collected from Puget Sound; Trinidad; Tomales Bay; Bolinas Bay; San Pedro; San Diego; and in haul XLV, along the rocky shore of San Diego Bay.

## Family ARICIIDAE

***Nainereis longa*** Moore

*Nainereis longa* Moore (1909a), p. 264.

In his description Moore does not mention minute denticulations which appear on the curved neuropodial spines.

Collected from Neah Bay, Alaska; Bolinas Bay; Black Point, San Francisco Bay; Pacific Grove; and Point Loma, San Diego.

***Nainereis robusta*** Moore

*Nainereis robusta* Moore (1909a), p. 262, pl. 8, figs. 34-37.

These, which agreed in other respects with Moore's descriptions, have the second somite continued forward to the posterior edge of the mouth, thus dividing the "posterior ring" of the peristomium into two parts.

Collected from Black Point, San Francisco Bay; and Pacific Grove.

***Scoloplos elongata*** Johnson

*Scoloplos elongata* Johnson (1901), p. 412, pl. 10, figs. 105-110.

Collected from Salmon Bay and Port Orchard, Puget Sound; Tomales Bay (entrance); and Coronado.

***Aricideopsis megalops*** Johnson

*Aricideopsis megalops* Johnson (1901), p. 413, pl. 10, figs. 111-112; pl. 11, figs. 113-114.

Locality unknown.

***Aricia*** sp. (?)

Collected from San Diego, Coronado, and also in haul XLIII-1, in San Diego Bay in 3 to 7 fathoms on soft black mud.

## Family SPIONIDAE

***Spio acuta*** sp. nov.

Pl. 11, figs. 14-20

This species is represented in the collection by two specimens, both of which had lost their posterior ends. The length of the remaining portion is twenty millimeters, and the width one and one-half millimeters. The head (pl. 11, fig. 14) has a very acute prostomium. The

peristomium is relatively long and has a median dorsal elevation which appears like a posterior continuation of the prostomium, and is then itself continued into the base of a conical elevation on the dorsal surface of the first setigerous somite, the general effect being that of a median caruncle extending from the apex of the prostomium to the posterior border of the first setigerous somite (pl. 11, fig. 14). On either side an elevated ridge starts from the anterior face of the peristomium and extends, as a low wing, to the posterior edge of the somite. The tentacles are about four times longer than the head and arise from the posterior end of a depression bounded by the "wing" and the "caruncle." Each tentacle tapers regularly to its apex, with a faint groove on its dorsal surface. There are four small black eyes, the posterior ones being nearer together and a little larger than the anterior ones.

The first setigerous somite has a distinct neuropodium and notopodium, the setigerous lobe of the latter being more prominent than that of the former. Each has a prominent postsetal lobe, that of the notopodium being the larger (pl. 11, fig. 15).

On the second setigerous somite the neuropodial lobe is much longer and has, on one side, a broad wing which forms the gill. On the fifth and sixth somites the neuropodial lobes nearly meet on the mid-dorsal line. Farther back they retain this size though, with increasing width of body, more of the dorsal surface is left uncovered in the mid-line.

When fully developed the parapodium (pl. 11, fig. 16 of the 13th) shows prominent postsetal lobes, but the setae themselves arise directly from the body wall, without any definite setal lobe. The postsetal neuropodial lobe is rounded but not very prominent. The postsetal lobe of the notopodium is drawn out to form a prominent gill composed of a cirrus-shaped ciliated dorsal portion, which contains a blood-vessel in the form of a single loop, and a shorter, flattened ventral portion.

Behind the twenty-fifth somite the neuropodium and notopodium are widely separated so that the former is distinctly ventral and the latter distinctly dorsal. Between them the body-wall is much swollen (glandular?). A low vertical ridge unites the two parts of the parapodium. The gill has a dorsal keel as in the anterior somites, but it is smaller (pl. 11, fig. 18).

The setae of the first setigerous somite are relatively very long and longitudinally striated. Each gently tapers to its apex and has

a small wing along its middle half. Farther back these setae (pl. 11, fig. 17 of the 13th somite) are much stouter and their free portions are scarcely longer than the postsetal lobes. Each has a slight lateral expansion at the point where it leaves the body wall, and tapers from this point to an acute tip. The setae have prominent longitudinal striations. Those in the two lobes of the parapodium are similar, except that the most dorsally placed ones are a trifle longer.

There are only a few ventral setae. In the parapodium figured there were two sharp-pointed setae on its ventral side, each with a subterminal wing (pl. 11, fig. 19), and one, essentially similar in form, on its dorsal side. Between them are three hooded crochets, having obscure terminal teeth covered by a transparent hood (pl. 11, fig. 20). The dorsal setae, which are similar to those of the anterior somites, are longer and more numerous than the ventral ones.

Dorsally, a conspicuous white ridge crosses the middle of each somite.

Collected from San Diego.

Type in the Museum of the University of California; co-type in the American Museum of Natural History.

#### ***Scolecolepis alaskensis* sp. nov.**

Pl. 12, figs. 21, 22

No specimen was entire. In the type, a fragment of the anterior end measured eighty millimeters for the first 130 somites. The width of the head, at its base, was five, and that of the second somite, eight millimeters. From here the width gradually increased to thirteen millimeters at the one hundred and thirtieth somite. Another specimen was considerably larger than the type.

The head is roughly triangular in form and is divided, by two deep grooves, into a median caruncle-like portion and two lateral areas (pl. 12, fig. 21). There are two tentacles (not shown in the figure) situated in deep depressions at the posterior end of the head. The median caruncle-like area is continued backward between the bases of the tentacles, ending in a slightly elevated free fold. Anterior to each tentacle the outer wall of the groove lies against the "caruncle," but just in front of each it bends abruptly outward and expands into an elevated wing-like outer wall to the tentacular pit. Each tentacle has an erect bulbous base and a gently tapering terminal

portion, which is deeply grooved on its dorsal surface and extends to the eighteenth setigerous somite. The anterior end of the "caruncle" is provided with a median papilla. The pharynx was partly protruded and showed a much pigmented inner surface. Eyes were not observed.

The peristomium is fused ventrally with the first setigerous somite so that the latter seems to be situated on top of the former. The ventral surface of the peristomium has numerous longitudinal grooves which converge toward the margin of the mouth. The lateral and dorsal lips are very rugose, possibly due to the partial protrusion of the pharynx.

The first setigerous somite is fused ventrally with the peristomium, while dorsally its posterior margin is even with the posterior edge of the tentacle. The neuropodium is a low papilla, having a postsetal lobe extending to the end of the setae. The notopodium, a rounded papilla, is much shorter than the neuropodium, and has small postsetal lobes and few setae.

The second setigerous somite is not entirely distinct from the peristomium on its ventral surface, but is more distinct laterally. The neuropodium is larger than that of the first somite but otherwise resembles it. The notopodium has a rounded presetal lobe and a flat, curved gill, which extends dorsally about as far as the middle of the tentacle. The anterior edge of the gill is smooth, while its posterior edge is convex and frilled.

The later parapodia increase in prominence and the postsetal lobes of both neuropodium and notopodium become thick vertical plates separated from one another only by a very narrow space (pl. 12, fig. 22). The body gradually alters its shape until, at the twenty-fifth somite, it assumes a rectangular form, its lateral surfaces being composed of the vertically arranged parapodia. The width of this rectangle is about twice its height. The gills in each parapodium are continuations of the postsetal notopodial plate. They become more nearly cylindrical toward the middle of the body, and lie close to the dorsal surface with their long axes at right angles to that of the body, leaving an uncovered area about equal to half of the diameter of the body.

The posterior end of only one specimen was found, and it lacked the pygidium. On this fragment the gills disappear quite abruptly at a considerable distance from the end, and the neuropodial and notopodial lobes are very small. The setae are arranged in a single vertical row in each lobe of the parapodium, the most dorsally placed noto-

podial tuft being the longest of any. Each seta curves gently to an acute apex. In formalin the body is a uniform light brown.

Type collected from Shumagin, Alaska; others from the Popof Islands of the Shumagin group.

Type in the Museum of the University of California; co-type in the American Museum of Natural History.

**Polydora californica** sp. nov.

Pl. 12, figs. 23-29

This species is represented by an incomplete specimen having a body-width of rather less than one millimeter.

The head has a median "caruncle" which protrudes anteriorly beyond the margin of the head, and extends to between the bases of the tentacles. On either side of this "caruncle" there is a flattened wing-like area, and the apices of these two areas, together with the end of the median lobe, from the anterior margin of the head (pl. 12, fig. 23). On either side of the median lobe is a dark brown band of pigment. The tentacles are three millimeters long, or six times longer than the head, and their width, at their bases, is about one quarter that of the head. There are two pairs of small black eyes concealed by the bases of the tentacles.

The anterior end of the body is flattened dorsally, gills appearing on the second setigerous somite. At first these gills are lateral and those on opposite sides of the same somite are separated by a considerable space. In later somites they gradually approach the dorsal surface, becoming strictly dorsal in the fifteenth somite. The gills are at first very short, but increase in length up to the seventh pair, which meet on the mid-dorsal line. Toward the posterior end the gills are smaller and are entirely missing on at least the last eighteen somites.

The fifteenth and later somites are nearly circular in cross section, except at the very posterior end, which is again flattened. For the first fifteen somites the only color is in the gills, which are dark brown. From the fifteenth to the fiftieth somite the dorsal surface is light reddish-brown, broken by a median colorless band and by a similar colorless line marking the somite boundary. The remainder of the animal is colorless. The body noticeably narrows toward the posterior end but the pygidium was not preserved.

The first parapodium is inconspicuous and its notopodial setae lie just ventral to the bases of the tentacles. The neuropodium and notopodium are each provided with a postsetal lobe, that of the notopodium

being more conical and having a narrower base than that of the neuropodium. In the notopodium there is a dorsal tuft of three or four long slender setae, each of which gently tapers to an acute point and has a narrow wing towards its apex. There is also a ventral tuft of shorter setae, similar in form to the dorsal ones, but somewhat stouter. In the neuropodium there is a double row of stout, curved, and sharp-pointed setae, each having a narrow wing along its curved edge (pl. 12, fig. 24). All setae show a tendency to fray along the edges, possibly as a result of the pressure of the cover glass.

The second parapodium is essentially similar, in general outline and in character of setae, to the first, but is much more prominent. On its dorsal surface there is a short, thick, finger-shaped gill containing very prominent blood vessels. The third parapodium is similar to the second in outline, but its gill is somewhat larger (pl. 12, fig. 25). The relative lengths of the setae are shown in this figure, but not their form. The setae are similar to those of the anterior somites, but are covered with fine fuzzy processes, due either to a deposit from the outside, or to their breaking up.

The spines of the sixth setigerous somite are of two kinds; one (pl. 12, fig. 26) gently curved to a blunt point; the other broadened at its apex and cut across so that one edge is prolonged into a rounded flat region, from the base of which numerous hair-like processes arise (pl. 12, fig. 27). The base of each spine is dark brown and its apex is yellow. Behind this somite the ventral setae are replaced by hooks, each with a well developed hood (pl. 12, figs. 28, 29), while the dorsal setae are like those of the anterior somites.

The specimen was taken from a tangled mass of tubes apparently constructed by the Polydora. No locality was recorded.

Type in the Museum of the University of California.

#### Family CHAETOPTERIDAE

##### ***Chaetopterus variopedatus* Renier**

*Tricoelia variopedatus* Renier (1804).

*Chaetopterus pergamentaceus* Aud. et Milne Edwards (1834), p. 281, pl. 8, figs. 1-4.

*Chaetopterus variopedatus* Claparède (1869), p. 78.

*Chaetopterus variopedatus* Joyeux-Laffuie (1890), p. 347.

*Chaetopterus variopedatus* Enders (1909), p. 481.

The California specimens belong to the species commonly called *C. pergamentaceus*, but as Joyeux-Laffuie (1890) has shown, the

European *C. pergaminateus* is synonymous with *C. variopedatus*. Enders (1909) concluded also that the species found on the eastern coast of the United States is *C. variopedatus*. I have compared the California specimens with a specimen from Naples, labeled *C. variopedatus*, and find no essential differences between them.

Frequent in collections from San Diego and San Pedro.

#### Family CIRRATULIDAE

##### ***Cirratulus cingulatus* Johnson**

*Cirratulus cingulatus* Johnson (1901), p. 422, pl. 14, figs. 145-148.

Collected at Puget Sound; Pillar Point, California; Point Loma, San Diego.

##### ***Cirratulus spirabranchus* Moore**

*Cirratulus spirabranchus* Moore (1904), p. 492, pl. 38, figs. 26-27.

Collected from Bolinas Bay; Pacific Grove; Santa Barbara; San Pedro; and also in haul LIV, on the sand bar at the entrance to San Diego Bay in 2 to 4 fathoms.

##### ***Cirratulus robustus* Johnson**

*Cirratulus robustus* Johnson (1901), p. 423, pl. 14, figs. 149-150.

Collected from Kodiak Islands, Alaska; Bolinas Bay; Pacific Grove; and San Pedro.

##### ***Cirratulus luxuriosus* Moore**

*Cirratulus luxuriosus* Moore (1904), p. 493, pl. 38, figs. 28-31.

The distinction between this species and *C. spirabranchus* did not always seem to me to be clear. I have separated the two chiefly on the position of the gills, these being on the fourth setigerous somite in *C. luxuriosus* and on the seventh in *C. spirabranchus*.

Collected from Pillar Point, California; Pacific Grove; White's Point and Terminal Island, near San Pedro; and also in haul XLI-4, in San Diego Bay in 2 to 3 fathoms on sand and broken shells.

##### ***Cirratulus* sp. (?)**

Collected in haul LXX-5, off La Jolla in 54 to 118 fathoms on mud and soft black shale.

**Tharyx multifilis** Moore

*Tharyx multifilis* Moore (1909a), p. 267, pl. 9, fig. 43.

Collected from San Pedro and also in haul 1155, off La Jolla in 70 fathoms on green mud.

**Chaetozona spinosa** Moore

*Chaetozona spinosa* Moore (1903), p. 468, pl. 26, figs. 73-74.

Collected in haul XLII, in San Diego Bay in 3 to 7 fathoms on soft black mud; and in haul XLIII-1, in San Diego Bay in 3 to 7 fathoms on soft black mud.

## Family MAGELONIDAE

**Magelona longicornis** Johnson

*Magelona longicornis* Johnson (1901), p. 414, pl. 11, figs. 115-118

Collected from Kumnes Point, and San Pedro.

## Family AMMOCHARIDAE

**Ammochares occidentalis** Johnson

*Ammochares occidentalis* Johnson (1901), p. 420, pl. 14, figs. 140-142.

Collected from Sitka Harbor, Alaska; and Timm's Flats and Sand Flats near San Pedro.

## Family TEREBELLIDAE

**Amphitrite palmata** Moore

*Amphitrite palmata* Moore (1905c), p. 858, pl. 44, figs. 19-22.

Collected from Yakutat, Alaska.

**Amphitrite spiralis** Johnson

*Amphitrite spiralis* Johnson (1901), p. 426, pl. 16, figs. 169-171c.

Collected from Port Orchard, Channel Rocks, and Pleasant Beach in Puget Sound; Trinidad; Patrick's Point, Humboldt County; Santa Barbara; Point Loma and vicinity in San Diego Bay; and Coronado. Also in shore collection at Station VIII at San Pedro.

**Amphitrite robusta** Johnson

*Amphitrite robusta* Johnson (1901), p. 425, pl. 16, figs. 164-168.

Collected from Port Orchard and Pleasant Beach in Puget Sound; Patrick's Point, Humboldt County; Lime Point, San Francisco Bay;

San Pedro; and San Diego Bay. Collected also in haul LXVII, off San Diego in 19 to 31 fathoms on grayish-yellow sand; and in haul LXX-5, off La Jolla in 54 to 118 fathoms on green mud and soft black shale.

**Terebella californica** Moore

*Terebella (Schmardanella) californica* Moore (1904), p. 496, pl. 38, figs. 36-37.

Collected from Pillar Point, California; San Pedro; and False Bay, and Point Loma near San Diego.

**Terebella** sp. (?)

Tubes only, collected in haul 1555, off San Clemente Island in 50 fathoms on coarse sand.

**Lanice heterobranchia** Johnson

*Lanice heterobranchia* Johnson (1901), p. 427, pl. 17, figs. 172-174.

Collected from Puget Sound; Patrick's Point, Humboldt County; Trinidad; Cape Mendocino; Tomales Bay; Pillar Point, California; Pacific Grove; San Pedro; and San Diego Bay. Collected also in the following hauls: XLVI-2, off Coronado in 5 to 6 fathoms on sand; LIX, off the Coronado Islands in 15 fathoms on fine gray sand; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand.

**Thelepus crispus** Johnson

*Thelepus crispus* Johnson (1901), p. 428, pl. 17, figs. 175-178b.

All of these agreed with Johnson's description in the character of gills and setae, and in the general form of the body. I did not find uncini in two rows in any somite, and the body is apt to narrow posteriorly more than is stated in Johnson's description. The number of posterior somites free from setae was greater than in Johnson's description.

Collected from Yakutat and Neah Bay, Alaska; Puget Sound; Cape Mendocino; Bolinas, Duxbury Reef; Point Cavallo, San Francisco Bay; Pillar Point, California; Pacific Grove; Deadman's Island, White's Point, and Timm's Point near San Pedro; Avalon, Santa Catalina Island; False Bay, near San Diego; Point Loma, Zuninga Point, and Ballast Point in San Diego Bay; and San Clemente Island. Collected also in haul L-1, off San Diego in 21 to 28 fathoms on rocks; in haul LXXXIII, off San Pedro in 110 to 240 fathoms on sand and broken shells; and in haul 1238, on sand flats in San Diego Bay.

**Thelepus hamatus** Moore

*Thelepus hamatus* Moore (1905c), p. 856, pl. 44, figs. 16-18.

Collected in haul XXVI-1, off Santa Catalina Island in 46 to 49 fathoms on sand.

**Pista alata** Moore

*Pista alata* Moore (1909a), p. 273, pl. 9, figs. 48-51.

Collected from San Pedro; San Diego; and San Clemente Island. Collected also in the following hauls: XIV-1, off San Pedro in 40 to 155 fathoms on soft sticky mud; XIX-1, off San Pedro in 30 to 100 fathoms on soft mud, sand, and pebbles; L-1, off San Diego on a rocky bottom in 21 to 28 fathoms; 1102, off La Jolla in 15 to 35 fathoms on sand, mud, and broken shells; 1157, off La Jolla in 160 fathoms on green mud.

**Pista elongata** Moore

*Pista elongata* Moore (1909a), p. 270, pl. 9, figs. 45-47.

Collected from San Diego and San Clemente Island.

**Pista typha** Grube

*Pista typha* Grube (1878), p. 232, pl. 12, fig. 4.

Collected in haul 1157, off La Jolla in 160 fathoms on green mud.

**Pista** sp.(?)

Collected in haul LXX-5, off La Jolla in 54 to 118 fathoms on mud and soft black shale; and in haul LXX-6, off La Jolla in 54 to 125 fathoms on mud, sand, and soft black shale.

**Polycirrus californicus** Moore

*Polycirrus californicus* Moore (1909a), p. 276, pl. 9, figs. 52-53.

Collected from Portuguese Bend; San Pedro; and Coronado.

**Streblosoma crassibranchia** sp. nov.

Pl. 12, figs. 30, 31

The definition of this species is provisional, for it depends upon a single imperfect specimen. Its total length was twelve millimeters and its greatest width not more than one millimeter.

The prostomium is prominent and its sides are folded almost at right angles to its dorsal portion so that, together with the lower lip, they enclose a rectangular area. The lower lip is fleshy and rather prominent. The tentacular ridge is moderately developed, with a dense row of minute dark spots extending to the ends of the lower lip. The tentacles are more than one-third longer than the body and the width of each, at its base, is about one-eighth that of the body; they narrow very little toward their ends. The specimen had six tentacles in a row on the right and five on the left. The two most ventral ones of the left row were very small, and were possibly regenerating. There are three pairs of cirriform gills. The anterior pair have five cirri on either side, extending to the base of the tentacles. The middle pair have four cirri on either side, and are slightly more than half as long as the anterior pair. The posterior pair are nearly as long as the middle pair and have three cirri on the left and one on the right. It is not probable that these numbers are constant.

Setae begin on an elevated ridge on the second somite and extend for eighteen somites. The body, behind this point, was much smaller than anteriorly and no setae were seen on it. It was possibly regenerating. The setae (pl. 12, fig. 30) are short with lance-shaped ends, and are arranged in a dense bundle. The uncus is provided with a large terminal hook, and the crest is composed of two larger lateral and three smaller median teeth (pl. 12, fig. 31).

Locality (?). Type in the Museum of the University of California.

#### Family AMPHARETIDAE

##### ***Amage tumida* Ehlers**

*Amage tumida* Ehlers (1887), p. 220, pl. 48, figs. 10-19.

These differ from Ehler's description in the number of somites, but it seems best to list the three specimens in the collection with Ehler's species.

Collected in haul 1112, off La Jolla in 45 fathoms on green mud and fine sand; and in haul 1123, off La Jolla on a muddy bottom in 160 fathoms.

##### ***Amphicteis alaskensis* Moore**

*Amphicteis alaskensis* Moore (1905c), p. 846, pl. 44, figs. 1-4.

Collected in haul LXX-5, off La Jolla in 54 to 118 fathoms on mud and soft black shale.

**Amphicteis japonica McIntosh**

*Amphicteis japonica* McIntosh (1885), p. 431, pl. 27a, figs. 3-5.

Collected in haul LXX-6, off La Jolla in 54 to 125 fathoms on mud, sand, and soft black shale; and in haul LXXXIII-1, off San Diego in 106 to 132 fathoms on fine gray sand.

**Amphicteis glabra Moore**

*Amphicteis glabra* Moore (1905c), p. 849 pl. 44 figs. 5-8.

Collected in the following hauls: XIV-3, off San Pedro in 40 to 150 fathoms on gray mud; XLII-1, in San Diego Bay in 3 to 7 fathoms on soft black mud; LXXXIII-1, off San Diego in 106 to 132 fathoms on fine gray mud; LXXXIV, in San Diego Bay in 1 to 2 fathoms on mud and broken shells; 1124 and 1157, off La Jolla on a muddy bottom in 160 fathoms.

**Amphicteis scaphobranchiata Moore**

*Amphicteis scaphobranchiata* Moore (1906), p. 255, pl. 12, figs. 54-61.

In minor details these differ from Moore's description. The paleoli often taper, at the end, in much more abrupt fashion than he figures, and the peristomium shows transverse wrinkles on its dorsal surface. The peculiarly shaped median branchia, which Moore thought might not be normal, has this form wherever it appears, and is apparently perfectly normal.

Collected in the following hauls: XII-2, off San Pedro in 35 to 175 fathoms on black asphalt rocks, pebbles, coarse sand, and broken shells; XVIII, off San Pedro in 17 to 33 fathoms on sand and mud; XLII, in San Diego Bay in 3 to 7 fathoms on soft black mud; LXX-6, off La Jolla in 54 to 125 fathoms on mud, sand, and soft black shale.

**Ampharete arctica Malgren**

*Ampharete arctica* Malmgren (1864), p. 364, pl. 26, figs. 77-77d.

Collected in haul VI-1, in the outer San Pedro Harbor in 9 fathoms on gray sand.

**Melinna denticulata Moore**

*Melinna cristata* Moore (1905c), p. 851, pl. 44, figs. 9-10 (name preoccupied).

*Melinna denticulata* Moore (1908b), p. 349.

Collected in haul LXXX-1, off San Diego in 135 fathoms on fine greenish-gray mud and sand; and in haul 1157, off La Jolla on a muddy bottom in 160 fathoms.

**Sabellides anops** Johnson

*Sabellides anops* Johnson (1901), p. 424, pl. 15, figs. 157-161; pl. 16, figs. 162-163.

Collected from San Pedro; in haul 1102, off La Jolla in 15 to 35 fathoms on sand, mud, and broken shells; and in haul 1124, off La Jolla on a muddy bottom in 160 fathoms.

**Sabellides auricula** Malmgren

*Amage auricula* Malmgren (1864), p. 371, pl. 25, figs. 72-72d.

Collected in haul LXXIII-3, off San Diego in 57 to 106 fathoms on dark-green mud and fine sand.

## Family AMPHICTENIDAE

**Pectinaria brevicoma** Johnson

*Pectinaria brevicoma* Johnson (1901), p. 423, pl. 15, figs. 151-156.

Collected from Berg Bay, Glacier Bay, Wrangell, and Kodiak Islands in Alaska; Santa Barbara; and San Pedro. Collected also in the following hauls: X, off San Pedro on a muddy bottom in 19 to 38 fathoms; XIV-1, off San Pedro in 40 to 155 fathoms on soft, sticky mud; XIV-2, off San Pedro in 25 to 240 fathoms on greenish-brown mud and gray sand; XIV-3, off San Pedro in 40 to 150 fathoms on gray mud; XVIII, off San Pedro in 17 to 33 fathoms on sandy mud; XX, off San Pedro in 50 to 100 fathoms, bottom not recorded; XLII, in San Diego Bay in 3 to 7 fathoms on soft black mud; XLIII-1, in San Diego Bay in 3 to 7 fathoms on soft black mud; XLIII-2, in San Diego Bay in 5 to 8 fathoms on soft black mud; LXII, off San Diego in 16 to 18 fathoms on gray sand; LXX-1, off La Jolla in 56 to 137 fathoms on rocks; LXX-5, off La Jolla in 54 to 118 fathoms on mud and soft black shale; LXX-6, off La Jolla in 54 to 125 fathoms on mud, sand, and soft black shale; LXXII-3, off San Diego in 45 to 50 fathoms on foul, dark-green mud; LXXIII-1, off San Diego in 106 to 132 fathoms on fine gray sand; LXXIII-2 and 3, off San Diego in 57 to 106 fathoms on green mud and sand; LXXX-2, off San Diego in 125 fathoms on fine mud and sand; LXXXII-2, off Point Firmin in 30 to 31 fathoms; 1112, off La Jolla in 45 fathoms on green mud and fine sand; 1122, off La Jolla in 100 fathoms on green mud and fine sand; 1124 and 1157, off La Jolla on a muddy bottom in 160 fathoms.

**Cistenides hyperborea** Malmgren*Cistenides hyperborea* Malmgren (1864), p. 360, pl. 18, figs. 40-40e.

Collected from Kodiak Islands in Alaska.

## Family CAPITELLIDAE

**Dasybranchus glabrus** Moore*Dasybranchus glabrus* Moore (1909a), p. 280, pl. 9, fig. 58.

Moore's description was based on a single specimen forty-five millimeters long. The specimens in the collections which seem to belong to this species were much longer, some sexually mature forms measuring three hundred millimeters. The inflated hoods surrounding the ends of the abdominal crochets are not smooth as figured by Moore, but, instead, each has a transverse row of short sharp teeth on its end.

Collected from Deadman's Island; San Pedro; and San Clemente Island.

**Dasybranchus giganteus** Moore*Dasybranchus giganteus* Moore (1909a), p. 278, pl. 9, fig. 56.

Collected from Coronado and San Clemente Island.

**Notomastus tenuis** Moore*Notomastus tenuis* Moore (1909a), p. 277, pl. 9, fig. 55.

Locality unknown.

## Family CHLORHAEMIDAE

**Trophonia papillata** Johnson*Trophonia papillata* Johnson (1901), p. 416, pl. 12, figs. 122-123.

Collected from Trinidad; Shelter Cove; Tomales Bay; La Jolla; and San Diego. Collected also in haul XLII, in San Diego Bay in 3 to 7 fathoms on soft black mud; and in haul LXX-7, off La Jolla on a rocky bottom in 55 to 125 fathoms.

**Trophonia capulata** Moore*Trophonia capulata* Moore (1909a), p. 284, pl. 9, figs. 60-61.

Collected from Portuguese Bend; and in haul X, off San Pedro on a muddy bottom in 19 to 38 fathoms.

**Trophonia minuta** sp. nov.

Pl. 12, fig. 32

Total length not over fifteen millimeters. Its much flattened anterior end was smoothly beveled dorsally, and covered with fine sand-grains. The remainder of the body is circular in outline on cross-section and of nearly uniform diameter back to about the twenty-fifth somite, where it abruptly narrows to not more than a quarter of its former width. There is a row of inconspicuous papillae along the anterior dorsal edge of each somite, and the first six or seven somites have a similar row of minute papillae along their anterior ventral edges. Otherwise the whole surface of the somites is smooth. The posterior end of the animal was lacking in all specimens.

Anterior tufts of setae are prominent and half as long as the entire body. The dorsal setae of the remainder of the body are very short, fine, delicate, and capillary, but otherwise essentially like the anterior setae in form. There are three ventral hooks in a vertical row on each somite, the most dorsal one being the longest, while the two others are successively shorter and stouter (pl. 12, fig. 32). The head was retracted in all specimens.

Moore (1909a, p. 284) lists *Trophonia papillata*, Johnson, and notes that one specimen was small and poorly preserved, possibly being a new species. *T. minuta* is probably the same species as this new one mentioned by Moore, and differs from other California *Trophonia* thus far described in the very feeble development of the papillae. That they are adults and not, as I at first supposed, immature forms is shown by the fact that one was full of eggs.

Collected in haul 1147, off La Jolla in 10 fathoms.

Type in the Museum of the University of California; co-type in the American Museum of Natural History.

**Trophonia inflata** sp. nov.

Pl. 12, fig. 33

The type is eighteen millimeters long and five millimeters wide at about one-fourth of its length behind the head. The diameter of the head is about four millimeters. The posterior end of the body is very narrow, barely 0.5 mm. wide at its end. This inflated condition is unusual and may be due to the method of preservation. The anterior setae are delicate and about twelve millimeters long. The

tentacles are very slender and one-third as long as the anterior setae. They are apparently unequal in size and their exact number was not easy to determine in preserved material. The palps are much thicker than the tentacles and one-half as long as the longest one. Each is provided with lobulated edges and a ventral groove.

The anterior end is noticeably truncated dorsally, the truncated portion being covered with a dense layer of sand grains. A much thinner outer coating covers the remainder of the body, the papillae being clearly seen through it. For about the first ten somites these papillae form a fringe along the anterior border of each somite. Farther back the papillae become less prominent and are distributed over most of the surface of the somite. Larger papillae are arranged so that those of successive somites form a row about midway between the neuropodium and the mid-ventral line on either side. Another series of papillae form an incomplete row on either side, ventral to the others. On the ventral margin of the head there are about six prominent papillae just ventral to the palps. The dorsal papillae are essentially similar to the lateral and ventral ones, except that none is especially prominent. Clumps of papillae accompany the setae tufts, the largest forming a longitudinal row ventral to the neuropodium.

The anterior neuropodial setae are slender and elongated, their joints being six to eight times longer than broad. Farther back they become exceedingly delicate, and are especially liable to be lost when the sandy covering of the body is scraped away. The notopodial setae are also very delicate at the anterior end of the body, but are replaced by hooks at about the sixth somite. These are at first arranged in transverse rows of three or four, but the number becomes smaller toward the posterior end. The hooks (pl. 12, fig. 33) are pale yellow with smooth bases. Each gently curves toward its bluntly rounded apex, and is without accessory processes.

The type was collected from Santa Catalina Island. Others were collected from Portuguese Bend; San Diego; and in haul L-1, off San Diego on a rocky bottom in 21 to 28 fathoms.

Type in the Museum of the University of California; co-type in the American Museum of Natural History.

***Flabelligera infundibularis* Johnson**

*Flabelligera infundibularis* Johnson (1901), p. 417, pl. 12, figs. 124-127.

Collected from Yakutat and Kodiak Islands, Alaska; and Scow Bay and other points in Puget Sound.

**Brada pilosa** Moore

*Brada pilosa* Moore (1906), p. 231, pl. 10, figs. 14-17.

Collected in the following hauls: XLII and XLIII-1, in San Diego Bay in 3 to 7 fathoms on soft black mud; XLIII-3, in San Diego Bay in 5 to 8 fathoms on soft black mud.

**Brada granulata** Malmgren

*Brada granulata* Malmgren (1867), p. 194, pl. 13, figs. 71-71d.

Collected at Orea in Prince William Sound, Alaska.

## Family STERNASPIDAE

**Sternaspis fessor** Stimpson

*Sternaspis fessor* Stimpson (1853), p. 29, fig. 19.

Abundant in the collections, and apparently identical with the Atlantic species. Collected from Sitka, Alaska, and in the following hauls: X, off San Pedro on a muddy bottom in 19 to 38 fathoms; XII-2, off San Pedro in 35 to 175 fathoms on black asphalt rocks, pebbles, coarse sand, and broken shells; XIII, off San Pedro on a sandy bottom in 35 to 36 fathoms; XIV-2, off San Pedro in 25 to 240 fathoms on greenish-brown mud and gray sand; XIX-3, off San Pedro in 30 to 77 fathoms on soft mud, coarse sand, and pebbles; XX, off Santa Catalina Island in 50 to 100 fathoms; XXI-1, off Santa Catalina Island in 43 to 58 fathoms on green mud, sand, and pebbles; XXX-1, off Santa Catalina Island in 62 fathoms on rock; XXXV, off Ballast Point, Santa Catalina Island in 6 to 30 fathoms on green mud; LXX-5, off La Jolla in 54 to 118 fathoms on mud and soft black shale; LXXI, off La Jolla on a muddy bottom in 15 to 56 fathoms; LXXIII-2 and 3, off San Diego in 57 to 106 fathoms on green mud and sand; LXXX-2, off San Diego in 125 fathoms on mud and fine sand; 1102, off La Jolla in 15 to 35 fathoms on sand, mud, and broken shells; 1112, off La Jolla in 45 fathoms on green mud and fine sand; 1145, off La Jolla on a muddy bottom in 30 fathoms.

## Family OPHELLIDAE

**Travisia pupa** Moore

*Travisia pupa* Moore (1906), p. 228, pl. 11, fig. 23.

Collected in the following hauls: XII-2, off San Pedro in 35 to 175 fathoms on black asphalt rocks, pebbles, coarse sand, and broken

shells; XIV-2, off San Pedro in 25 to 240 fathoms on greenish-brown mud and gray sand; XIX-3, off San Pedro in 30 to 77 fathoms on soft mud, coarse sand, and pebbles; LXX-3, off La Jolla in 55 to 108 fathoms on rocks and fine mud; LXXII-2, off San Diego in 47 to 51 fathoms on soft gray mud; LXXII-4, off San Diego in 36 to 47 fathoms on mud; LXXIII-3, off San Diego in 57 to 106 fathoms on dark-green mud and sand; 1157, off La Jolla on a muddy bottom in 160 fathoms; 1475 and 1497, off La Jolla on a sandy bottom in 50 to 100 fathoms.

#### **Ammotrypane brevis** Moore

*Ammotrypane brevis* Moore (1906), p. 354, fig. 1.

Collected from San Pedro.

#### **Ammotrypane gracile** McIntosh

*Ammotrypane gracile* McIntosh (1885), p. 357, pl. 43, figs. 9, 12.

Collected from Pacific Grove; Deadman's Island, San Pedro; San Diego; and Coronado. Collected also in the following hauls: XXXIV, off Santa Catalina Island in 90 to 125 fathoms on green mud and sand; LXXIII-3, off San Diego in 57 to 106 fathoms on dark-green mud and sand; 1112, off La Jolla in 45 fathoms on green mud and fine sand.

#### **PolyophtHALAMUS australis** Grube

*PolyophtHALAMUS australis* Grube (1878), p. 196, pl. 10, fig. 4.

Collected from White's Point and vicinity near San Pedro; and in haul LXXVIII, from the piles of the Santa Fé wharf in San Diego Bay.

#### **Ophelina magna** sp. nov.

Pl. 12, figs. 34-36

The body is ninety millimeters long and eight millimeters wide at its widest point, the sixth setigerous somite. There are forty-eight somites and thirty-one pairs of gills, the first pair being on the eleventh somite.

The prostomium is smooth and bluntly conical (pl. 12, fig. 34). On either side of its base is a prominent sensory pit. The peristomium is marked, dorsally, by a longitudinal groove on either side, which is continued posteriorly into a groove just dorsal to the setae

tufts. Its dorsal surface is also marked with transverse annulations, the posterior border of each slightly overlapping the one behind it so as to resemble clapboards. These annulations are found in succeeding somites, but their overlapping is less marked posteriorly.

The mouth has prominent anterior and posterior lips. Two grooves, appearing at the base of the prostomium, diverge to pass along the lateral edges of the mouth and, continuing posteriorly, form the lateral edges of the ventral "sole." Both dorsal and ventral lips are provided with many small scale-like epidermal thickenings arranged in rows resembling the pavement teeth of an elasmobranch.

The ventral surface of each of the first seven setigerous somites is flat, and divided on either side by a longitudinal furrow. Behind the seventh somite the whole surface of each is much depressed, forming, in preserved material, a deep longitudinal groove which extends to the posterior end of the body. All somites are annulated. Anteriorly, each has three annulations, of which the first and third are biannulate on the dorsal surface. The ventral surface retains the triannulate condition throughout the entire body except for the last four or five somites, where it disappears. Dorsally, the surface first becomes quadriannulate, then biannulate, and the annulations finally disappear entirely in the last nine somites.

The anus is posterior and is surrounded by a ring of about thirty cirri, of which the two ventral ones are much longer than the others. The cirri are thick and almost spherical in form.

On the ninth and tenth setigerous somites there are numerous small glands, the openings of which extend nearly to the mid-dorsal line. They are especially numerous on the tenth somite, where the skin containing them shows a swollen area.

The parapodia have two thick presetal lobes throughout the body. The setae of the first setigerous somite are arranged in a dorsal and ventral bundle, each containing about fifteen. Each dorsal seta is long and curves gently to a moderately acute apex. Each has a narrow wing on its convex surface which does not continue to its apex (pl. 12, fig. 35). The basal portion of each has minute longitudinal striations. Most of the ventral setae were broken, but those which remained were similar in form to the dorsal ones.

Farther back, the setae become more prominent (pl. 12, fig. 36, a parapodium of the 14th somite). Ventrally there is a tuft of setae essentially like those of the first setigerous somite. At first the dorsal tuft has a few setae like those of the ventral tuft, but, dorsal to these,

are some very long thread-like setae which extend beyond the apex of the gill. These thread-like setae are noticeably longitudinally striated, but have no lateral wing.

Each gill is finger-shaped and much wrinkled (possibly a result of preservation). They are of uniform length throughout except for the last pair, which are noticeably smaller. Dorsal to the gills are many small spots, apparently the openings of epidermal glands.

Collected in the following hauls: VI-1, in the outer San Pedro Harbor in 3 fathoms on gray sand; XXXII, off Santa Catalina Island in 12 to 40 fathoms on green mud and sand; XLI-1 to 3, in San Diego Bay in 2 to 3 fathoms on coarse sand and broken shells; 252, in San Diego Bay in 3 to 5 fathoms on sand and mud. The type was from an unknown locality.

Type in the Museum of the University of California; co-type in the American Museum of Natural History.

#### ***Ophelina mucronata* sp. nov.**

Pl. 12, figs. 37, 38

The length of specimens of this species varies with the degree of expansion. A slender one, apparently much expanded, measured thirty-five millimeters in length, and barely one millimeter in width, while the type was twenty-five millimeters long and two millimeters wide.

The head is almost an equilateral triangle having rounded basal angles and an apex prolonged into a short sharp-pointed process. There is a pair of very faintly indicated sensory spots on its dorsal surface (pl. 12, fig. 37). The mouth is situated barely one-half the length of the head behind its apex. The pharynx, when protruded, consists of three broad foliaceous lobes. Behind the mouth the ventral surface of the head is very much swollen. The first setigerous somite is not sharply separated from the prostomium, and that portion anterior to the seta tuft is broader than the rest and continuous with the swollen sides of the head, so that the first setae apparently arise at the boundary between the swollen head and this somite. The setae of the first tuft are more prominent than of the immediately following ones.

The body consists of about thirty-four somites, though it is not easy to be accurate on this point because of the difficulty in discerning the somite boundaries towards the posterior end of the body. For the first twelve setigerous somites the body is nearly circular in cross-

section, its ventral surface is flattened, and its somite boundaries are indistinct and marked, chiefly, by the position of the setae tufts. On either side of the ninth somite there is a vertical torus-like glandular swelling. Gills begin on the twelfth somite and the body changes in appearance, due to the occurrence of a deep ventral and two shallow lateral grooves. Its dorsal surface is more convex and is provided with definitely arranged transverse markings which, in the non-pigmented forms, appear as five narrow white bands in each somite, the one nearest the gill being the largest. Behind the last pair of gills the lateral grooves become less prominent and the whole body enlarges. In preserved material, the terminal portion of the body appears as a narrow, three-ringed area invaginated into a swollen area just anterior to it. On either side, this carries a bundle of long, delicate, and pointed setae. The pygidium has a ventral cirrus. The base of the cirrus is half as wide as the pygidium and its sides are rounded and rapidly narrow, ending in a blunt-pointed finger-shaped process. On either side of this process the edge of the pygidium is prolonged into seven slender cirri.

There are eighteen pairs of gills. They are apparently capable of contraction, since they are relatively longer in the type than in other specimens (pl. 12, fig. 38, from co-type). They are bifid and much wrinkled.

The setae of the first tuft are more prominent than those of the immediately following tufts, which are, however, easily seen as far back as the first gill-bearing somite. Here they are very small, and are visible only under considerable magnification. They are situated in two tufts at the base of the gill. The ventral setae are shorter, and the dorsal ones are slightly longer, than the diameter of the gill (pl. 12, fig. 38). As shown in the figure they arise directly from the body-wall, without any noticeable parapodia. All the setae are simple, long, narrow and tapering.

Collected from La Jolla in sand.

Type in the Museum of the University of California; co-type in the American Museum of Natural History.

#### Family MALDANIDAE

##### **Clymenella rubrocincta** Johnson

*Clymenella rubrocincta* Johnson (1901), p. 418, pl. 13, figs. 128-133.

Collected from Puget Sound; Tomales Bay; Pacific Grove; San Pedro; and San Diego. Collected also in the following hauls: XLV,

along the rocky shore of San Diego Bay; LIX, off the Coronado Islands in 15 fathoms on fine gray sand; 1124, off La Jolla on a muddy bottom in 160 fathoms; 1155, off La Jolla on a muddy bottom in 70 fathoms.

#### **Maldane sarsii** Malmgren

*Maldane sarsii* Malmgren (1865), p. 188.

Collected in the following hauls: LXX-5, off La Jolla in 54 to 118 fathoms on mud and soft black shale; 1122, off La Jolla in 100 fathoms on green mud and fine sand; 1157, off La Jolla on a muddy bottom in 160 fathoms; 1475, off La Jolla on a sandy bottom in 50 to 100 fathoms.

#### **Maldane similis** Moore

*Maldane similis* Moore (1906), p. 233, pl. 11, figs. 26-30.

Collected in haul 1475, off La Jolla on a sandy bottom in 50 to 100 fathoms; and in haul 1486, off Oceanside in 403 fathoms on green mud. The specimen obtained in this haul is doubtfully referred here. If it belongs to this species it was immature.

#### **Maldane disparidentata** Moore

*Maldane disparidentata* Moore (1904), p. 494, pl. 38, figs. 28-31.

Collected from Pacific Grove; Timm's Flats near San Pedro; and Coronado. Collected also in the following hauls: XIV-3, off San Pedro in 40 to 150 fathoms on gray mud; XIX-2, off San Pedro in 30 to 77 fathoms on soft sandy mud and pebbles; LXXIV, in San Diego Bay in 1 to 2 fathoms on mud and broken shells; LXXV-1, in San Diego Bay on a muddy bottom in 2 to 3 fathoms.

#### **Clymene mirabilonga** Moore

*Clymene mirabilonga* Moore (1903), p. 480, pl. 27, figs. 89-93.

Collected from San Pedro and in the following hauls: X, off San Pedro in 19 to 38 fathoms on green mud; LXX-5, off La Jolla in 54 to 118 fathoms on mud and soft black shale.

#### **Isocirrus** sp. (?)

Collected in haul LXX-7, off La Jolla in 55 to 125 fathoms on soft black shale.

## Family SCALIBREGMIDAE

**Sclerocheilus pacificus** Moore*Sclerocheilus pacificus* Moore (1909a), p. 282, pl. 9, fig. 59.

I have identified a number of specimens as belonging to this species, though agreeing with Moore that they differ widely from the type of the genus. I was unable to find the furcate setae which are described and figured by Moore as characteristic of the species.

Collected from Avalon, Santa Catalina Island.

## Family ARENICOLIDAE

**Arenicola claparedii** Levinson*Arenicola claparedii* Levinson (1883), p. 136.

Collected from Dutch Harbor, Unalaska; and Alki Point, Puget Sound.

## Family SABELLIDAE

**Sabella elegans** Bush*Sabella elegans* Bush (1904), p. 194, pl. 26, fig. 2; pl. 27, fig. 6c; pl. 33, figs. 20–21; pl. 34, figs. 1, 4, 5, 10; pl. 37, figs. 12–33.

Locality unknown.

**Potamilla acuminata** Moore*Potamilla acuminata* Moore (1904), p. 159, pl. 12, fig. 41.

Collected in haul L-1, off San Diego on a rocky bottom in 21 to 28 fathoms; one specimen from an unknown locality.

**Myxicola pacifica** Johnson*Myxicola pacifica* Johnson (1901), p. 431, pl. 19, figs. 193–198.

Collected from Santa Barbara, San Pedro, and also in the following hauls: V-1, off San Pedro in 11 to 16 fathoms; XV, off San Pedro in 4 to 7 fathoms on coarse sand; XVI-2, off San Pedro in 9 fathoms on small rocks and pebbles; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand.

**Parasabella media** Bush*Parasabella media* Bush (1904), p. 200, pl. 27, figs. 3–5; pl. 33, figs. 34–36; pl. 34, fig. 3; pl. 36, figs. 13–14; pl. 37, fig. 30.

Locality unknown.

**Metachone mollis** Bush

*Metachone mollis* Bush (1904), p. 216, pl. 35, figs. 19, 20, 28.

Collected in haul XLIII-1, in San Diego Bay in 3 to 7 fathoms on soft black mud.

**Laonome punctata** Treadwell

*Laonome punctata* Treadwell (1906), p. 1178, figs. 76, 77.

Collected from Honolulu.

**Laonome oculifera** sp. nov.

Pl. 12, figs. 39-43

The body, without the gills, is twenty millimeters long. It is six millimeters wide at its widest point, the thorax. The thoracic region is slightly flattened, while the abdomen is more nearly rounded, gradually tapering to its end. The thorax consists of eight somites and the abdomen of about sixty. The collar is two-lobed and rather prominent. Its edge is entire and its parts widely separated dorsally, while its ventral free ends are prolonged into slightly rolled edges, those of the two sides being in contact. The color, in alcohol, is a uniform light brown, the gills being somewhat lighter than the rest of the body. No colored spots occur except the eyes on the radioles.

There are about twenty-four radioles on a side arising from a prominent base which is slightly coiled ventrally. There are two rows of barbs on the inner face of each radiole. They are largest near its base, becoming very small toward its apex. The basal ones are black and the others are colored like the radiole. Each radiole has from one to five prominent light brown eyes on its dorsal surface.

The faecal groove is prominent in the abdomen. It bends to the right of the animal at the posterior end of the eighth somite, where it continues to the dorsal surface. Ventral scutes are prominent on all somites, the first thoracic one being much the largest. Its middle length is almost half its width, while that of the other thoracic scutes is only one-fifth their width. All of these, and six or seven anterior abdominal ones, tend toward a biannulate condition. The remaining scutes are about three times broader than long and each is equally divided by the faecal groove.

There are two sorts of setae on the collar fascicle. Dorsally there is a bundle of long, gently tapering, sometimes slightly curved setae, each of which has a wing on either side (pl. 12, fig. 39). Ventrally

the setae are shorter and relatively broader than the dorsal ones, each with an asymmetrical wing at its end and numerous striations on its surface (pl. 12, fig. 40). While the most dorsal setae of the other thoracic somites are much like those of the collar setae, the ventral ones have orbiculate ends (pl. 12, fig. 41). The thoracic torus is provided with a row of large hooked uncinae, the apex of each being finely striated but hardly produced into definite teeth, while the basal portion of each is rounded and prolonged backward into a basal rod (pl. 12, fig. 42). Parallel to these uncinae is a row of pennoned setae (pl. 12, fig. 43). The abdominal setae are similar to those of the ventral part of the collar. The uncinae are like those of the thorax, but without pennoned setae.

Collected from San Pedro.

Type in the Museum of the University of California.

**Branchiomma disparoculatum** sp. nov.

Pl. 12, figs. 44-46

The type is thirty-five millimeters long; its thorax is seven millimeters long; and its gills are also seven millimeters long. Its body is not over four millimeters wide in the widest portion of the thorax, and its abdomen is of uniform diameter except at its extreme posterior end, where it narrows abruptly. There are about twenty-one gills on each side, which are frequently broken and but slightly rolled at their bases. Radioles have barbs extending to their very ends except in those provided with eyes, when their tips are without them. In one pair of radioles, each carries a large subterminal eye, while a variable number of other radioles carry smaller ones which, in some cases, are hardly larger than a speck of pigment. The buccal membrane consists of two pairs of thin, leaf-like processes, of which the ventral one continues, as a thin lamella, to the ventral surface of the body between the collar lobes. The ends of the collar are slightly separated dorsally and the dorsal part of the collar, while thick, is inconspicuous owing to the rather sudden transition to its thin portion. This thin part forms a fold which partly overlaps the thick portion and is then continued without a break to the ventral surface where each side terminates in a triangular fold extending beyond the bases of the gills.

The thorax consists of eight somites and is provided with rather prominent ventral shields whose width is one-third that of the body.

There is a single tuft of curved, sharp-pointed collar setae, each of which has a terminal wing-like expansion (pl. 12, fig. 44). In profile, this expansion looks like a lateral wing; seen in full face, it shows on both sides of the central axis and is apparently a thin globular expansion which tapers to a point at its apex. The setae in other thoracic fascicles are of two kinds, one similar to those of the collar while the other kind are shorter and orbicular (pl. 12, fig. 45). Thoracic tori are provided with uncini and pennoned setae. The uncus has a short base, one large tooth, and an apex with minute striations (pl. 12, fig. 46). Pennoned setae of the usual type are present but have rather larger terminal expansions.

Abdominal ventral shields are as prominent as the thoracic shields and, relatively, somewhat wider. The faecal groove crosses the shield of the first abdominal somite, and divides all subsequent ones equally. Abdominal setae are much longer than the thoracic ones. Abdominal uncini are much like thoracic ones, but their bases are apt to have a brown color. Terminal tooth very prominent, crest prominent, with numerous striations, but not showing separate teeth.

Collected from Honolulu Harbor, San Pedro, and San Diego. The type was labelled haul 9, off San Diego, but, as that haul was made with a no. 20 net towed in 70 fathoms, it is probable that the label was erroneously marked. Co-types also from San Diego. Specimens from Honolulu had tubes covered with minute fragments of shells and skeletons of Foraminifera, while some from San Pedro had tubes covered with fine sand.

Type in the Museum of the University of California; co-type in the American Museum of Natural History.

#### ***Pseudopotamilla occelata* Moore**

*Pseudopotamilla occelata* Moore (1905b), p. 559, pl. 37, figs. 8-14.

Collected from Fort Ross Cove; Lime Point, San Francisco Bay; and in the following hauls; LXVIII, off San Diego in 19 to 30 fathoms on green mud and sand; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand.

#### ***Pseudopotamilla brevibranchiata* Moore**

*Pseudopotamilla brevibranchiata* Moore (1905b), p. 555, pl. 37, figs. 1-7.

Collected from San Pedro.

**Pseudopotamilla debilis** Bush*Pseudopotamilla debilis* Bush (1904), p. 204, pl. 36, figs. 23, 24, 26.

Collected in haul 1202, off La Jolla on a rocky bottom in 80 fathoms.

**Distylia rugosa** Moore*Distylia rugosa* Moore (1904), p. 499, pl. 38, figs. 38-41.

Collected from San Pedro; several from an unknown locality.

**Eudistylia polymorpha** Johnson*Eudistylia polymorpha* Johnson (1901), p. 429, pl. 17, figs. 179-183; pl. 8, figs. 184-185.

Collected from Ocean Cape and Yakutat Bay, Alaska; Puget Sound; Pacific Grove; and San Pedro.

**Schizobranchia nobilis** Bush*Schizobranchia nobilis* Bush (1904), p. 207, pl. 24, fig. 3; pl. 28, fig. 7; pl. 33, fig. 22; pl. 35, figs. 1, 3-8, 10, 11, 23.

Collected from Orca in Prince William Sound, Alaska; and Port Townsend, Wash.

## Family SERPULIDAE

**Serpula columbiana** Johnson*Serpula columbiana* Johnson (1901), p. 432, pl. 19, figs. 199-204.

Collected from Puget Sound; Trinidad; Shelter Cove, Mendocino County; Bolinas; Duxbury Reef; Point Cavallo, San Francisco Bay; Pillar Point, California; Santa Monica; and San Diego.

**Eupomatus uncinatus** Philippi*Serpula uncinatus* Philippi (1844), p. 195.

Collected from San Pedro and San Diego Bay.

**Eupomatus gracilis** Bush*Eupomatus gracilis* Bush (1904), p. 234, pl. 27, fig. 9; pl. 34, fig. 25; pl. 37, figs. 26, 27.

Collected from San Pedro and San Diego.

**Hydroïdes sp. (?)**

A number of tubes marked "yacht bottom, Honolulu," were in the collection, and contained specimens of *Hydroïdes* too poorly preserved to admit of an examination of the soft parts. Collar setae are of two kinds. One (pl. 12, fig. 47) has a stout base, divided distally into three branches. Two of these are very short and stout while the other is a long slender process. None were entire, but apparently the end is rounded rather than pointed. The second kind of seta is long and slender, very gradually tapering to an acute tip with a narrow and much striated wing along one edge. The uncinus is of usual form and has six or seven teeth.

The basal plate of the operculum has thirty-two acute, conical, and sharp-pointed teeth around its edge. The terminal plate is very prominent and has thirteen arm-like expansions, each prolonged at its apex into a crescent-shaped expansion (pl. 12, fig. 48).

**Apomatus geniculata Moore**

*Apomatus geniculata* Moore (1904), p. 168, pl. 11, figs. 17, 18; pl. 12, fig. 38.

Collected in haul 1552, off San Clemente Island in 50 fathoms on coarse sand.

**Protula atypa Bush**

*Protula atypa* Bush (1904), p. 228, pl. 37, figs. 1, 2, 4.

Collected in the following hauls: XII-1, off San Pedro in 40 to 145 fathoms on green mud and sand; XXXV, off Ballast Point, Santa Catalina Island in 6 to 30 fathoms on green mud; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand.

**Spirabranchus quadricornis Grube**

*Spirabranchus quadricornis* Grube (1878), p. 275, pl. 15, fig. 6.

Collected from San Pedro; Avalon, Santa Catalina Island; La Jolla; and San Clemente Island.

**Crucigera zygophora Johnson**

*Crucigera zygophora* Johnson (1901), p. 433, pl. 19, figs. 205-208.

Collected from Sitka Harbor, Alaska; and Santa Barbara.

**Crucigera websteri** Benedict

*Crucigera websteri* Benedict (1886), p. 550, pl. 21, figs. 24-25; pl. 22, figs. 26-30.

Collected from San Pedro.

## Family HERMELLIDAE

**Sabellaria californica** Fewkes

*Sabellaria californica* Fewkes (1889), p. 130, pl. 7, figs. 3-4.

Collected from Lime Point, San Francisco Bay; Pacific Grove; Santa Barbara; Deadman's Island, San Pedro; San Pedro; La Jolla; Point Loma, San Diego; and Coronado. Collected also in the following hauls: XLV, along the rocky shore of San Diego Bay; XLVI-2, off San Diego in 5 to 6 fathoms on sand; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand.

**Sabellaria cementarium** Moore

*Sabellaria cementarium* Moore (1906), p. 248, pl. 12, figs. 45-51.

Collected from Portuguese Bend; San Pedro; and San Diego. Collected also in the following hauls: XVI-2, off San Pedro in 9 fathoms on small rocks and pebbles; LXII, off San Diego in 16 to 18 fathoms on gray sand; LXVII, off San Diego in 19 to 31 fathoms on yellowish-gray sand; LXXXII-1, off Point Firmin in 27 to 30 fathoms on fine gray sand; 1166, off La Jolla on a sandy bottom in 5 to 13 fathoms.

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## EXPLANATION OF PLATES.

### PLATE 11

- Fig. 1. Head of *Panthalis pacifica*.  $\times 15$ . The terminal joint of one tentacular cirrus on the right side had been lost.
- Fig. 2. First parapodium of *Panthalis pacifica*.  $\times 23$ .
- Fig. 3. Eighth parapodium of *Panthalis pacifica*.  $\times 23$ .
- Fig. 4. Terminal portion of seta from first parapodium of *Panthalis pacifica*.  $\times 280$ .
- Fig. 5. Tip of ventrally placed seta from first parapodium of *Panthalis pacifica*.  $\times 280$ .
- Fig. 6. Tip of very large seta from eighth parapodium of *Panthalis pacifica*.  $\times 280$ .
- Fig. 7. Tip of dorsalmost seta from eighth parapodium of *Panthalis pacifica*.  $\times 280$ .
- Fig. 8. Head of *Nereis notomacula*.  $\times 20$ .
- Fig. 9. First parapodium of *Nereis notomacula*.  $\times 45$ .
- Fig. 10. Eighth parapodium of *Nereis notomacula*.  $\times 45$ .
- Fig. 11. Seta from eighth parapodium of *Nereis notomacula*.  $\times 280$ .
- Fig. 12. Hooked seta from eighth parapodium of *Nereis notomacula*.  $\times 280$ .
- Fig. 13. Ventral crochet and dorsal aciculum of *Leodice biannulata*.  $\times 280$ .
- Fig. 14. Head of *Spio acuta*.  $\times 30$ .
- Fig. 15. First parapodium of *Spio acuta*.  $\times 68$ .
- Fig. 16. Thirteenth parapodium of *Spio acuta*.  $\times 45$ .
- Fig. 17. Seta of thirteenth parapodium of *Spio acuta*.  $\times 185$ .
- Fig. 18. Parapodium from region of body behind twenty-fifth somite of *Spio acuta*.  $\times 45$ .
- Fig. 19. Seta from first parapodium of *Spio acuta*.  $\times 185$ .
- Fig. 20. Hooded seta from first somite of *Spio acuta*.  $\times 185$ .

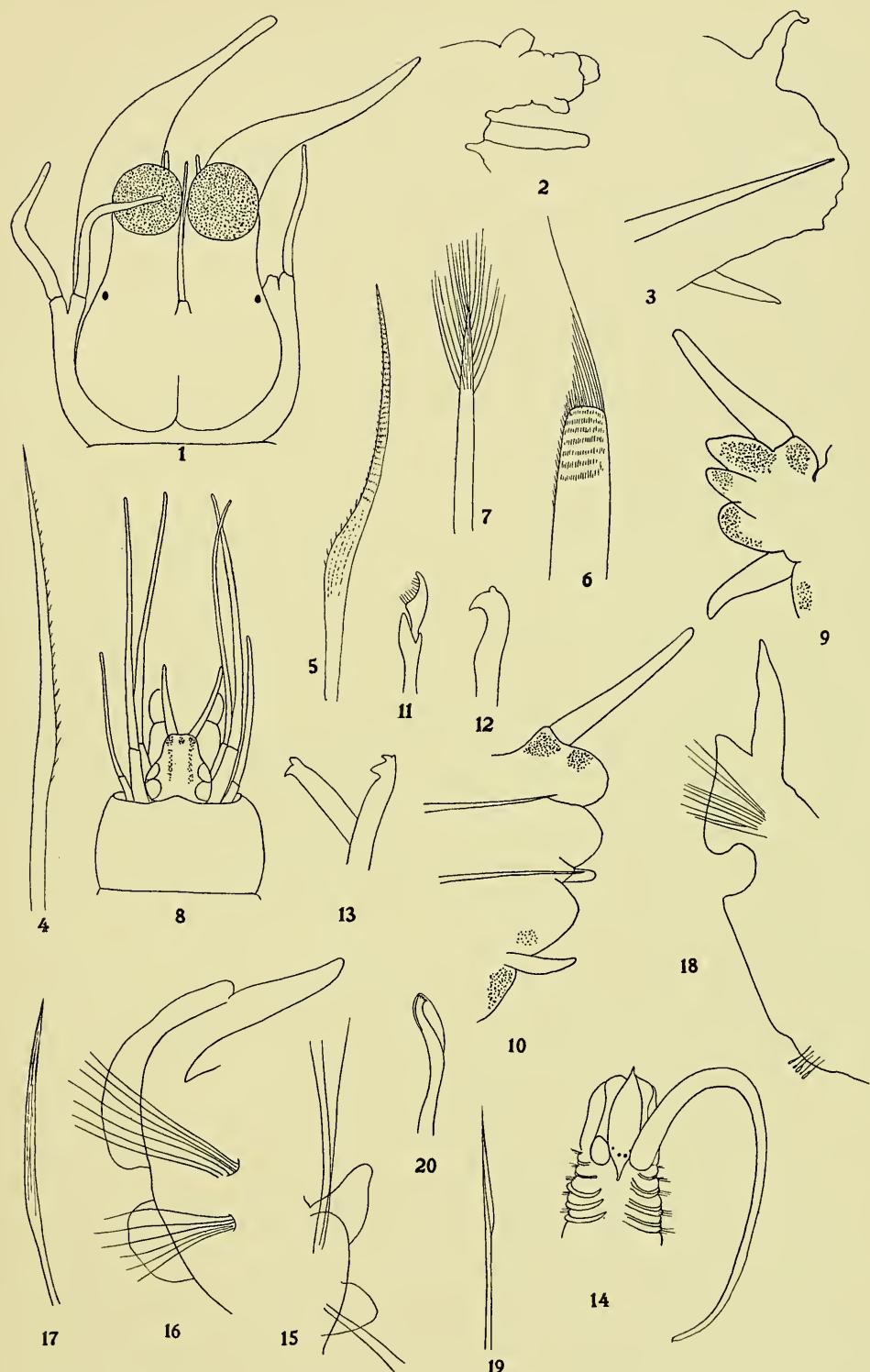






PLATE 12

- Fig. 21. Head of *Scolecolepis alaskensis*.  $\times 5$ .
- Fig. 22. Parapodium from region of twenty fifth somite, of *Scolecolepis alaskensis*.  $\times 5$ .
- Fig. 23. Head of *Polydora californica*.  $\times 28$ .
- Fig. 24. Seta from first neuropodium of *Polydora californica*.  $\times 280$ .
- Fig. 25. Third parapodium of *Polydora californica*.  $\times 68$ .
- Fig. 26. Hook from sixth somite of *Polydora californica*.  $\times 185$ .
- Fig. 27. Second form of hook from sixth somite of *Polydora californica*,  $\times 185$ .
- Figs. 28 and 29. Two views of a ventral hook from somite behind the sixth, of *Polydora californica*.  $\times 185$ .
- Fig. 30. Seta from fifth setigerous somite of *Streblosoma crassibranchiata*.  $\times 280$ .
- Fig. 31. Uncinus from *Streblosoma crassibranchiata*.  $\times 560$ .
- Fig. 32. Ventral hooks of *Trophonia minuta*.  $\times 68$ .
- Fig. 33. Notopodial hook of *Trophonia inflata*.  $\times 68$ .
- Fig. 34. Head of *Ophelina magna*.  $\times 10$ .
- Fig. 35. Seta from first setigerous somite of *Ophelina magna*.  $\times 185$ .
- Fig. 36. Fourteenth parapodium of *Ophelina magna*.  $\times 14$ .
- Fig. 37. Head of *Ophelina mucronata*.  $\times 45$ .
- Fig. 38. Gills of *Ophelina mucronata*.  $\times 45$ .
- Fig. 39. Dorsal collar seta of *Laonome oculifera*.  $\times 185$ .
- Fig. 40. Ventral collar seta of *Laonome oculifera*.  $\times 185$ .
- Fig. 41. Ventral thoracic seta of *Laonome oculifera*.  $\times 185$ .
- Fig. 42. Thoracic uncinus of *Laonome oculifera*.  $\times 185$ .
- Fig. 43. Pennoned seta from thorax of *Laonome oculifera*.  $\times 185$ .
- Fig. 44. Collar seta of *Branchiomma disparoculatum*.  $\times 185$ .
- Fig. 45. Spatulate thoracic seta of *Branchiomma disparoculatum*.  $\times 185$ .
- Fig. 46. Uncinus from thorax of *Branchiomma disparoculatum*.  $\times 185$ .
- Fig. 47. Collar seta of *Hydroides* sp.  $\times 185$ .
- Fig. 48. Terminal plate of operculum of *Hydroides* sp.  $\times 8$ .

