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Errata and Additions

Pt. I. Erect *Sthenelais variabilis colorata,* to *Sthenelais* sp.

Pt. I. Erect *Lepidonotus pomareae panamensis,* to *Lepidonotus panamensis.*

Middle of p. 86, add Holotype.—AHF no. 18

P. 161, change *Lumbrineris brevicirra* to *Lumbrineris zonata* Johnson.

P. 212, under LEOCRATES, insert *Leocrates chinensis* Kinberg.

At top of p. 289, add Polychaetous Annelids. Part III. Spionidae.

P. 322, change *Polydora uncata* to *Boccardia uncata.*

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ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 7 NUMBERS 1 AND 2

POLYCHAETOUS ANNELIDS

PART I. APHRODITIDAE TO PISIONIDAE

(PAGES 1-156, PLATES 1-28)

NEW SPECIES OF POLYCHAETOUS ANNELIDS FROM SOUTHERN CALIFORNIA

(PAGES 157-172, PLATES 29, 30)

by

OLGA HARTMAN

SEP 11 1939

THE UNIVERSITY OF SOUTHERN CALIFORNIA PRESS
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1939

REPORTS ON THE COLLECTIONS OBTAINED BY ALLAN HANCOCK PACIFIC EXPEDITIONS OF VELERO III OFF THE COAST OF MEXICO, CENTRAL AMERICA, SOUTH AMERICA, AND GALAPAGOS ISLANDS IN 1932, IN 1933, IN 1934, IN 1935, IN 1936, IN 1937, AND IN 1938.

POLYCHAETOUS ANNELIDS
Part I. Aphroditidae to Pisionidae

By OLGA HARTMAN

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Allan Hancock Pacific Expeditions
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POLYCHAETOUS ANNELIDS

Part I. Aphroditidae to Pisionidae

(PLATES 1-28)

BY OLGA HARTMAN

The polychaetous annelids included in this report were collected largely by the Allan Hancock Pacific Expeditions to Lower California, western Mexico, western Central America, the Pacific side of Panama, Colombia, Ecuador, Peru, Cocos and Galapagos islands, and southern California north to San Francisco. A few specimens, indicated with accession numbers, enumerated at the end of the station list, are in the collections of The University of Southern California, and were collected from southern California.

A station list follows, including only those stations of the Allan Hancock Pacific Expeditions which were represented in the families investigated in this report. Under each are listed the species collected, for the families herein considered. New species or new names are preceded by an asterisk.

St. 20-33. Jan. 1, 1933. La Libertad, Ecuador. With electric light.
Arctonoë vittata (Grube)

St. 22-33. Jan. 22, 1933. La Plata Island, Ecuador.
Halosydna parva Kinberg

St. 28-33. Jan. 25, 1933. Gardner Bay, Hood Island, Galapagos. Diving in 2 fms.
Sthenelais fusca Johnson

St. 66-33. Feb. 9, 1933. Albemarle Island, Tagus Cove, Galapagos. In 10-20 fms., dredged.
**Eusigalion hancocki,* new species

St. 74-33. Feb. 14, 1933. Albemarle Island, Cartago Bay, Galapagos. In 3-6 fms., dredged.
**Eusigalion hancocki,* new species

St. 76-33. Feb. 14, 1933. Same locality. North sandy shore, off dead tree.
Thormora johnstoni (Kinberg)

St. 114-33. Mar. 10, 1933. Bahia Honda, Panama. In coral, from 2 fms., near East Point.
Iphione ovata Kinberg

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St. 116-33. Mar. 13, 1933. Puerto Culebra, Costa Rica. In 2 fms., dredged in Cocos Bay.
Sthenelais variabilis Potts *colorata* Monro

St. 125-33. Mar. 19, 1933. Isabel Island, Sinaloa, Mexico. In coral, from 2 fms.
Lepidonotus hupferi Augener

St. 126-33. Mar. 21, 1933. Santa Maria Bay, Lower California. In 0-25 fms., dredged.
**Eusigalion hancocki,* new species

St. 132-34. Jan. 4, 1934. Braithwaite Bay, Socorro Island, Mexico. In 40 fms., dredged; rock and nullipore fragments.
Chaetacanthus magnificus (Grube)

St. 140-34. Jan. 5, 1934. Sulphur Bay, Clarion Island, Mexico. Coral clump.
**Psammolyce spinosa,* new species

St. 148-34. Jan. 13, 1934. Albemarle Island, Tagus Cove, Galapagos. In 12-15 fms., dredged. Corals, nullipores, rock.
Lepidonotus nesophilus Chamberlin
Lepidametria gigas (Johnson)
Hololepida, sp.

St. 152-34. Jan. 14, 1934. Same locality, north shore. In coral.
Halosydna parva Kinberg

St. 167-34. Jan. 19, 1934. Charles Island, Galapagos. In 15 fms., dredged. Rock.
Lepidametria virens (Blanchard)

St. 169-34. Jan. 20, 1934. Academy Bay, Indefatigable Island. Dredged. Rock and algae.
Lepidametria virens (Blanchard)

St. 171-34. Jan. 21, 1934. East of Wreck Bay, Chatham Island. In 35-40 fms., dredged. Coarse sand and corallines.
Lepidonotus furcillatus Ehlers

St. 182-34. Jan. 24, 1934. James Bay, James Island. In 30 fms., dredged. Coarse sand.
Lepidametria virens (Blanchard)

St. 194-34. Jan. 27, 1934. Post Office Bay, Charles Island, Galapagos. In coral.
Thormora johnstoni (Kinberg)

St. 198-34. Jan. 29, 1934. Charles Island, Galapagos. In 55-65 fms., dredged. Sand.
Polyodontes panamensis (Chamberlin)
**Eusigalion spinosum,* new species

St. 208-34. Feb. 9, 1934. Between La Libertad and Salinas, Ecuador. In 7-8 fms., dredged. Sand and small shells.
**Eusigalion hancocki,* new species

St. 209-34. Feb. 9, 1934. La Libertad, Ecuador. In 8-10 fms., dredged. North of St. Elena. Rock with large shells and gorgonids.
Aphrodita japonica Marenzeller

St. 210-34. Feb. 9, 1934. Between La Libertad and Salinas, Ecuador. In 7-10 fms., dredged. Rock, large shells and gorgonids.
Lepidonotus hupferi Augener

St. 211-34. Feb. 10, 1934. La Plata Island, Ecuador. Shore. Rocky reefs.
Chaetacanthus magnificus (Grube)

St. 212-34. Feb. 10, 1934. Same. In 45-55 fms., dredged. Sand, shale, rock, and mud.
Aphrodita japonica Marenzeller
Lepidonotus furcillatus Ehlers

St. 213-34. Feb. 10, 1934. Same. In 7-10 fms., dredged. Rocks with nullipores.
Aphrodita japonica Marenzeller
Iphione ovata Kinberg
?*Lepidametria virens* (Blanchard)
Sthenelanella uniformis Moore

St. 216-34. Feb. 11, 1934. Cape San Francisco, Ecuador. In 20 fms., dredged. Muck.
Polyodontes oculea (Treadwell)
Pareulepis fimbriata (Treadwell)
**Leanira fimbriarum,* new species

St. 217-34. Feb. 11, 1934. Same. In 2 fms. Rocky.
Thormora johnstoni (Kinberg)

St. 232-34. Feb. 14, 1934. Port Utria, Colombia. Shore, isthmus between two islands.
Iphione ovata Kinberg

St. 239-34. Feb. 15, 1934. Port Utria, Colombia. Shore. Reef inner side, outer isle.
Iphione ovata Kinberg

St. 244-34. Feb. 21, 1934. Bahia Honda, Panama. In 30-35 fms., dredged, between Medidor and Pacora Island. Fine shell, mud, coarse sand.
**Pontogenia laeviseta,* new species
Panthalis pacifica Treadwell

St. 245-34. Feb. 21, 1934. Same. In 15-25 fms., dredged off Northwest Point, Pacora Island. Rock, large shells, and nullipores.
Chaetacanthus magnificus (Grube)
**Lepidonotus pomareae* Kinberg *panamensis,* new subspecies

St. 249-34. Feb. 22, 1934. Same. In 15-20 fms., dredged, outside of island south of bay. Rock.
**Pontogenia laeviseta,* new species

St. 250-34. Feb. 22, 1934. Secas Islands, Panama. In 25 fms., dredged. Mud and dead shells.
**Psammolyce fimbriata,* new species
Sthenelais variabilis Potts *colorata* Monro

St. 251-34. Feb. 22, 1934. Same. In 15 fms., dredged, south and west of islands. Rock and nullipores.
Chaetacanthus magnificus (Grube)

St. 264-34. Mar. 2, 1934. Petatlan Bay, Mexico. In 25 fms., dredged south and west of White Friars Island. Rock with gorgonids.
Chaetacanthus magnificus (Grube)

St. 273-34. Mar. 4, 1934. Tenacatita Bay, Mexico. In 75 fms., dredged between white rocks and bay. Shells and worm tubes in sand and mud.
Harmothoë exanthema (Grube)
Lepidonotus nesophilus Chamberlin
**Sthenelais maculata,* new species

St. 277-34. Mar. 5, 1934. Isabel Island, Mexico. In 10-25 fms., dredged around island. Sand, nullipores.
**Pontogenia laeviseta,* new species

St. 283-34. Mar. 9, 1934. Thurloe Bay, Lower California. In 8-10 fms., dredged off Thurloe Pt. Rock with gorgonids.
**Psammolyce fimbriata,* new species

St. 287-34. Mar. 10, 1934. South Bay, Carros Island, Mexico. In 10-15 fms., dredged. Rock close to kelp beds.
**Aphrodita falcifera,* new species
Sthenelais verruculosa Johnson

St. 315-34. Dec. 8, 1934. Indefatigable Island, Galapagos. Opposite Gordon Rocks. In coral.
Lepidametria virens (Blanchard)

St. 343-34. Dec. 12, 1934. James Island, Galapagos. Shore, Sulivan Bay.
Iphione ovata Kinberg
Sthenelais fusca Johnson

St. 364-35. Jan. 10, 1935. Callao, Peru. In 3 fms. In line with Lorenzo Island.
**Sthenelais maculata,* new species

St. 366-35. Jan. 10, 1935. Same. In 8 fms. Between rocks south of Lorenzo Island.
**Pisionella hancocki,* new genus and species

St. 372-35. Jan. 12, 1935. Independencia Bay, Peru. In 5 fms. East of Vieja Island.
Harmothoë exanthema (Grube)

St. 373-35. Jan. 12, 1935. Same. In 12 fms.
**Sthenelais maculata,* new species

St. 374-35. Jan. 12, 1935. Same.
Halosydna parva Kinberg

St. 375-35. Jan. 13, 1935. Same. Shore, lee side of Vieja Island.
Lepidonotus crosslandi Monro
Pisione oerstedi Grube
Pisionella hancocki, new genus and species

St. 376-35. Jan. 13, 1935. Same. In 7 fms.
Lepidonotus crosslandi Monro
Harmothoë exanthema (Grube)

St. 379-35. Jan. 13, 1935. Independencia Bay, Peru. In 20 fms.
**Sthenelais maculata,* new species

St. 380-35. Jan. 14, 1935. Same. Shore. Station on east side of bay.
Halosydna fuscomarmorata (Grube)
Halosydna parva Kinberg

St. 384-35. Same. In 5 fms., three-fourths mile off shore.
Harmothoë exanthema (Grube)

St. 385-35. Jan. 14, 1935. Same. In 9-10 fms., one and one-fourth miles off shore. Red algae and gastropods.

Harmothoë exanthema (Grube)

St. 391-35. Jan. 17, 1935. Lobos de Afuera, Peru. Shore. Main isle, with electric light. Rocks.

Halosydna fuscomarmorata (Grube)

St. 396-35. Jan. 18, 1935. Salango Island, Ecuador. In 12 fms., Salango Bay.

Lepidametria virens (Blanchard)

St. 400-35. Jan. 19, 1935. Manta, Ecuador. Shore.

**Sthenelais maculata,* new species

St. 405-35. Jan. 22, 1935. Gorgona Island, Colombia. Shore, below sandy beach.

**Polynoë veleronis,* new species

St. 414-35. Jan. 23, 1935. Port Utria, Colombia. In 3 fms., lee beach of isle. Pocillopora coral.

Halosydna fuscomarmorata (Grube)

?*Thormora johnstoni* (Kinberg)

St. 429-35. Jan. 27, 1935. Octavia Bay, Colombia. In 30-35 fms., north end of channel. Coarse sand and gravel.

Lepidonotus furcillatus Ehlers

St. 430-35. Jan. 27, 1935. Same. In 75 fms., outside middle of channel. Soft mud.

Aphrodita japonica Marenzeller

St. 432-35. Jan. 27, 1935. Same. In 50 fms. Soft mud and fine gravel.

Aphrodita japonica Marenzeller

St. 436-35. Jan. 28, 1935. Piñas Bay, Panama. Shore.

Iphione ovata Kinberg

**Eulagisca panamensis,* new species

**Leanira fimbriarum,* new species

St. 437-35. Jan. 28, 1935. Piñas Bay, Panama. In coral.

Halosydna fuscomarmorata (Grube)

St. 443-35. Jan. 29, 1935. Same. In 20 fms., N.N.E. of Pt. Isle. Mud.

**Polyodontes frons,* new species

St. 444-35. Jan. 29, 1935. Same. In 2-4 fms. Coral from south bay, mainland side.
***Halosydna glabra,* new species
Iphione ovata Kinberg

St. 446-35. Feb. 4, 1935. Secas Islands, Panama. Shore. Small grass-covered island with reef.
Iphione ovata Kinberg

St. 448-35. Feb. 5, 1935. Same. In 12 fms. Anchorage from first small sand beach.
Lepidonotus hupferi Augener

St. 450-35. Feb. 5, 1935. Same. In 14 fms. Shells, nullipores.
Thormora johnstoni (Kinberg)
Sthenelais variabilis Potts *colorata* Monro

St. 451-35. Feb. 5, 1935. Same. In 12 fms., toward anchorage from small island.
**Pontogenia laeviseta,* new species
Sthenelais variabilis Potts *colorata* Monro

St. 465-35. Feb. 8, 1935. Playa Blanca, Costa Rica. Shore. Shale beach between beach and rocky reef.
**Psammolyce antipoda* (Schmarda) *anoculata,* new subspecies

St. 466-35. Feb. 9, 1935. Parker Bay, Costa Rica. Shore. Small isle at north shore.
Iphione ovata Kinberg

St. 470-35. Feb. 9, 1935. Same. In 5 fms. Sand and mud.
Sthenelais variabilis Potts *colorata* Monro

St. 492-36. Feb. 16, 1936. Pt. Tosco, Lower California, Mexico. In 45 fms. Green mud.
Panthalis pacifica Treadwell

St. 498-36. Feb. 19, 1936. San Lorenzo Channel, south of Espiritu Santo Island, Lower California. In 5-15 fms. Coralline algae.
Iphione ovata Kinberg

St. 502-36. Feb. 21, 1936. La Paz Bay, Lower California. In 7 fms., out from anchorage. Sandy mud.
Polyodontes oculea (Treadwell)

St. 510-36. Feb. 22, 1936. Cove south of Ballena Bay, Espiritu Santo Island, Lower California. Shore.
Iphione ovata Kinberg

St. 518-36. Feb. 25, 1936. North Bay of San Francisco Island, Lower California. Shore.
Iphione ovata Kinberg

St. 525-36. Feb. 28, 1936. Channel west of Coronados Island, Lower California. In 3-10 fms. Corallines.
Thormora johnstoni (Kinberg)

St. 529-36. Mar. 1, 1936. Off San Francisquito Bay, Lower California. In 165 fms. Shale and gray mud.
Lepidonotus versicolor Ehlers

St. 530-36. Mar. 1, 1936. Same. In 10-20 fms. Coral, kelp, nullipores.
Thormora johnstoni (Kinberg)

St. 532-36. Mar. 2, 1936. In San Francisquito Bay, Lower California. In 20 fms. Sand and kelp.
**Hololepida veleronis,* new species

St. 542-36. Mar. 4, 1936. In Puerto Refugio, Angel de la Guardia Island, Lower California. In 15-30 fms. Broken shale.
**Pontogenia laeviseta,* new species

St. 546-36. Mar. 5, 1936. North of Angel de la Guardia Island, Lower California. In 40-70 fms.
**Hololepida veleronis,* new species

St. 548-36. Mar. 5, 1936. Same. In 80 fms.
**Pontogenia laeviseta,* new species

St. 549-36. Mar. 6, 1936. East of Angel de la Guardia Island, Lower California. In 40 fms.
Lepidonotus hedleyi Benham

St. 558-36. Mar. 9, 1936. Off Isla Partida to the south, Lower California. In 20 fms. Gravel and shell.
Aphrodita japonica Marenzeller
Thormora johnstoni (Kinberg)

St. 610-37. Feb. 28, 1937. Santa Rosalia Bay, Lower California. In 15 fms. Sand and kelp.
Halosydna parva Kinberg

St. 612-37. Mar. 1, 1937. Lagoon Head Anchorage, Lower California. In 7 fms. Sand.
Harmothoë hirsuta Johnson

St. 617-37. Mar. 2, 1937. San Juanico Bay, Lower California. In 24 fms. Sand and kelp.
**Halosydna,* species B

St. 632-37. Mar. 6, 1937. San Gabriel Bay, Espiritu Santo Island, Lower California. In 24 fms. Sandy mud.
Aphrodita japonica Marenzeller

St. 634-37. Mar. 6, 1937. Same. Shore. In coral.
Thormora johnstoni (Kinberg)
**Sthenelais maculata,* new species

St. 638-37. Mar. 7, 1937. Same. Shore. In coral.
Iphione ovata Kinberg

St. 639-37. Mar. 7, 1937. San Lorenzo Channel, Espiritu Santo Island, Lower California. In 3-5 fms. Sand, algae, corallines.
**Psammolyce myops,* new species
**Sthenelais maculata,* new species

St. 640-37. Mar. 7, 1937. West of San Lorenzo Channel, Espiritu Santo Island, Lower California. In 30 fms. Sandy mud.
**Leanira fimbriarum,* new species

St. 662-37. Mar. 11, 1937. Agua Verde Bay, Lower California. In 8 fms. Off San Marcial reef.
Iphione ovata Kinberg

St. 667-37. Mar. 12, 1937. Escondido Bay, Lower California. In 60 fms. Off Carmen Island.
**Leanira fimbriarum,* new species
**Sthenelais neoleanirae,* new species

St. 683-37. Mar. 15, 1937. Outside Concepcion Bay, Lower California. In 12 fms. Corallines.
**Halosydna glabra,* new species
Lepidonotus hupferi Augener
Thormora johnstoni (Kinberg)

St. 688-37. Mar. 16, 1937. Concepcion Bay, Lower California. In 12 fms. Sand and mud.
**Halosydna glabra,* new species

St. 701-37. Mar. 20, 1937. Angeles Bay, Lower California, Mexico. In 32 fms. Sand and shell.
**Eusigalion hancocki,* new species

St. 719-37. Mar. 24, 1937. Consag Rock, Lower California. In 20-25 fms.
**Halosydna,* species A

St. 728-37. Mar. 27, 1937. San Esteban Island, Lower California. Shore. Rocky.
Lepidonotus versicolor Ehlers

St. 740-37. Mar. 31, 1937. San Ignacio Bay, Sinaloa, Mexico. In 3-5 fms. Sand.

Aphrodita parva Moore

St. 745-37. Apr. 2, 1937. Isabel Island, Sinaloa, Mexico. In 10-18 fms. Corallines.

**Eusigalion hancocki,* new species

**Psammolyce fimbriata,* new species

Sthenelais fusca Johnson

St. 747-37. Apr. 2, 1937. Same. In 10-18 fms. Corallines.

**Eusigalion hancocki,* new species

St. 769-38. Jan. 11, 1938. Off San Jose Light, Guatemala. In 20 fms. Mud.

Lepidametria virens (Blanchard)

**Eusigalion hancocki,* new species

St. 770-38. Jan. 11, 1938. Same. In 7-11 fms. Sand, shell, mud.

**Panthalis marginata,* new species

Pareulepis fimbriata (Treadwell)

?*Sthenelais fusca* Johnson

St. 780-38. Jan. 14, 1938. Chatham Bay, Cocos Island. In 40-46 fms. Coarse white sand.

**Eusigalion spinosum,* new species

**Psammolyce spinosa,* new species

Sthenelais fusca Johnson

St. 789-38. Jan. 19, 1938. South Seymour Island, Galapagos. Shore. Rocky.

Iphione ovata Kinberg

Thormora johnstoni (Kinberg)

St. 796-38. Jan. 21, 1938. Sulivan Bay, James Island, Galapagos. Shore. Rocky.

Iphione ovata Kinberg

St. 814-38. Jan. 28, 1938. North of Hood Island, Galapagos. In 20-40 fms. Sand, shell.

Lepidonotus nesophilus Chamberlin

**Eusigalion spinosum,* new species

St. 833-38. Feb. 10, 1938. Independencia Bay, Peru, off north entrance. In 8 fms. Sand, shell.

**Sthenelais maculata,* new species

St. 834-38. Feb. 10, 1938. Same. Off east rocky point. In 21 fms. Mud.
**Polynoë veleronis,* new species

St. 835-38. Feb. 10, 1938. South end of Independencia Bay, Peru. In 18 fms. Sand, shell, rock.
**Polynoë veleronis,* new species

St. 863-38. Mar. 1, 1938. Bahia Honda, Panama, off North Island. In 30-50 fms. Rock, sand, mud.
Aphrodita japonica Marenzeller
**Pontogenia laeviseta,* new species
Lepidonotus furcillatus (Ehlers)
**Lepidonotus pomereae* Kinberg *panamensis,* new subspecies

St. 867-38. Mar. 2, 1938. Secas Islands, Panama. Shore. Coral.
Iphione ovata Kinberg
Lagisca multisetosa Moore

St. 874-38. Aug. 1, 1938. Northeast of Anacapa Island, California. In 45 fms. Dead shell.
Lepidonotus caelorus Moore
Eunoë senta (Moore)
?*Lagisca multisetosa* Moore

St. 876-38. Aug. 1, 1938. Same. In 45 fms. With sea urchins.
**Eusigalion spinosum,* new species
Sthenelanella uniformis Moore

St. 878-38. Aug. 1, 1938. North of Anacapa Island, California.
Halosydna brevisetosa Kinberg
Thormora johnstoni (Kinberg)
Sthenelanella uniformis Moore

St. 880-38. Aug. 2, 1938. East of Santa Rosa Island, California. In 16 fms. Sand and shell.
**Leanira fimbriarum,* new species

St. 882-38. Aug. 3, 1938. South of San Miguel Island, California. In 15 fms. Sand and shell.
Halosydna brevisetosa Kinberg

St. 885-38. Aug. 4, 1938. San Luis Obispo Bay, California. In 8-14 fms.
Halosydna brevisetosa Kinberg
?*Eunoë barbata* Moore

St. 886-38. Aug. 5, 1938. Off Half Moon Bay, California. In 16 fms. Coarse gravel.
Aphrodita refulgida Moore
Halosydna brevisetosa Kinberg

St. 887-38. Aug. 7, 1938. East of Middle Farallon Islands, California. In 37 fms.
Aphrodita refulgida Moore
**Eusigalion spinosum*, new species

St. 888-38. Aug. 8, 1938. Monterey Bay, California. In 10-13 fms. Fine sand.
Harmothoë hirsuta Johnson
**Eusigalion spinosum*, new species
Sthenelais verruculosa Johnson

St. 889-38. Aug. 8, 1938. Monterey Bay, off Point Piños, California. In 36 fms. Broken shell.
**Eusigalion spinosum*, new species

St. 890-38. Aug. 8, 1938. Monterey Bay, off Point Piños, California. In 10-13 fms., dredged in fine sand.
**Sthenelais hancocki*, new species
**Eusigalion spinosum*, new species

St. 891-38. Aug. 8, 1938. Outside of Monterey Bay, California. In 26 fms. Sponges.
Lepidonotus caelorus Moore
**Eusigalion spinosum*, new species

St. 893-38. Aug. 10, 1938. Off Point Arguello, California. In 15-30 fms. Sand and algae.
**Eusigalion spinosum*, new species
Sthenelais verruculosa Johnson

St. 894-38. Aug. 10, 1938. South of San Miguel Island, California. In 5-10 fms. Kelp.
Lepidonotus caelorus Moore
Sthenelais verruculosa Johnson

St. 896-38. Sept. 12-14, 1938. San Miguel Island, California. Dredged.
**Eusigalion spinosum*, new species

St. 897-38. Same.
**Eusigalion spinosum*, new species
Sthenelais verruculosa Johnson

St. 899-38. Nov. 17, 1938. Off Long Point, Catalina Island, California. In 90-110 fms., dredged in sandy gravel.
Aphrodita parva Moore
?*Sthenelais fusca* Johnson

St. 900-38. Nov. 18, 1938. Off Long Point, Catalina Island, California. In 40 fms. Brachiopod and sponge clusters.
Lepidonotus caelorus Moore

St. 901-38. Nov. 20, 1938. Point Fermin, California. Shore. Rocky beach.
Halosydna brevisetosa Kinberg

St. 902-38. Nov. 21, 1938. Portuguese Bend, California. Shore. Rocky beach.
Halosydna brevisetosa Kinberg
Halosydna johnsoni (Darboux)

St. 903-38. Dec. 5, 1938. Anaheim Slough, near Anaheim Landing, California. Shore. Muddy sand.
Halosydna johnsoni (Darboux)

St. 904-38. Dec. 6, 1938. Laguna Beach, California. Shore. Reefs.
Halosydna brevisetosa Kinberg
Thormora johnstoni (Kinberg)
Harmothoë hirsuta Johnson

St. 905-38. Dec. 7, 1938. Same as for St. 903-38.
Halosydna johnsoni (Darboux)

St. 906-38. Dec. 8, 1938. Portuguese Bend, California. Shore. Reefs.
Halosydna brevisetosa Kinberg
Halosydna johnsoni (Darboux)
Harmothoë hirsuta Johnson

Acc. R 1. Dredged off southern California.
Aphrodita refulgida Moore

Acc. 525. El Segundo, near Los Angeles, California. Dredged.
Halosydna latior Chamberlin

Acc. 542. Five miles east of Lighthouse, near Los Angeles, California. Dredged.
Halosydna latior Chamberlin

Acc. 585. D 88. East from breakwater, near San Pedro, California. In 8 fms.
Halosydna latior Chamberlin
Sthenelais fusca Johnson

Acc. 587. D 90. Dredged off southern California.
**Eusigalion spinosum,* new species

Acc. 590. D 93. Near Rocky Point, vicinity of Los Angeles, California. Dredged.
Aphrodita armifera Moore
**Eusigalion spinosum,* new species

D 104. Santa Catalina Island, California. Dredged.
Aphrodita armifera Moore

Acc. 622. D 133. White's Point, southern California. Dredged.
Halosydna latior Chamberlin

Table I below indicates the main geographical areas investigated by the Allan Hancock Pacific Expeditions and gives the species, grouped by families, taken from these areas. The numbers in the columns refer to the stations investigated, without the year number. Complete station numbers may be consulted in the list above. Areas indicated by *x* refer to stations for which there are collections made other than by the Hancock Expeditions, or for previous records from the literature.

It is to be observed that, of a total of 59 species, few are common to the northern and southern eastern Pacific. Thus, for example, only 5 species *(Aphrodita japonica, Arctonoë vittata, Thormora johnstoni, Sthenelais fusca,* and *Sthenelais verruculosa)* have been taken over this range. In addition, there are only 6 species *(Aphrodita refulgida, Halosydna latior, Pareulepis fimbriata, Eusigalion spinosum, Leanira fimbriarum,* and *Sthenelanella uniformis)* common to southern California and the equatorial or subequatorial Pacific. Also, the affinities of the fauna of the Gulf of California are seemingly with that of western Mexico, on the one hand, and the Galapagos, on the other.

TABLE I

Name of Species	California	Gulf of Calif.	Western Mexico	Costa Rica	Panama	Colombia	Ecuador	Peru	Cocos	Galapagos
	LOCALITIES									
Aphroditidae										
Aphrodita armifera	895, 897									
A. falcifera			287							
A. japonica	881	558, 632			863	430, 432	213 209, 212			
A. parva	899		740							
A. refulgida	886, 887									
Pontogenia laeviseta		542, 548	277		244, 249 451, 863					
Polynoidae										
Arctonoë vittata	x						20			
Chaetacanthus magnificus			132, 264		245, 251		211			
Eulagisca panamensis					436					
?Eunoë barbata	885									
Eunoë senta	874									
Halosydna brevisetosa	878, 882, 885, 886, 901, 902, 904, 906									
H. fuscomarmorata					437	414		380, 391		
H. glabra		683, 688			444					
H. johnsoni	902, 903, 905, 906									
H. latior	x	x								
H. parva		610					22	374, 380		152
H. sp. A		719								
H. sp. B		617								

Name of Species	LOCALITIES									
	California	*Gulf of Calif.*	*Western Mexico*	*Costa Rica*	*Panama*	*Colombia*	*Ecuador*	*Peru*	*Cocos*	*Galapagos*
Harmothoë exanthema		Perdita Island	273					372, 376, 384, 385		
H. hirsuta	888, 904, 906	612								
Hololepida veleronis		532, 549								
Hololepida, sp.										148
Iphione ovata		numerous		466	114, 867	232, 239	213	436, 446		343, 789
Lagisca multisetosa	874									796
Lepidonotus furcillatus					863	429	212		171	
L. caelorus	874, 891, 894, 900									
L. crosslandi								375, 376		
L. hedleyi		549								
L. hupferi		683	125		448		210			
L. nesophilus			?273							148, 814
L. panamensis					245, 863					
L. versicolor		529, 728								
Lepidametria gigas										148
L. virens				769			?213, 396			167, 169, 182, 315
Polynoë veleronis						405		834, 835		
Thormora johnstoni	878, 904	numerous			450	?414	217			76, 194, 789
Polyodontidae										
Panthalis marginata				770						
P. pacifica	x	492			?244					
P., sp.						851				

Name of Species	LOCALITIES									
	California	*Gulf of Calif.*	*Western Mexico*	*Costa Rica*	*Panama*	*Colombia*	*Ecuador*	*Peru*	*Cocos*	*Galapagos*
Polyodontes frons					443					
P. oculea		502					216			
P. panamensis										198
Pareulepidae										
Pareulepis fimbriata	Mission Bay			770			216			
Sigalionidae										
Eusigalion hancocki		126, 701	745, 747	769			208			74, 66
E. spinosum	numerous								780	198, 814
Leanira fimbriarum	880	640, 667			436		216			
Psammolyce antipoda anoculata				465						
P. fimbriata		283	745		250					
P. fimbriata myops		639								
P. spinosa			140							780
Sthenelais fusca	x		745	770					780	28, 343
S. maculata		634, 639	273					364, 373, 379, 833		
S. neoleanirae		667								
S. variabilis colorata				116, 470	250, 450, 451					
S. verruculosa	888, 893, 894, 897		287							
Sthenelanella uniformis	876, 878, 895, 900		259				213			
Pisionidae										
Pisione oerstedi								375		
Pisionella hancocki								366, 375		

The families considered in this report include the scale-bearing chaetopods and the Pisionidae. The latter family is included because its affinities are with this group, with respect to its proboscidial and prostomial structures. A key to these families follows.

1. Dorsum provided with elytra which may or may not be concealed by a felty covering 2

1. Dorsum without elytra or felt . . . . . PISIONIDAE

2. Some segments with dorsal cirri, others with elytra 3

2. All segments with elytra; body long, vermiform (not represented in the collections) . . . POLYLEPIDIDAE

3. Body long, slender, all posterior segments bearing elytra . . . . SIGALIONIDAE

3. Body long, slender, to short, plump; posterior segments have elytra alternating with dorsal cirri or have no elytra 4

4. Elytra and dorsal cirri alternate more or less regularly throughout; prostomium with sessile eyes and with or without pedunculate eyes; without facial tubercle . POLYODONTIDAE

4. Elytra and dorsal cirri alternate regularly on anterior segments, but irregularly present on posterior segments or entirely absent 5

5. Ventral acicula stout, with an expansive chitinous, embedded plate (pl. 23, fig. 280) at its distal end; body short, subrectangular; posterior segments without true elytra . . . . PAREULEPIDAE

5. Ventral acicula without distal expansion; body long or short; posterior segments with or without elytra 6

6. Proboscis without horny jaw pieces; prostomium with a median antenna; eyes usually stalked (rarely sessile); facial tubercle well developed; dorsum with or without felt . . . . APHRODITIDAE

6. Proboscis with 4 horny jaw pieces at its distal end; prostomium with 3 or 2 antennae; eyes sessile; facial tubercle absent or not conspicuous; dorsum without felt covering . . . . POLYNOIDAE

Family Aphroditidae

The Aphroditidae are almost entirely restricted to subintertidal habitats. Thus they are usually not encountered in shore collecting. Two genera, *Aphrodita* Linnaeus and *Pontogenia* Claparède, are represented in the collections.

Sixteen species of the genus *Aphrodita* have been reported from the eastern Pacific, the majority of them as original descriptions, and only one species of *Pontogenia* (*P. curva* Chamberlin). Many of these are too little known to permit certain identity. Eleven species of *Aphrodita* were originally described from California, nine of which originated in southern California. A revision of the entire group from the eastern Pacific is necessary before any extensive conclusions may be drawn as to the distribution of these species. A revision and study of the type specimens would be of the greatest value. However, at least some of them have not been found where they were said to have been deposited.

Numerous specimens available for study in the collections of The University of Southern California, collected from California south to Peru, have permitted the identification of some of the species which had been in doubt. *A. raripillata* Essenberg (1917, p. 413) agrees well with *A. armifera* Moore (1910, p. 371). Both types originated in southern California. *A. armifera* Fauvel (1925, p. 144) from Australia is another species (see page 23). *A. cryptommata* Essenberg (1917, p. 409) must be referred to *A. japonica* Marenzeller (1879, p. 111), one of the commonest species of *Aphrodita* dredged in fairly shallow waters from southern California southward. *A. leioseta* Chamberlin (1919, p. 254) from Mendocino, California, is perhaps the same. *A. echidna* Treadwell (1906, p. 1157) (not Quatrefages, 1865, p. 197) was referred to *A. japonica* by Moore (1910, p. 375). This seems unlikely, however, because some of the neuropodial setae were said to be bifurcated, with a denticulate tip (Treadwell, 1906, fig. 24). This condition is not usually characteristic of the genus *Aphrodita*.

Aphrodita solitaria Essenberg (1917, p. 408) may be the same as *A. refulgida* Moore (1910, p. 376). Both have pointed neuropodial setae (pl. 1, figs. 7, 8) in addition to other identical characters, and both probably originate from southern California. *A. castanea* Moore (1910, p. 380) was compared with *A. negligens* Moore (1905, p. 525; 1910, p. 385) but their identity was not definitely established. These two, as also *A. californica* Essenberg (1917, p. 406), have many similarities. In *A. californica* the stout notopodial setae were said to be almost completely concealed in the felt. This character, in itself, is not significant for it is sometimes dependent on the amount of accumulated debris or attached organisms rather than on an actual difference in the lengths of these setae. Fauvel (1925, p. 140) questionably referred *A. castanea* Moore and *A. longipalpa* Essenberg (1917, p. 403) to *A. talpa* Quatrefages (1865, p. 196) from Australia. This identity seems extremely unlikely, especially because of the differences in the setae of both notopodia and neuropodia. Unless a restudy of the type of *A. longipalpa* is possible, this name is perhaps to be considered a doubtful one. There is no convincing record that *A. talpa* Quatrefages occurs in the eastern Pacific. Also, none of the specimens here available from the eastern Pacific have neuropodial setae as shown by Fauvel (1925, fig. 4) who re-examined the type specimen of *A. talpa* and made a careful study of the setae.

A. defendens Chamberlin (1919a, p. 80) was described from Peru, in 1,036 fms. The great depth from which it was taken does not favor its comparison with species from shallower waters without additional collections from similar depths.

The following species of APHRODITIDAE are taken up in this report.

Aphrodita armifera Moore (includes *A. raripillata* Essenberg)
Aphrodita japonica Marenzeller (includes *A. cryptommata* Essenberg and perhaps *A. leioseta* Chamberlin)
Aphrodita parva Moore
Aphrodita refulgida Moore (includes *A. solitaria* Essenberg)
Aphrodita falcifera, new species
Pontogenia laeviseta, new species

Genus APHRODITA Linnaeus

Aphrodita armifera Moore

Plate 1, Fig. 6

Aphrodita armifera Moore, 1910, pp. 371-375, pl. 31, figs. 65-66, pl. 32, figs. 67-75; Chamberlin, 1919c, p. 254 (not Fauvel, 1925; see *A. falcifera,* p. 23).

Aphrodita raripillata Essenberg, 1917, pp. 413-416, pl. 36, figs. 64-67, pl. 37, figs. 85-86 (not Fauvel, 1925, p. 144).

Collections.—Acc. 590, D-104, 895-38, 897-38, San Pedro, California. 5 specimens.

Aphrodita armifera is characterized by its heavy, smooth, dorsal notopodial spines which are deep copper colored. These are conspicuously heavier than the neuropodial spines and appear darker because of their thicker stems. They are stoutest at the base and taper rapidly to a blunt point. The longest are dorsalmost. They form 5 or 6 irregular transverse rows on a parapodium. They project out from the body so as to form a formidable series.

The ventralmost neuropodial setae have a pair of spurs differing from those in *A. falcifera* (cf. pl. 1, figs. 6 and 14). Median and superior neuropodial setae do not have lateral processes. The presence or absence of pilosity is variable. The ventral setae are ranked about as follows: 2 superior, 3 median, 4 to 6 inferior.

A. armifera differs from *A. falcifera* (see p. 23) most notably in having copper-colored, nearly straight, stout dorsal spines instead of yellow, slenderer, dorsal spines, and in having only the ventralmost neuropodial setae spurred instead of all or most of them.

A. armifera Fauvel (1925, pp. 144-147) from Australia is not the same as *A. armifera* Moore. In the former, the notopodial setae are rough, and the neuropodial setae have a lateral spur as described for *A. falcifera* (p. 23). Fauvel designated the notopodial setae as "bronzées ou dorées." In *A. armifera* Moore they are coppery.

A. raripillata Essenberg (1917, p. 413) from southern California may be referable to *A. armifera* Moore, although it is not certain that the inferior neuropodial setae have the paired spurs characteristic of the latter. In other respects the descriptions are similar.

Distribution.—Southern California. Subintertidal to 55 fms.

Aphrodita japonica Marenzeller

Plate 1, Figs. 1-5

Aphrodita japonica Marenzeller, 1879, pp. 111-112, pl. 1, fig. 2.

Aphrodita japonica Moore, 1903, p. 423; 1908, pp. 338-339; 1910, pp. 375-376; Berkeley, 1923, p. 211.

Aphrodita cryptommata Essenberg, 1917, pp. 409-411, pl. 34, figs. 39-50, pl. 37, fig. 83.

Collections.—209-34, 212-34, 213-34, 430-35, 432-35, 558-36, 632-37, 863-38, 881-38, Redondo Beach, California. 10 specimens.

Length to 48 mm, width to 25 mm without lateral fibers. The neuropodial setae are arranged in three tiers, arranged about as follows: 2 stout superior (pl. 1, fig. 1), 5 median slenderer than those in the superior rank (pl. 1, fig. 2), 7-20 inferior much paler and slenderer setae. Those in the superior and median tiers are falcate, copper colored, those in the inferior tier are as shown in figure 4, and are pale yellow. In some specimens the pilosity is very extensive (pl. 1, fig. 5), in others almost absent, because of the sloughing off of the pilose hood. The longer dorsal setae have a hooked tip (pl. 1, fig. 3).

Dorsal cirri are long, slender; ventral cirri are pale, tapering, extending distally about as far as the middle of the ventralmost setae or somewhat beyond.

The description of *A. cryptommata* Essenberg agrees well with that of *A. japonica* save for the statement that in the former the elytra are squarish along their medial margins. The shape of the elytra is similar, however, if the inner edge be slightly cut away, as sometimes happens when the dorsal felt is cut apart.

Distribution.—Northeast and northwest Pacific; California south to Ecuador. In depths to 75 fms.

Aphrodita parva Moore

Plate 1, Figs. 9, 10

Aphrodita parva Moore, 1905, pp. 529-532, pl. 34, figs. 3-7; 1908, p. 339; 1910, pp. 385-386; Treadwell, 1914, p. 178; Berkeley, 1923, p. 211.

Collections.—740-37, 899-38. About 25 specimens.

Length 8 to 24 mm; width to 15 mm without lateral fibers. The dorsum is dark drab, completely covered with fibers and debris, neither notopodial nor neuropodial setae projecting. Lateral fibers inconspicuous. The superior neuropodial setae are pilose distally (pl. 1, fig. 10). The inferior neuropodial setae have a minute spur at their widest part (pl. 1, fig. 9). Some of them have a delicate dehiscent hood.

Distribution.—Northeast Pacific, Gulf of Georgia to western Mexico. In depths from 3 to 667 fms.

Aphrodita refulgida Moore

Plate 1, Figs. 7, 8

Aphrodita refulgida Moore, 1910, pp. 376-380, pl. 32, figs. 76-84; Treadwell, 1914, p. 177.

Aphrodita solitaria Essenberg, 1917, pp. 408-409, pl. 37, figs. 81, 82; pl. 33, figs. 27-38.

Collections.—886-38, 887-38, Acc. R 1. 3 specimens.

All of the neuropodial setae taper distally and terminate in an attenuated point (pl. 1, figs. 7, 8). The description of *A. solitaria* Essenberg agrees reasonably well with Moore's description of *A. refulgida.*

Monro (1933, p. 12) doubtfully referred some specimens from Perlas Islands in the Panama region to *A. solitaria* Essenberg. I believe these to be what has herein been designated *A. japonica* (see above).

Distribution.—Central and southern California. Subintertidal to 51 fms.

Aphrodita falcifera, new species

Plate 1, Figs. 11-15; Plate 26, Figs. 319, 320

Collection.—287-34 (Holotype). 1 specimen.

Length 22 mm, width 16 mm; number of setigerous segments 34. Anterior and posterior ends similar in outline, the posterior end not greatly attenuated to form a tube.

Prostomium approximately triangular, the anterior end broadest; provided with 4 subequal black eye spots, the two of a side near together. A small median antenna is inserted between the eyes, and a smaller, papillar antenna is on each side between anterior and posterior eyes (pl. 1, fig. 15). The facial tubercle is large, conspicuous, as typical of the genus.

General appearance rough, spiny, because of the numerous, long, dorsal spines which project laterally, obliquely upward and dorsally across the body. The notopodial setae (pl. 26, fig. 319) are yellowish to gold, the neuropodial setae bronze colored. The former greatly exceed the ventral setae in number and length. The dorsal setae form ten or more irregular transverse series in each parapodium; they are slenderer than the superior neuropodial setae, and the ventralmost are about as thick as the dorsalmost, but the uppermost exceed the lower in length. In the inferior part of the fascicle there are a few finer, shorter setae which are obscurely pilose. The others appear rough due to the presence of numerous pustules over the surface, but the tips are smooth (pl. 26, fig. 320).

The neuropodial setae project from the neuropodium in three series (pl. 1, fig. 11). There are 2 heavier, longer superior setae, 2 or 3 slenderer median setae of about the same color, and 3 or 2 still finer, somewhat paler inferior setae. All are falcate distally, with a minute spur near the point where the seta curves (pl. 1, figs. 12 to 14). This condition contrasts with that in *A. armifera* where only the inferiormost setae have a lateral projection, also in the latter the spur is paired (pl. 1, fig. 6). The elytra are pale or white, smooth save for a few scattered prickles.

Fauvel (1917, p. 167) reported and described a single specimen from southern Australia, which he referred to *A. talpa* Quatrefages. The same specimen he later (1925, p. 144) referred to *A. armifera* Moore. The dorsal setae were described as follows: "Bronzées ou dorées, plutôt courtes, droites ou légèrement incurvées et dépassent peu l'épais et grossier feutrage dorsal." In the specimen at hand, these setae are yellow, only the neuropodial setae are bronze. In other respects the specimen from Carros Island agrees with the description given for the individual from southern Australia. In my opinion this is different from *A. armifera* Moore.

Holotype.—AHF no. 1.

Distribution.—South Bay, Carros Island, Mexico, in 10-15 fms. ?Southern Australia.

Genus **PONTOGENIA** Claparède

Pontogenia laeviseta, new species

Plate 2, Figs. 16-30

Collections.—244-34, 249-34, 277-34, 451-35, 542-36, 548-36, 863-38 (Holotype). 10 specimens.

Length to 20 mm, width to 7 mm. Number of setigerous segments 32. Dorsum pale, the elytra imbricated and not concealed by felt, but laterally somewhat covered by foreign matter that is enmeshed in the strong dorsal spines. Notopodial setae pale amber, neuropodial setae somewhat darker. Ventrum pale save for dark spots that form a pattern, consisting of a pair along the mid-ventral line, and one or two irregular pairs along the sides, median to the parapodia. The dark spots represent some of the ventral papillae which more or less closely cover the ventral surface. These papillae are continued on the neuropodia, thickest on the anterior sides.

The prostomium is white, globular, with a stout anterior prolongation forming the base of the median ceratophore (pl. 2, fig. 16). At the anteroventral margin is a pair of oval stalks bearing a pair of eyes at the terminal ends. The dorsal eye is small, rounded, the ventral much larger and more prominent. The median antenna is long, slender, greatly exceeding the cirrus of the first segment but surpassed by the palpi. The latter are smooth, white, tapering, inserted on the ventral side of the first foot, and extend distally beyond the prostomial antenna.

Parapodia are prominent in ventral view. The neuropodial lobe is elongate, triangular. The first parapodium is weak, largely concealed by the heavy bases of the palpi. Its setae are few, small. From the second segment the notopodia and neuropodia are much stronger. The notopodial setae include a dorsal fascicle of stouter, slightly curved setae faintly toothed on one side (pl. 2, fig. 29), and an inferior fascicle of much smaller, hair-like setae. The neuropodial setae include 2 stouter, falcate setae with several subterminal teeth (pl. 2, fig. 19), and an inferior fascicle of finer, smaller, more numerous setae with a falcate tooth and 2 rows of many teeth on the cutting edge (pl. 2, fig. 28).

The third segment (cirriferous) contains a superior fascicle of about 7 heavy, acicular notopodial setae, faintly denticulated on one side (pl. 2, fig. 26). The setae in other fascicles resemble those in the second segment. The dorsal cirrus is very long, slender, with a tip similar to that of the prostomial antenna, extending distally about as far as the palpi. The ventral cirrus extends distally about as far as the neuropodium, and has a slight terminal thickening.

Median parapodia have thick, blunt notopodia with numerous heavy setae, and triangular neuropodia with a few (about 3) long, falcate setae (pl. 2, figs. 17, 18). Some of the superiormost notopodial setae pierce the lateral margin of the elytrum, where the latter is attached to the elytrophore. They are directed dorsally so as to lie on the dorsal side of the elytrum. In addition, there are heavy notopodial setae directed laterally and ventrally. The neuropodia project laterally beyond the notopodia and have few (about 3) long, falcate setae. All are similar and have a subterminal spur some distance below the terminal fang (pl. 2, figs. 20, 21). The notopodial setae (pl. 2, fig. 22, 27) have asperities over most of their surface save at the tip and near its insertion in the notopodium, but there are no lateral teeth or spinelets. The inferiormost notopodial setae are nearly smooth (pl. 2, fig. 30).

Posterior parapodia are essentially like those in the median region of the body, except that they are smaller, and the neuropodial setae have as many as 2 or 3 lateral spurs (pl. 2, figs. 23, 24).

Elytra 15 pairs, white, translucent, their point of attachment at the external margin (pl. 2, fig. 17), their surface covered over with many globular to elongate papillae, most crowded near the elytrophore (pl. 2, fig. 25) and somewhat dispersed near the distal margin. The papillae resemble those on the notopodium but are more flattened, merging into the surface of the elytrum.

The character of the prostomium with its ocular prominences, the kind of neuropodial setae and the elytra identify this species with the genus *Pontogenia*. It lacks, however, the harpoon-like and scimitar-like setae characteristic of most of the species of this genus. They are replaced by notopodial setae that are almost smooth except for minute asperities.

This is the first record, to my knowledge, of this genus from the eastern Pacific. Several species (*P. curva* Chamberlin, *P. maggiae* Augener, and *P. sericoma* Ehlers) have been described from the Gulf of Mexico and the West Indian region, but from each of these *P. laeviseta* differs most notably in its setigerous structures.

Holotype.—AHF no. 2.

Distribution.—Bahia Honda, Panama (type); Secas Islands, Panama; Isabel Island, Mexico; Angel de la Guardia Island, Lower California, Mexico. Shore to 80 fms.

Family Polynoidae

Key to Subfamilies of *POLYNOIDAE* herein considered

1. Prostomium with only two antennae; body short, depressed, completely covered by elytra . . . . . IPHIONINAE
1. Prostomium with a median antenna in addition to the paired ones; body short, depressed to elongate slender; completely covered by elytra or more or less exposed 2
2. Paired prostomial antennae inserted terminally, continuous with the prostomial peaks . . . . LEPIDONOTINAE
2. Paired prostomial antennae inserted ventrally, the prostomium terminating anteriorly in a pair of tapering peaks . . . . HARMOTHOINAE

Subfamily Iphioninae Seidler

Genus IPHIONE Kinberg

Iphione ovata Kinberg

Plate 3, Figs. 31, 32

Iphione ovata Kinberg, 1855, p. 383; 1910, p. 8, pl. 3, figs. 8-8H, pl. 10, fig. 43; Chamberlin, 1919a, p. 64; Monro, 1928a, pp. 557-558; 1928b, pp. 471-472.

Collections.—114-33, 232-34, 239-34, 343-35, 436-35, 446-35, 466-35, 498-36, 510-36, 518-36, 638-37, 662-37, 789-38, 796-38, 867-38. 28 specimens.

Elytral margin entire, without lateral fringe, but with conspicuous spines on the lateral and postlateral portions of the elytra. The prostomium has 2 pairs of black eyes on its posterior half, and a tiny median papilla midway between the eyes. The anterior paired antennae are inserted terminally, but the inflated appearance of the prostomial lobe obscures the bases of the antennae from dorsal view.

Parapodia are robust, the neuropodial lobes sharply truncate, the neuroacicular lobe projects from the dorsal ectal margin (pl. 3, fig. 32). Notopodial setae are numerous, slender, hair-like, closely serrated. Neuropodial setae are much coarser, the tip entire, with 15-20 transverse rows of serrations (pl. 3, fig. 31).

Distribution.—*Iphione ovata* Kinberg is widely distributed in tropical waters of the eastern Pacific, from Ecuador north to Agua Verde Bay, Gulf of California, and westward to the Galapagos Islands and the Hawaiian Islands. It is replaced by *I. muricata* Savigny in the Indo-Pacific region.

Subfamily **Lepidonotinae** Seidler

Key to Genera of *LEPIDONOTINAE* herein considered

1. With 12 pairs of elytra 2
1. With 15 pairs of elytra . . . . EULAGISCA
1. With 18 pairs of elytra . . . . HALOSYDNA
1. With more than 18 pairs of elytra 4
2. Elytrophores with branchiae . . . CHAETACANTHUS
2. Elytrophores without branchiae 3
3. Notopodia with two kinds of setae, including some which are smooth, lancet shaped . . . . THORMORA
3. Notopodial setae of one kind, ornamented with transverse rows of serrations . . . . LEPIDONOTUS
4. Prostomial antennae inserted subterminally; neuropodial setae few, stout, falcate, the serrations obscure or absent . . . . ARCTONOË
4. Prostomial antennae inserted distinctly terminally; neuropodial setae numerous, not unusually stout, transverse serrations usually distinct . . . . LEPIDAMETRIA

Genus **CHAETACANTHUS** Seidler

Resembles *Lepidonotus* Leach in segmental and elytral counts; elytrophores with branchial appendages. Dorsal setae fine, hair-like, numerous, much as in *Iphione* Kinberg. Several species have been described in this genus, but all are thought to be identical with *C. magnificus* (Grube) (Seidler, 1924, p. 97).

Chaetacanthus magnificus (Grube)

Iphione magnifica Grube, 1875, p. 51.

Polynoë branchiata Treadwell, 1902, p. 186, figs. 5-7.

Lepidonotus (Physalidonotus) barbatus Augener, 1910, pp. 244-246, figs. 4-6.

Chaetacanthus magnificus Seidler, 1924, pp. 97-98; Monro, 1928a, p. 558.

Lepidonotus pilosus Treadwell, 1937, pp. 141-143, pl. 1, figs. 1-7.

Collections.—132-34, 211-34, 245-34, 251-34, 264-34. 7 specimens.

Lepidonotus (Physalidonotus) barbatus Augener was described from a single specimen questionably attributed to the north Pacific. The same author considered the specimen close to *Lepidonotus chitoniformis* Moore. The latter is, however, a *Euphione* (Seidler, 1924) and indigenous to the northwest Pacific.

Lepidonotus pilosus Treadwell was described from the southern end of the Gulf of California, Mexico. It has branchiae on the elytrophores, hence a *Chaetacanthus;* the elytra are heavily fringed and the notopodial and neuropodial setae agree with those in *C. magnificus* (Grube).

Distribution.—West Indian region; Panama; eastern Pacific from Ecuador north to the Gulf of California. Widely distributed in warm and tropical seas. Intertidal to 40 fms. In coral and rock crevices.

Genus **ARCTONOË** Chamberlin

Consists of a varying number of segments, to 60 or more. Elytra continued to end of body but often leaving a broad dorsal area exposed. Inserted as in *Halosydna* Kinberg on the first 26 segments, insertion more or less irregular on more posterior segments. Last few pairs of elytra sometimes so small as to be made out with difficulty. Prostomium lepidonotoid, but lateral antennae inserted subterminally, and eyes much reduced in size. Parapodia subbiramous, the notopodium reduced, with an aciculum and a few serrated setae; neuropodium robust, its setae stout, falcate, often few in number, with serrations obscure or absent.

Arctonoë vittata (Grube)

Plate 3, Figs. 33-37

Polynoë vittata Grube, 1855, p. 82-83.

Lepidonotus lordi Baird, 1863, p. 107.

Halosydna lordi Baird, 1865, p. 190-191; Moore, 1908, p. 330.

Polynoë lordi Johnson, 1897, pp. 175-177, pl. 7, figs. 35, 44; pl. 8, figs. 51-51b; 1901, pp. 388-390.

Halosydna vittata Baird, 1865, p. 188.

Acholoë vittata Marenzeller, 1902, pp. 576-577, pl. 3, fig. 13.

Arctonoë lia Chamberlin, 1920, pp. 6B-7B, pl. 1, figs. 1-4, pl. 2, figs. 1-3.

Halosydnoides vittata Seidler, 1924, pp. 134-135; Monro, 1928c, p. 312.

Halosydna succiniseta Hamilton, 1915, pp. 234-235, figs. 1-4.

Collection.—20-33, at night, with electric light. 2 specimens.

Pale or white; length to 25 mm, number of setigerous segments to 56. The prostomium is broader than long and has clavate appendages (pl. 3, fig. 33). Elytra present on some segments throughout length; they are smooth, pale, the edges entire or the outer edge slightly frilled. The first parapodium (segment 2) has bifid notopodial (pl. 3, fig. 36) and neuropodial setae (pl. 3, figs. 35, 37). The neuropodial setae in more posterior segments are stout, few, to 5 or 6 in a fascicle, with obscure rows of pectinae at the widest region (pl. 3, fig. 34).

No fine swimming setae or other specialized natatory organs could be detected that might explain the presence of these two individuals in the surface tow at night. Also, they are not sexually mature. The length of the specimens (25 mm) indicates that they were well past the pelagic larval stage, known to exist in some polynoids.

This is the first record of this species south of southern California.

Distribution.—Japan; Alaska; western North America to San Diego; Ecuador. Intertidal to 12 fms. Often found associated with Fissurella or other gastropods.

Genus **EULAGISCA** McIntosh

Body short, depressed; lateral antennae inserted subterminally, the median antenna dorsal to the paired ones. Elytra 15 pairs, inserted as in *Harmothoë* Kinberg. Notopodial and neuropodial lobes developed, attenuated distally to a slender tip. Notopodial setae numerous, some as stout as, or stouter than, the neuropodial setae; distally entire, and with transverse rows of pectinae more or less obscured. Neuropodial setae numerous, their tips entire or with a minute subterminal tooth (pl. 3, fig. 38), with transverse rows of pectinae more obvious than in the notopodial setae.

Eulagisca panamensis, new species

Plate 3, Figs. 38-42

Collection.—436-35 (Holotype). One specimen.

Length 40 mm; width 6 mm without, 11 mm with parapodia, 17 mm with setae. Form broad, depressed, harmothoid. Prostomium without prostomial peaks, the paired antennae inserted subterminally, the median antenna inserted at the anterior margin of the prostomium, dorsal to the paired antennae. Facial tubercle present but not conspicuous. A triangular flap (=nuchal hood) extends toward the posterior margin of the prostomium but does not cover it.

Elytra 15 pairs, completely covering dorsum; their surface smooth, margin entire; the outer edge turned up by the dorsally directed notopodial fascicles. Anterior margin concave slightly (pl. 3, fig. 42). They are pale save for a semilunar, rust-colored area over the posterior half, around the elytral scar, but leaving a pale posterior margin. Styles of dorsal cirri, peristomial cirri, and prostomial antennae dark brown with pale terminal tips. Ventral cirri pale.

Parapodia well developed, the acicular lobes taper and terminate in points (pl. 3, fig. 39). Notopodial setae numerous, some finer, others about as heavy as the neuropodial setae; all are nearly smooth, with faint indications of teeth along the cutting edge (pl. 3, fig. 40). Neuropodial fascicle stout, the dorsalmost setae similar to the ventralmost except that the latter are somewhat smaller; tip entire (pl. 3, fig. 41) or with a minute subterminal tooth (pl. 3, fig. 38); with transverse rows of pectinae.

The presence of some bifid neuropodial setae in this specimen minimizes the importance of this character in separating *Eulagisca* McIntosh from *Allmanniella* McIntosh. Monro (1936, p. 91) has already indicated the affinities of these 2 genera.

Eulagisca panamensis differs from *E. corrientis* McIntosh, the only other species in this genus, in that the notopodial setae are not notably stouter than the neuropodial setae; also, a few of the latter have a minute subterminal tooth. The elytra in *E. panamensis* are rather firmly attached, in *E. corrientis* they are readily detached. *E. corrientis* is known from the southwest Atlantic, in depths of 150-600 fms.; *E. panamensis* was taken from the intertidal zone on the Pacific side of Panama.

Holotype.—AHF no. 3.

Distribution.—Piñas Bay, Panama. Shore.

Genus HALOSYDNA Kinberg, emend., Hartman

Body moderately short, depressed; number of setigerous segments about 36; number of elytra 18 pairs (or rarely 19), distributed on segments 2, 4, 5, 7, 9, . . . 27, 28, 30, 31, 33 (or rarely also on 34). Notopodial setae shorter and slenderer than neuropodial setae, serrulated. Neuropodial setae with a distal enlargement, the tip entire or bifid, the expanded portion with transverse rows of serrations. (See Hartman, 1938, p. 109, for synonymy.)

Halosydna fuscomarmorata (Grube)

Plate 9, Figs. 119, 120

Polynoë fuscomarmorata Grube, 1875, p. 62.

Halosydna fuscomarmorata Augener, 1906, pp. 117-119, pl. 3, figs. 41-44; Monro, 1928a, pp. 566-567.

Collections.—391-35, 380-35, 414-35, 437-35. 5 specimens.

Length to 25 mm (egg-laden individual). The dorsum, including the elytra, is dark bluish gray, the ventrum paler; setae are amber colored. The prostomium has four small eyes so placed as to be almost visible in dorsal view. Elytra are smooth, with a characteristic dark, marmorated pattern, deepest in the area over the hilum, but leaving a pale or white spot over the area of attachment (pl. 9, fig. 119). Microtubercles are distributed chiefly along the anterior margin but a few are scattered over the entire surface (see also Monro, 1928a, p. 567). Neuropodial setae are distinctly bifid at their distal end, and the serrations increase in size distally (pl. 9, fig. 120).

Distribution.—Peru, Colombia, Panama. Intertidal to 3 fms. Seidler (1924, p. 120) erroneously reported this from the West Indies. Since this record is based on Grube's type, it should be Peru.

Halosydna latior Chamberlin

Halosydna latior Chamberlin, 1919b, pp. 1-2; Hartman, 1938, p. 110.

Halosydna obtusa-cirrata Treadwell, 1937, pp. 143-144, pl. 1, figs. 8-11.

Collections.—Acc. 525, Acc. 542, Acc. 585, Acc. 622. 10 specimens.

Distribution.—Southern California to Lower California, Mexico. Low intertidal to 40 fms. *H. obtusa-cirrata* Treadwell was described from east of Cedros Island, Lower California. This is the same as Cerros Island, on the outer side of Lower California, along the northern half of the peninsula.

Halosydna parva Kinberg

Plate 21, Figs. 265-267

Halosydna parva Kinberg, 1855, p. 385; 1910, pp. 17-18, pl. 5, fig. 24; Seidler, 1924, p. 116.

Polynoë mülleri Grube, 1856, p. 48; Augener, 1906, p. 119.

Polynoë clavata Grube, 1856, p. 47.

Collections.—22-33, 152-34, 374-35, 380-35, 610-37. 5 specimens.

Some individuals have a rust colored dorsal pigmentation, others sooty. The dorsum is marked with segmental dark transverse stripes; the prostomial antennae and palpi are dark.

The prostomium, without the prostomial peaks, is 6-sided, and a little wider than long. A shallow median sulcus extends throughout its length. Eyes are subequal in size. The median ceratophore is inserted broadly between the bases of the lateral ceratophores. The median style is 4 or 5 times as long as its base. Palpi are smooth, extending distally beyond the peristomial cirri.

The neuropodial setae are pale amber, disposed 16 to 20 in a fascicle, in 2 or 3 trim vertical rows. All are similar, subequal to one another, and distally bifid (pl. 21, fig. 267). The notopodial setae are much finer than the neuropodial setae, the dorsalmost shorter, blunter. Elytra have lateral fringe on the exposed ectal margin (pl. 21, fig. 266), and microtubercles over the surface (pl. 21, fig. 265), distributed most abundantly on the exposed part of the surface. Most of the surface has a finely reticulated pigmented pattern, least developed where the tubercles are largest.

Several individuals from Peru differ slightly in that the microtubercles are proportionately larger. A specimen from Santa Rosalia Bay, Lower California (610-37), has some of its neuropodial setae entire distally. It is very dark (preserved) throughout.

Augener (1906, p. 118) had occasion to reexamine the type of *Polynoë clavata* Grube and concluded that it and *H. mülleri* Grube were identical. An elytrum from the type of *P. clavata* (Augener, 1906, pl. 3, fig. 45) closely resembles one from a specimen from Independencia Bay, Peru (374-35). Grube gave "West Indies" as the type locality. Augener, however, corrects "dass diese von Callao [Peru] an der pacifisch-amerikanischen Küste stammt." The neuropodial setae are clearly bifid (pl. 21, fig. 267), the serrated rows distinct.

Halosydna virgini Kinberg (1855, p. 384) from Honolulu may be close to *H. parva.* Its identity is doubtful. Another closely related species is *Polynoë marginata* Grube (1876, p. 62) from Callao, Peru. Augener (1906, p. 119) reported the type missing from the museum at Copenhagen, where it was said to have been deposited.

Distribution.—Chile; Peru; Ecuador; Gulf of California, Mexico; Galapagos. Shore to 15 fms.

Halosydna brevisetosa Kinberg

Halosydna brevisetosa Kinberg, 1855, p. 385; 1910, p. 18, pl. 5, fig. 25; Monro, 1928c, pp. 311-312 (not Treadwell, 1902, p. 186; see Hartman, 1938, p. 110).

Polynoë brevisetosa Johnson, 1897, pp. 167-170, pl. 6, fig. 24, pl. 7, figs. 31, 40, pl. 8, fig. 46.

Lepidonotus insignis Baird, 1863, pp. 106-107.

Halosydna insignis Moore, 1908, p. 330; 1910, pp. 329-331; Berkeley, 1923, p. 212; Monro, 1928c, p. 311.

Polynoë insignis Johnson, 1901, pp. 387-388.

Lepidonotus grubei Baird, 1863, pp. 107-108; 1865, pp. 189-190.

Collections.—878-38, 882-38, 885-38, 886-38, 901-38, 902-38, 904-38, 906-38. Numerous individuals.

Distribution.—Alaska, south to southern California. Intertidal to 16 fms.

Halosydna johnsoni (Darboux)

Polynoë reticulata Johnson, 1897, pp. 170-172, pl. 7, figs. 32, 41, pl. 8, fig. 47 (not Claparède, 1868).

Lepidonotus johnsoni Darboux, 1899, p. 246, footnote.

Polynoë californica Johnson, 1901, p. 387.

Halosydna californica Moore, 1910, p. 331; Treadwell, 1914, pp. 180-181.

Halosydna macrocephala Essenberg, 1917, pp. 53-55, pl. 3, figs. 22-33.

?Halosydna reticulata Monro, 1928a, pp. 563-565.

Collections.—902-38, 903-38, 905-38, 906-38. 10 specimens.

This species was originally given a preoccupied name (see synonymy above). In a small footnote, Darboux (1899, p. 246) renamed it, but the note has apparently been overlooked. This name predates Johnson's revision (1901, p. 387).

Halosydna macrocephala Essenberg (1917, pp. 53-55, pl. 3, figs. 22-33) was separated from *H. californica* Johnson on differences in shape and size of the prostomium and the greater depth of the grooves of the palpi. These characters have questionable specific value. The elytra were described as lacking marginal fringe. In *H. johnsoni* there is a fringe, though often weak. In other respects the descriptions of these two agree reasonably well.

Halosydna reticulata Monro (1928a, p. 563) from the Galapagos Islands may represent more than one species, perhaps none of which is the same as *H. johnsoni.* The specimens investigated showed significant differences in the tuberculation of the elytra and the nature of the neuropodial setae.

Distribution.—Southern California. Intertidal to 290 fms. (Moore, 1910, p. 331). Common in *Crepidula* colonies, in Anaheim Slough, California.

Halosydna glabra, new species

Plate 4, Figs. 43-50

Collections.—444-37, 683-37, 688-37 (Holotype). 7 specimens.

Length of 25 segments about 24 mm, width with setae to 9 mm. Nephridial papillae from seventh segment, but not large before the tenth segment, from which they are conspicuous, pendulous, the distal end slightly widened, diffusely rust or sooty pigmented. Elytral margin entire, without fringe or papillae.

The prostomium is about as broad as long. The 4 eyes are black, the anterior pair slightly the larger, disposed at the sides of the widest part of the prostomium; posterior eyes are near the postectal margin of the prostomium. A shallow median sulcus divides the prostomial lobes. Prostomial antennae are dark, the median ceratophore thicker than the laterals and extending a little beyond them. The median style is about as large and long as the peristomial cirri and resembles them in general appearance. Lateral antennae are only about half as long as the median antenna. Palpi are dark, smooth save for transverse wrinkles of contraction; there are a pale subterminal enlargement and a terminal filament. They extend distally beyond the longest peristomial cirri. One individual (683-37) has palpi that are much longer, but they lack the contraction wrinkles.

Elytra 18 pairs, the first pair orbicular (pl. 4, figs. 43, 45), the others transversely oval (pl. 4, fig. 44). The first pair (and sometimes also the second) have two kinds of macrotubercles, (1) a translucent yellowish, slightly hooked, with terminal knobs, and (2) conical, white or opaque mound, lacking a stalk, ornamented with shallow convolutions (pl. 4, fig. 46). In addition, there are great numbers of microtubercles scattered more or less regularly over the surface. The area over the elytral scar is pale, with an irregular dusky ring surrounding it. More posterior elytra are smooth, except for a few microtubercles along the anterior margin, near the concavity (pl. 4, fig. 50). The surface is underlain with a fine reticulated mesh, that is darkest and coarsest in an area around the elytral scar. An area over the hilum is pale (pl. 4, fig. 44).

Parapodia are robust, fleshy; on median segments the cirrophores are about as heavy, and nearly as long, as the stout neuropodia. The notopodia are reduced, but with a projecting aciculum and a fascicle of fine setae. The dorsal cirrus is slender, tapering, with a slight subterminal thickened area and a dusky ring; it extends distally about as far as the neuropodial setae. Ventral cirrus is pale, short, tapers rapidly from a stout base and terminates in a slender prolongation not reaching to the end of the neuropodium.

Notopodial and neuropodial setae are each of one kind though of different sizes. There are 10 to 15 notopodial setae in a fascicle, including superior shorter (pl. 4, fig. 47) and longer, slenderer setae (pl. 4, fig. 49). The neuropodial setae are much coarser, longer, and include 12 to 15 in a supraacicular fascicle and 18 to 24 in a subacicular fascicle; the two fascicles form a continuous series of 3 or 4 vertical rows. They are bifid distally (pl. 4, fig. 48).

Halosydna elegans Kinberg (1857, p. 18) from the Galapagos Islands was described without elytral fringe. Later, Monro (1928a, p. 567) reported it from the Galapagos Islands, and added to the original meagre description. *H. glabra* differs from *H. elegans* particularly in having a greatly reduced notopodium, also the larger elytral tubercles are convoluted and do not have a flat top.

Holotype.—AHF no. 4.

Distribution.—Concepcion Bay, Gulf of California, Mexico; Piñas Bay, Panama. In coral and coralline zones, to 12 fms.

Halosydna, species A

Plate 4, Figs. 51-55

Collection.—719-37. One specimen.

General color pale flesh, but under low magnification the elytra are seen to have dispersed reticulated rust-colored blotches, that are darkest and most concentrated in anteriormost elytra, and more or less limited to an area over the hilum in posterior elytra. The dorsal cirri have a broad dark band subterminally. Setae and acicula are pale amber; palpi and prostomial antennae rust-colored.

The unique specimen is coiled, but measures about 27 mm long when stretched out. It includes 33 setigerous segments. The prostomium is lepidonotoid, with a shallow median sulcus throughout, the 4 subequal black eyes located at the sides and posterior margin of the prostomium.

There are 18 pairs of elytrophores. The elytra are more or less loosely attached, but most are still present. They completely cover the dorsum. The marginal fringe is limited to the external margin. The surface is ornamented with some large, button-like, soft papillae (pl. 4, fig. 54) most numerous on anterior elytra, but some are present throughout. In addition, the surface is diffusely covered with microtubercles each of which has a small horny projection. The rust-colored blotches, under high magnification, are seen to consist of numerous polygonal areas (pl. 4, fig. 55).

Parapodia subbiramous, the notopodium obsolete, inserted on the dorsal side of the neuropodium. It is provided with a small fascicle of about 12 to 15 short, notopodial setae, their free portions less than half as long as the free ends of the neuropodial setae. They include shorter, curved, denticulated, superior setae (pl. 4, fig. 53) and longer, slender, serrulated inferior setae (pl. 4, fig. 51). Neuropodia are robust, tapering slightly to a truncate acicular lobe from which the yellow aciculum projects a short distance. The neuropodial setae emerge from the lobe in about 2 trim vertical rows, and include about 25 setae in a median parapodium. They are minutely bifid at the tip (pl. 4, fig. 52), the accessory tooth nearly parallel to the main shaft. The transverse rows of serrations increase in size distally.

The elytral and setigerous structures of this specimen do not compare favorably with those of any known species of *Halosydna.* Furthermore, it originates from a locality (Consag Rock, upper end of the Gulf of California) which has not been biologically investigated heretofore for its chaetopod fauna.

Distribution.—Upper end of Gulf of California, Mexico. In 20-25 fms.

Halosydna, species B

Plate 22, Figs. 273-279

Collection.—617-37. One specimen.

A nearly complete specimen, with 32 setigerous segments, measures 17 mm long. It is pale throughout except for small brownish patches on the elytra. An oblong pale area over the hilum is bounded on its inner side by a sooty patch that blends gradually with the brown patches. Elytra and acicula pale amber.

The prostomium is somewhat macerated and turned under. It is about as broad as long, with a shallow median sulcus. A single pair of black eyes is near the posterior margin, but the anterior eyes might have become obliterated through maceration.

Elytra are fringed on their external margins, with a short, slender, trim fringe (pl. 22, fig. 274). The anterior margin is slightly excavate. There are no macrotubercles, but the surface is more or less uniformly covered with microtubercles; these have a circular base and a horny blunt cone (pl. 22, fig. 276). In addition there are irregular blotches of pigment (pl. 22, fig. 275). The entire surface is underlain by minute clear areas, smaller than the tubercles and regularly distributed.

The parapodia are subbiramous, the notopodia small, papillar, on the anterodorsal face of the neuropodia. About 12 longer, slender, serrulated notopodial setae project distally, beyond the middle of the neuropodial setae, and there are a few shorter, blunter superior notopodial setae. Neuropodia are robust, truncate distally (pl. 22, fig. 277), with longer larger setae in the superior fascicle (pl. 22, fig. 278) and similar smaller setae inferiorly (pl. 22, fig. 273). All are entire distally. The dorsal cirrostyles extend distally well beyond the notopodial setae.

The unique character of the neuropodial setae, with their long, smooth entire tips, and the tuberculation of the elytra do not favor the inclusion of this specimen with any known species of *Halosydna.*

Distribution.—San Juanico Bay, Gulf of California, Mexico, in 24 fms.

Genus **LEPIDONOTUS** Leach

Lepidonotus nesophilus Chamberlin

Plate 7, Figs. 83-95

Lepidonotus nesophilus Chamberlin, 1919a, p. 75.

Collections.—148-34, 814-38, ?273-35. 9 specimens.

In these specimens the prostomium is clearly lepidonotoid, with a shallow median sulcus, the prostomial antennae inserted terminally, 4 black eyes on the posterior half (pl. 7, fig. 83). The posterior border of the prostomium is overlapped by a pair of small lobes, median to the posterior pair of eyes. A single specimen from 273-34 differs in that the prostomium is slightly overlapped by a rounded median prolongation.

Elytral fringe is trim, short, closely spaced (pl. 7, figs. 84, 85), the reticulations are fine, mesh-like, the color disposed in minute spots (pl. 7, fig. 86). The first pair, or also the next 2 or 3 pairs, are ornamented with pale conical macrotubercles (pl. 7, fig. 87), their tips covered with numerous blunt spinelets (pl. 7, figs. 88, 90) in addition to numerous smaller tubercles. In a specimen from 148-34 these macrotubercles (pl. 7, fig. 89) are much like those shown by Chamberlin (1919a, pl. 4, fig. 5). In a specimen from 814-38 they are less sharply pointed (pl. 7, fig. 88). Elytra more posteriorly have fewer large tubercles, and appear almost smooth save for the numerous minute spine-like tubercles. These are especially abundant along the fimbriate margin. The microtubercles are pale, glistening, resembling oil droplets. The elytra are grayish green with a conspicuous white spot over the elytrophore, as described by Chamberlin, but the setae are pale amber, not brown.

Dorsal cirri are long, slender, extending distally beyond the setae, the terminal filament long, a brown ring below the subterminal enlargement.

Notopodial setae are spinose, ranging from blunt, short, to tapering pointed. The longer setae are tapering, laciniole, with spinelets along 2 edges (pl. 7, fig. 95); the shorter setae are bluntly rounded distally. Neuropodial setae are of one kind in median parapodia; they have a well-developed subterminal tooth and 7 to 10 or 11 transverse rows of pectinae, the most distal row of pectinae with the largest teeth (pl. 7, figs. 93, 94). Neuropodial setae in the second segment are of two kinds, (1) superior, heavier setae with bifid tip (pl. 7, fig. 92) and (2) paler, slenderer, tapering, inferior setae (pl. 7, fig. 91).

On the whole, these specimens agree with Chamberlin's description. The prostomium, however, is more typically lepidonotoid than originally shown. The macrotubercles are variable in size and form, from one individual to another. There is great similarity, however, in the shape of the elytra, the proportions and parts of the notopodial and neuropodial setae.

Distribution.—Galapagos Islands, Tenacatita Bay, western Mexico. Intertidal to 75 fms.

Lepidonotus hedleyi Benham

Lepidonotus hedleyi Benham, 1915, pp. 181-183, pl. 38, figs. 1-7; Fauvel, 1932, p. 14; Okuda, 1937, pp. 267-268, fig. 8.

Collection.—549-36. One individual.

The dorsum of anterior segments is traversed by a broad band of brown pigment, segmentally arranged. Prostomial prolongations, median ceratophore including the style, and the palpi, have a similar dark color.

The prostomium is a little wider than long, a median sulcus separates the lobes. The 4 eyes are black, conspicuous, the anterior pair at the broadest part of the prostomium. Elytral margin is entire; its surface is provided with widely separated blunt chitinous spines, and pigmented patches that are interspersed with clear, mesh-like areas. The elytra extend laterally about as far as the neuropodia but they do not nearly cover the neuropodial setae.

Notopodial setae are transversely serrated; most of them are longer, distally pointed, but a few in the superior part of the fascicle are short, slightly arcuate. The notopodial setae of the first parapodium (segment 2) are all of the pointed kind. Neuropodial setae are dark yellow; typically all are bifid, with a rather short, serrated area. In the first parapodium all of the neuropodial setae are long, pointed, without a subterminal tooth.

Distribution.—Australia; Indian Ocean; South Sea Islands; Gulf of California, east of Angel de la Guardia Island. Intertidal to 40 fms.

Lepidonotus versicolor Ehlers

Plate 5, Figs. 56, 59-61

Lepidonotus versicolor Ehlers, 1901, pp. 50-52, pl. 3, figs. 1-9 (not Augener, 1922, pp. 173-174, fig. 1).

Collections.—529-36, 728-37. 2 specimens.

Length to 25 mm; width 9 mm with, 7 mm without parapodia. Elytra firmly attached, covering the dorsum but leaving the neuropodial setae exposed. In 728-37, only the first 2 pairs of elytra have conspicuous surface tubercles (pl. 5, fig. 56). In 529-36, the first 7 pairs of elytra are thus covered. Their margin is entire, or the first few pairs of elytra have a row of sparse, short, inconspicuous fringes (pl. 5, fig. 56). The first few pairs of elytra have numerous, pale yellow subglobular tubercles, which under magnification resemble hedge apples; those on the first pair form a closely set row around the periphery of the scale, and others are scattered over the dorsal surface. On more posterior elytra only a few of the tubercles are large, most of them are much smaller and depressed, causing the surface to look pitted. An area over the hilum is pale, the surface at the sides of, and posterior to, this area is usually mottled with gray pigment.

The prostomial prolongations, their cirri, the median ceratophore and its style are dusky. There are 4 eyes, the anterior pair at the sides, near the middle of the prostomium. The other pair is near the posterior margin of the prostomium, somewhat concealed by the overhanging fold from the succeeding segment (pl. 5, fig. 61). It may be for this reason that Ehlers showed only 2 eyes (1901, pl. 3, fig. 2).

Neuropodial setae are pale amber, notopodial setae light yellow. The dorsal and ventral acicula are light brown and project from their respective lobes a short distance. The dorsal and ventral setae are each of only one kind. The former are transversely serrated, some have a blunt tip and are shorter, others are longer, pointed. The neuropodial setae are simple, without subdistal tooth or with a small subterminal swelling. In the first parapodium, the dorsalmost (pl. 5, fig. 59) and ventralmost (pl. 5, fig. 60) neuropodial setae are simple but the dorsalmost are thicker and thickened subdistally. There are no smooth notopodial setae, shown by Ehlers (1901, pl. 3, fig. 6), such as characterize the genus *Thormora.* In other respects these individuals agree well with the description and figures of this species.

In spite of the great differences in the bathymetric ranges of the two individuals herein considered (165 fms. and shore) there are no significant differences between them. The tuberculation of the elytra is less marked in the intertidal individual, but the tubercles do not differ in their details.

The identity of *L. versicolor* Ehlers and *L. argus* (Quatrefages) from Australia appears not unlikely. Both have elytra with entire margins and subglobular surface tubercles; the neuropodial setae are entire distally, including those in the first parapodium. In *L. argus,* however, the larger tubercles are sparsely covered with spinelets (Fauvel, 1917, pl. 4, fig. 9), compared to the condition in *L. versicolor* (Ehlers, pl. 3, fig. 5).

Distribution.—Juan Fernandez, western South America; Gulf of California, lower half, Mexico. Intertidal to 165 fms.

Lepidonotus furcillatus Ehlers

Plate 5, Figs. 57, 58

Lepidonotus furcillatus Ehlers, 1901, pp. 52-54, pl. 2, figs. 1-8; Augener, 1913, pp. 102-103; Seidler, 1924, pp. 64-66.

Lepidonotus arenosus Ehlers, 1901, pp. 49-50, pl. 2, figs. 9-12.

Collections.—212-34, 171-34, 429-35, 863-38. 5 specimens.

The remaining elytra, on segments 17 and 19 (212-34), are marginally fringed and have numerous, low, rounded yellow tubercles over the dorsal surface, and teardrop-shaped tubercles posterior to the elytral scar (Ehlers, 1901, pl. 2, fig. 11). Notopodial and neuropodial setae are pale. The latter are bifid subdistally. The first parapodium contains some neuropodial setae that are tapering, pointed (pl. 5, fig. 58), others that are distinctly bifid (pl. 5, fig. 57).

A single posterior fragment from Bahia Honda retains one of the last pair of elytra. This has, in addition to the characteristic blunt tubercles, 4 blunt, slightly hooked, tall yellow spines along the posterior border. The facial tubercle is elongate, papillar.

Augener (1913, p. 102) reexamined both of Ehlers' types and concluded they were identical, in spite of differences in the form of the surface spines on the elytra. The specimens in the collections bear out this conclusion, since some of the elytra have tall, slightly hooked spines, others lack them. None, however, have bifid spines such as shown by Ehlers (1901, pl. 2, fig. 5).

Distribution.—Western South America, from Colombia south to Chile; southwest Australia. Intertidal to 55 fms.

Lepidonotus crosslandi Monro

Plate 5, Figs. 62-69

Lepidonotus crosslandi Monro, 1928a, pp. 553-555, figs. 1-4.

Collections.—375-35, 376-35. 6 specimens.

The general color of the preserved (alcohol) specimens is fulvous; most of the elytra have a characteristic broad, dusky crescent around the posterior half of the elytral scar which gradually fades out at the posterior margin. All of the specimens are broken across, transversely, near the middle. Total length is 8 to 17 mm.

The prostomium is typically lepidonotoid, with 4 small, black eye spots on the posterior half and widest part (pl. 5, fig. 62). The anterior edge of the second segment projects forward over the posterior margin of the prostomium in the form of a pair of short flaps.

The elytra are firmly attached and sparsely fringed on the outer, postlateral edge. The surface is uniformly covered with numerous trim, small flattened tubercles, approximately of two sizes (pl. 5, fig. 67), the smaller colorless, the larger yellow. Only the second and third pairs of elytra are slightly excavate at their anterior margins (pl. 5, fig. 69), others are subrectangular or oval in shape (pl. 5, fig. 68). The surface is pale, contrasting in color with the darker, amber-colored tubercles which, in color, resemble the neuropodial setae. The outer margins of the elytra extend laterally beyond the neuroacicular lobes, but they leave uncovered most of the free ends of the ventral setae and the distal halves of the dorsal cirri.

In median segments the neuropodial setae are almost or quite simple (pl. 5, fig. 66) but a few in each fascicle, particularly the superiormost, usually have vestiges of a subterminal tooth (pl. 5, fig. 65). The tips are stouter than Monro found them in specimens from Panama. All of the neuropodial setae in the second and third segments, save a few smaller pointed inferiormost (pl. 5, fig. 64), are distinctly bifid (pl. 5, fig. 63) differing therein from the specimens originally described, in which only the second segment has bifid setae, and the secondary tooth is less conspicuous.

The first parapodium has about 17 neuropodial setae, the second about 18, and a median parapodium about 20 to 25, the number increasing gradually from anterior to median regions. In Monro's specimens there were only about 6 neuropodial setae in median segments. On the whole, the setae are stouter in the specimens from Peru than indicated in those from Panama.

These collections are referred, with some doubt, to *L. crosslandi* Monro, for the reasons indicated above. The differences indicated above may or may not fall within the range of variation observable in some species of the Polynoidae.

Distribution.—Panama; Peru. Intertidal to 7 fms.

Lepidonotus hupferi Augener

Plate 6, Figs. 78-82

Lepidonotus hupferi Augener, 1918, pp. 133-136, pl. 2, figs. 7-11; Seidler, 1924, pp. 69-70.

Collections.—125-33, 210-34, 448-35, 683-37. 13 specimens.

Length 10 to 17 mm. Elytra completely cover the body. General color pale, but under low magnification the elytra are seen to have an irregular reticulated pattern of rust-colored blotches (pl. 6, fig. 82). An individual from La Libertad, Ecuador, has the rust-colored pigment replaced by sooty color. Base of palpi dark, appearing tucked in at its insertion.

Elytra are neatly fringed on their external margins. Median elytra oval, with a slight excavate anterior margin. The surface is covered with minute, chitinous tubercles, with a broad squat base and a slender stalk. Scattered irregularly over the surface but leaving a pale area over the elytral attachment are rust-colored blotches. Under high magnification they are seen to be mesh-like because of clear, cellular areas among them (pl. 6, fig. 78).

Notopodial setae are fine, short, serrated. They number about 30 in a median parapodium, and do not extend distally beyond the neuropodium. Neuropodial setae are heavier, longer, including about 20 supraacicular and over 50 subacicular in a median parapodium. Distally they have a minute subterminal tooth, but the inferiormost setae tend to be entire (pl. 6, fig. 81). This weakly bifid condition of the neuropodial setae agrees with the condition shown by Augener, and is in contrast to the condition shown by Kinberg for *L. caeruleus* from Brazil (1910, pl. 4, fig. 16). The first 2 or 3 neuropodia have setae that are distinctly bifid, those of the first parapodium are more distinctly toothed and have a longer serrulated blade (pl. 6, fig. 79) than those in the following segments (pl. 6, fig. 80).

Distribution. — British Gold Coast, Africa; western Mexico; Panama; northwestern South America. Intertidal to 12 fms.

Lepidonotus caelorus Moore

Lepidonotus caelorus Moore, 1903, pp. 412-414, pl. 23, fig. 12; 1905, pp. 546-547, pl. 36, figs. 36, 37; 1910, pp. 333-334; Berkeley, 1923, p. 213 (see Hartman, 1938, p. 108, for additional synonymy).

Collections.—874-38, 891-38, 894-38, 900-38. 5 specimens.

Distribution.—Northwest and northeast Pacific. Intertidal to 40 fms.

Lepidonotus pomareae Kinberg **panamensis,** new subspecies

Plate 6, Figs. 70-77

Collections.—863-38 (Holotype), 254-34. 3 individuals.

A larger specimen, about 38 mm long, consists of 27 segments. The body is strongly arched in the middle. Greatest width at the sixteenth segment is 9 mm between the nephridial papillae, and 16.2 mm including the setae.

The prostomium is largely hidden between the first pair of parapodia, and by a broad, fleshy, convex lobe projecting forward over its posterior half. The lateral antennae are inserted terminally, the styles long, slender, but not extending distally as far as the median antenna. Median ceratophore is long, cylindrical; its distal end projects beyond that of the lateral antennae, its style similar in shape to that of the lateral antennae, but a little longer. Eyes 4, dark, disposed on the posterior half of the prostomium, the anterior pair at the sides of the widest part of the prostomium, the posterior pair near the postectal margin. Palpi are long, stout, exceeding in length the antennae and dorsal cirri. They have a few longitudinal rows of minute papillae on the dorsal side.

The elytra completely cover the dorsum. They are firmly attached, deeply imbricated, and overlap those of the opposite side. Each has a conspicuous marginal fringe, and an elongate tuft at the inner ectal margin (pl. 6, figs. 70-72). The fringes are in most instances overgrown so as to appear much thicker than they actually are. The surface is richly covered with high, broad-headed tubercles on the exposed portion, and smaller, conical or somewhat curved tubercles and knobbed prominences on other portions. A few scattered hairs, resembling the marginal fringe, but shorter, are scattered among the tubercles, especially on the exposed parts of the elytra. The tall, large headed tubercles have their terminal disks excavate in the middle (pl. 6, figs. 73, 74), and the entire cap is covered with numerous slender spines. The stalk from which the tall tubercle arises is smooth and expands at its base. A smaller individual from the same locality (Bahia Honda) has only a few of the conspicuous macrotubercles.

Parapodia are subbiramous, the notopodium papillar, arising from the dorsal side of the neuropodium. Each has a stout, dark amber aciculum and numerous (about 20 or more) slender, spinose setae, most of them overgrown, but a few showing the well developed transverse rows of spinulae. A few (1 to 3) of the dorsalmost notopodial setae are shorter and blunter (pl. 6, fig. 76); most of the others have a similar basal portion, but are greatly elongate distally, with an attenuate tip.

The neuropodium is stout, deep, subtruncate, the acicular and postacicular lobes not notably different from one another. About 30 to 40 copper-colored stout setae (pl. 6, fig. 77), disposed in 4 or 5 irregular longitudinal rows, emerge above and below the aciculum. The dorsal cirrus is inserted on a broad, basal cirrophore, its style long, slender, extends distally beyond the terminal ends of the setae. Ventral cirri are short, cirriform, tapering, and do not extend distally to the end of the neuropodium (pl. 6, fig. 75).

Nephridial papillae are cylindrical, present between segments 7 and 25, or to the second last setigerous segment. Anal cirri are long, slender, about as long as the last 4 segments.

These individuals resemble *Lepidonotus pomareae* Kinberg, from the Hawaiian Islands. Both have deep, truncate neuropodia, the elytra with heavy marginal fringe including a postectal tuft. In the Panama form, however, the elytra are conspicuously covered with numerous, large headed, high tubercles, the sixth pair of elytra are rectangular, not triangular, and the total length is over 35 mm as against 13 mm specified for *L. pomareae*.

Holotype.—AHF no. 5.

Distribution.—Bahia Honda, Panama. In depths of 15 to 50 fms.

Genus LEPIDAMETRIA Webster

Lepidametria virens (Blanchard)

Plate 8, Figs. 105-110

Polynoë virens Blanchard, 1849, p. 16, fig. 2; Grube, 1876, p. 60.
Lepidasthenia irregularis Ehlers, 1901, pp. 54-55, pl. 3, figs. 10-16; Augener, 1924, pp. 291-292.
Lepidametria virens Monro, 1928a, p. 562.

Collections.—167-34, 169-34, 213-34(?), 182-34, 315-35, 396-35, 769-38. 10 specimens.

Length to 80 mm or over; number of segments over 72. Dorsum with transverse dark bands across the middle of the segments, and a broad band, almost as wide as the segment is long, over the elytrophoral area, median to the parapodial base. Parapodia are pale, prostomium pale rust color; the elytra are dusky on their proximal halves, pale along their outer portions.

The prostomial lobes are well separated anteriorly. The 4 black eyes are small and limited to the posterior half of the prostomium. Palpi are very long, extending distally far beyond the antennae (pl. 8, fig. 110). The first 3 sets of dorsal cirri are elongate, the first group the longest. From the fourth segment the dorsal cirri diminish in length but become thicker basally (pl. 8, figs. 106, 105).

Elytra are small, rounded, leaving a broad dorsal area exposed. They do not overlap those of succeeding pairs. They are inserted in pairs throughout.

Neuropodial setae, including those in anterior segments, have a subterminal tooth that is closely appressed to the main fang (pl. 8, figs. 107 to 109) and notably longer than that shown by Ehlers (1901, pl. 3, fig. 17). The dorsal cirri, from about the thirtieth segment, are broad, their basal parts filled with gonadial products. Some of the specimens include a tangle of long, tentacular filaments, perhaps of a terebellid, and were perhaps commensal.

Distribution.—Chile; Ecuador; western Mexico; Galapagos. Intertidal to 20 fms.

Lepidametria gigas (Johnson)

Plate 8, Figs. 99-104

Polynoë gigas Johnson, 1897, pp. 172-175, pl. 7, figs. 33, 42, pl. 8, figs. 48, 49.

Lepidasthenia gigas Moore, 1909, pp. 241-242; Treadwell, 1914, p. 183.

Lepidametria gigas Seidler, 1924, pp. 145-146; Monro, 1936, pp. 92-93, fig. 8.

Collection.—148-34. One specimen.

Length about 30 mm, number of segments 65. Elytra completely cover the dorsum and are present in pairs throughout. They are subcircular, smooth, with entire margin, and have a greenish gray mottled pattern.

Neuropodia are stout, distally acuminate (pl. 8, figs. 103, 104). Dorsalmost neuropodial setae are notably heavier and darker than those more ventrally. A few of the superiormost are distally entire (pl. 8, fig. 99) but most of them have a subterminal tooth. Median and inferior setae are bifid, the secondary tooth small as compared with the main fang (pl. 8, fig. 100). Anteriormost segments have a few (the fourth parapodium with 2) weakly serrated, pointed notopodial setae (pl. 8, fig. 102), and bifid neuropodial setae (pl. 8, fig. 101).

Distribution.—Southern California; South Georgia (Monro); Galapagos. Intertidal to 25 fms.

Genus **HOLOLEPIDA** Moore

Body elongated, consisting of numerous segments. Prostomium with antennae inserted subterminally; eyes 4; a large nuchal flap projecting over posterior part of prostomium (pl. 9, fig. 111). Notopodial setae smooth, of one kind; neuropodial setae in anterior segments of two kinds, (1) a small superior fascicle of fine, bent, denticulated setae, and (2) a larger inferior fascicle of larger, straight setae toothed along one edge.

Hololepida veleronis, new species

Plate 9, Figs. 111-118

Collections.—549-36 (Holotype), 532-36. 2 specimens.

A larger, anterior fragment (549-36) consists of 20 anterior segments, its length about 14 mm, width 3.3 mm without, 7 mm with parapodia, and 10 mm with setae at the sixteenth segment.

The prostomium is more than twice as broad as long, the lobes separated by a wide shallow median sulcus. A well developed nuchal flap extends forward reaching nearly to the base of the median ceratophore (pl. 9, fig. 111). Eyes are large, lenticulated, the anterior pair at the widest part of the prostomium, the posterior pair adjacent to the anterior, but nearer together. Prostomial antennae 3, ceratophores long, slender, styles subequal to one another, similar in shape and size to the peristomial cirri. Palpi are stout at base, long, tapering, extend distally beyond the tips of the antennae. A longitudinal groove extends lengthwise on the dorsal side.

Elytra pale, soft, the margin without fringe or papillae, greatly wrinkled and folded at the lateral edges; the surface smooth save for minute glistening microtubercles dispersed over the surface.

Parapodia elongate, directed laterally at sides of body. The second (first elytrophorous) segment resembles those following except that its ventral cirrus is much longer (pl. 9, fig. 118). The notopodial and neuropodial setae resemble those in more posterior podia except that some superior neuropodial setae are somewhat bent (pl. 9, fig. 117). Notopodia are reduced, papillar, provided with aciculum and from 10 to 15 stiff, rod-like setae. The dorsal cirrophore is long; it extends distally nearly to the middle of the dorsal setae; its style is much longer, slender, reaching well beyond the tips of the neuropodial setae (pl. 9, fig. 112).

Neuropodia have long, pointed acicular lobes and shorter, rounded postsetal lobes. The long, triangular acicular lobe extends laterally almost one third as far as the longer neuropodial setae (pl. 9, fig. 112). Ventral cirrus is slender, cirriform, inserted on the proximal third of the ventral face of the parapodium and hardly extends to the base of the inferiormost setae.

Notopodial setae are of one kind, slender, tapering, rod-like, with a row of minute teeth along one edge (pl. 9, fig. 114). Neuropodial setae are of two kinds, (1) slenderer, supraacicular, with few in a fascicle, and (2) heavier, with a long stem and a distal expanded portion provided with some obscure teeth on the cutting edge (pl. 9, fig. 115) and bifid tip (pl. 9, fig. 113). In a few anterior segments a small superior fascicle includes setae that are smaller, bent, the serrations not distinct.

A smaller, perhaps juvenile, posteriorly nearly complete specimen (532-36) consists of 34 segments, is about 10 mm long and 1.2 mm wide without parapodia. It resembles the larger piece, but is paler and the eyes are not lenticulated. Both specimens have the proboscis protruded a short distance.

Only 2 species of this small genus have heretofore been described. *H. magna* Moore (1905, p. 541) was dredged in 95-110 fms. from the Gulf of Georgia and southeastern Alaska, and later reported from British Columbia (Berkeley, 1923, p. 214). *H. magna* differs from *H. veleronis* in that it lacks the long parapodial lappets, the setae are more distinctly serrated, the prostomium is different (see Moore, 1905, pl. 35, figs. 24-29).

Hololepida australis Monro (1936, p. 93) was described from the vicinity of the Falkland Islands in depths of 135-267 meters. It differs from *H. veleronis* in having a different kind of nuchal hood, the setae are otherwise, and parapodial structures differ. *H. australis* measures 90 mm for 38 segments, *H. veleronis* is only 14 mm for 20 segments.

Hololepida veleronis has smooth setae and soft white scales that recall those of commensal polynoids. No notes were made as to its color in life, or its association, if any.

It is named for the motor cruiser, *Velero III,* during a cruise on which these collections were made.

Holotype.—AHF no. 6.

Distribution.—Near Angel de la Guardia Island (Holotype), and San Francisquito Bay, Gulf of California, Mexico. In 20 and 40 fms.

Hololepida, species

Collection.—148-34. One fragment.

A single macerated fragment of 27 segments is about 20 mm long and 9 mm with setae. The prostomium has a nuchal hood, but its parts are crushed and out of normal shape. There are 2 large eyes on each side, more or less fused to one another.

Notopodial setae are acicular, nearly smooth except for minute serrations along one edge, and nearly as thick as the neuropodial setae, but apparently heavier because of their cylindrical shape. Neuropodial setae have expanded, flattened distal portion, the tips entire but slightly falcate, the cutting edge finely serrated.

The neuropodial lobes are less thickened distally than in *H. veleronis* (see above), the dorsal and ventral margins nearly parallel, but the distal edge is obliquely truncate, beyond which the acicular lobe projects.

Distribution.—Albemarle Island, Galapagos, in 12-15 fms.

Genus **THORMORA** Baird

Differs from *Lepidonotus* Leach in that some of its notopodial setae are smooth, lancet-like, others are simple, serrated.

Thormora johnstoni (Kinberg)

Plate 7, Figs. 96-98

Lepidonotus johnstoni Kinberg, 1855, p. 384; Grube, 1876, p. 60; Chamberlin, 1919a, p. 74.

Lepidonotus (Thormora) johnstoni Seidler, 1924, p. 92.

Thormora johnstoni Monro, 1928a, p. 556; 1928b, p. 467.

Collections.—76-33, 194-34, 217-34, ?414-35, 450-35, 525-36, 530-36, 558-36, 634-37, 683-37, 789-38, 878-38, 904-38. 16 specimens.

First pair of elytra pale save for punctate disks, others with exposed portion dark (pl. 7, fig. 97) due to small polygonal areas interspersed among the punctate disks (pl. 7, fig. 98). The prostomium (pl. 7, fig. 96) resembles that of *Polynoë taeniata* Ehlers (1887, p. 51) later referred to *Thormora* (Seidler, 1924, p. 92) but the demarcation between the prostomium and prostomial peaks is much less abrupt. The palpi are not ciliated. In *L. socialis* Kinberg (1855, p. 383) the elytral margin is fringed.

Distribution. — Panama; Galapagos Islands; Hawaiian Islands; Gulf of California; southern California north to Anacapa Island; Colombia (?). Littoral to 20 fms.

Subfamily Harmothoinae Seidler

Genus HARMOTHOË Kinberg

Harmothoë hirsuta Johnson

Harmothoë hirsuta Johnson, 1897, pp. 182-183, pl. 6, figs. 27-29, pl. 7, fig. 38, pl. 8, fig. 53; Treadwell, 1906, p. 1154; Moore, 1910, pp. 350-351; Treadwell, 1914, p. 182.

? *Harmothoë hirsuta* Moore, 1908, pp. 334-335; Gravier, 1911, pp. 87-88; Chamberlin, 1919a, pp. 51-54, pl. 2, figs. 2-8, pl. 3, fig. 1; Monro, 1928a, pp. 558-559, fig. 8 (not Ehlers, 1901, p. 42).

The larger elytral macrotubercles occur in as many as three rows along the posterior margin. They are widest distally and have many small spinelets on the crown (Johnson, 1897, pl. 6, figs. 27-29). Thus they differ from the tapering, falcate spines, without spinelets, shown by Monro (1928, p. 59, fig. 8). The neuropodial setae are distinctly bifid, the subterminal tooth well below the main fang, and appressed to the main stalk.

Harmothoë hirsuta Moore (1908, p. 334) referred to 3 specimens taken from Port Townsend, Alaska, in 15-16 fms. Moore, at that time, commented on the differences observable between these and the types from southern California. One of these specimens was later made the type of *Eunoë barbata* Moore (1910, pp. 350-351). Whether the others are *H. hirsuta* is not certain because the elytra were said to lack the polygonal areas.

H. hirsuta Ehlers (1901, p. 42) from Tumbes, Chile, was later made the type of *H. anderssoni* Bergström (1916, p. 286).

Harmothoë hirsuta has been reported from the Antarctic, in 150 meters (Gravier, 1911, pp. 87-88). This record, because of its great distance from the type locality or other authentic records for the species, should perhaps be reinvestigated.

Harmothoë hirsuta Chamberlin (1919a, pp. 51-54, pl. 2, figs. 2-8, pl. 3, fig. 1) was based on specimens in which all elytra had been lost. The prostomial and setal outlines agree reasonably well with the description of Johnson.

Distribution.—Southern California; Panama. Intertidal.

Harmothoë exanthema (Grube)

Polynoë exanthema Grube, 1856, p. 46.
Polynoë vesiculosa Grube, 1878a, p. 514.
Harmothoë exanthema Bergström, 1916, pp. 287-288, pl. 3, fig. 5; Monro, 1936, p. 85. (See Bergström, 1916, for additional synonymy.)

Collections.—273-34, 372-35, 384-35, 385-35, Perdita Island, Gulf of California. 17 specimens.

Most individuals are characterized by having a pair of longitudinal black stripes at the sides, over the dorsal surface of the parapodia, and a transverse dark band across each anterior segment and on every second or third segment more posteriorly. The elytra have some large, globular vesicles with a terminal filament (see Bergström, 1916, pl. 3, fig. 5) distributed chiefly along the posterior margin. There are, in addition, numerous microtubercles over the entire surface. Marginal cilia are few, weak, reduced to a short external area. The anterior eyes are inserted ventrolaterally, slightly anterior to the widest part of the prostomium.

Neuropodial setae include both simple and bifid, in the same fascicle. The notopodial setae are distally entire, serrated, some of them are heavier than the neuropodial setae.

Distribution.—Southern and western South America, north to the Gulf of California, Mexico. Subintertidal to 75 fms.

Genus EUNOË Malmgren

Eunoë senta (Moore)

Plate 10, Figs. 128-133

Gattyana senta Moore, 1902, pp. 259-263, pl. 13, figs. 1-13; 1908, p. 337; 1910, pp. 361-362; Treadwell, 1906, p. 1154; Berkeley, 1923, p. 216.

Collection.—874-38. 3 specimens.

Length 18 to 22 mm, width 6 mm with, 4 mm without parapodia, 8 mm with setae. Prostomium pale, with 4 dark eyes on the posterior half; prostomial antennae dark brown. The first segment has a few stout setae resembling the more posterior blunt notopodial setae. The second segment (first parapodial) has 2 well-developed setigerous fascicles. Palpi and dorsal cirri are hirsute.

The elytra are conspicuously covered with furcated spines, that increase in size from anterior to posterior margins. The smallest spines are knob-like to minutely bifurcated (pl. 10, fig. 133), the largest multipronged (pl. 10, fig. 132). There are a few long, marginal cilia along the ectal margin.

Notopodial setae range from shorter, slightly arcuate, dorsalmost (pl. 10, fig. 130) to long, straight, tapering setae (pl. 10, fig. 131). Neuropodial setae are slightly falcate, with entire tip, the length of the serrated region decreasing from superiormost (pl. 10, fig. 128) to inferiormost (pl. 10, fig. 129).

Distribution.—Alaska, south to California (dredged). Moore's original record, North Greenland (1902, p. 263), was later corrected to read Icy Cape, Alaska (1905, p. 525). The specimens mentioned above came from near Anacapa Island, off central California, in 45 fms.

?Eunoë barbata Moore

Eunoë barbata Moore, 1910, pp. 334-338, pl. 28, figs. 1-6; Treadwell, 1914, p. 183.

Collection.—885-38. One specimen.

A single specimen, about 18 mm long, resembles *E. barbata* Moore in some respects, but the notopodial setae are more pointed, and the smooth distal end proportionately longer; also, the elytra lack the large, heavily prickled spines. The body is pale cream color, with a segmentally arranged, dark pattern, consisting of a pair of larger patches over the middle of the segment, a similar and smaller pair just posterior to the larger patches and nearly proximal to them, and a pair of more widely separated triangular spots just anterior to the segmental groove. The dorsal cirrostyles are dark, the nuchal prolongation dusky.

The few elytra remaining are, on the whole, less spiny than Moore has indicated, and the larger prickly tubercles are few, only 1 or 2 on an elytrum; the finer tuberculation is, however, as figured by Moore (1910, pl. 28, figs. 4-6).

Distribution.—Puget Sound; Monterey Bay, California. In depths of 45 and 861-1062 fms. The notes above are based on a specimen from San Luis Obispo Bay, California, in 40 fms.

Genus **LAGISCA** Malmgren

?Lagisca multisetosa Moore

Lagisca multisetosa Moore, 1902, pp. 267-269, pl. 14, figs. 29-36; 1910, pp. 340-341; Berkeley, 1923, p. 215.

Collection.—874-38. 2 specimens.

The material at hand does not permit the certain identity with the species indicated. Moore (1910, p. 341) has already commented on the possible range of variation in this species, and the need for a revision of species belonging to this genus.

Augener (1913, pp. 207-209) considered *Lagisca multisetosa* a questionable synonym of *Harmothoë aspera* Hansen, from the North Sea. Annenkova (1937, p. 152), perhaps at this suggestion, reported *H. aspera* from the North Sea, and considered *L. multisetosa* identical with the form from the North Sea. Until more collections are available, it will be difficult to conclude what the relations are between the north Pacific and the north Atlantic forms.

Distribution.—North Pacific, south to Lower California (Moore), in 40 to 1,400 fms. The type locality was first given as North Greenland, but later corrected to Icy Cape, Alaska (Moore, 1905, p. 525).

Genus **POLYNOË** Savigny, sensu Kinberg

Body long, consisting of numerous segments. Prostomium harmothoid, the lateral antennae inserted ventrally. Elytra 15 pairs, limited to the anterior portion of the body, the posterior segments uncovered. Notopodial setae more or less delicately serrated or quite smooth; neuropodial setae with transverse serrations, tip bidentate or unidentate.

Polynoë veleronis, new species

Plate 10, Figs. 121-127

Collections.—405-35, 834-38, 835-38 (Holotype). 6 specimens.

Length 30 to 35 mm, width 4.5 mm without, 6.0 mm with parapodia; number of segments 50 to 60, the last 18 or more left uncovered by the elytra. General form elongate, depressed, the sides more or less parallel.

Prostomium harmothoid, the 2 lobes well separated in their anterior halves but only weakly posteriorly, terminating anteriorly in a pair of acuminate prostomial peaks (pl. 10, fig. 121). Eyes 4, small, black, the anterior much the larger, directed ventrolaterally, on the anterior third of the prostomium; the posterior smaller, nearer together, on the posterior third of the prostomium. Facial tubercle conical, with blunt tip, visible only in ventral view.

Palpi and all cirriferous styles have minute papillations; they taper distally with only a slight, or no, subterminal enlargement.

Elytra 15 pairs, the first pair subcircular (pl. 10, fig. 123), others oval in shape. The margin is entire, without fringe, papillae or crenulations. The surface is smooth, dark brown over most of the area, but with a pale irregular circular area between the elytral scar and the posterior margin, and a pale area where the preceding one overlaps the anterior margin. A few minute, low, yellow microtubercles are distinguishable in the pale area.

Parapodia subbiramous, the notopodium reduced, provided with a yellow aciculum that projects some distance beyond the lobe, and 6 to 10 pale, serrated setae. Neuropodium obliquely truncate, with a small fleshy, triangular, preacicular lobe at the dorsoectal edge (pl. 10, fig. 124). Dorsal cirrus long, the cirrophore extends laterally as far as, or beyond, the notopodial lobe, the styles are dark at the base and extend distally beyond the neuropodial setae. Ventral cirri pale, small, tapering, inserted on the distal half of the ventral side of the neuropodium. Ventral cirrus of second segment elongate (pl. 10, fig. 122).

The notopodial setae are as thick as the neuropodials, distally blunt, with serrated edge (pl. 10, fig. 125). The notopodium of segment two has about 20 to 25 setae which resemble those in more posterior segments. The neuropodial setae are transversely serrated. They include a superior fascicle of 6 to 10, with bifid tips, and a long serrated region (pl. 10, fig. 127). The inferior fascicle contains 40 or more setae with shorter, serrated edge and bifid tip (pl. 10, fig. 126). The neuropodium of segment two has about 6 superior setae resembling those more posteriorly but more tapering and with an obscure bifid tip, and a larger inferior fascicle of 25 to 30 pointed, serrated setae. Notoacicula and neuroacicula are pale yellow and project beyond the acicular lobes.

Polynoë veleronis differs from *P. antarctica* Kinberg in that its notopodia are provided with numerous setae instead of only 2 to 5 smooth setae, and the neuropodia are less oblique. Several other species of *Polynoë* have been described from western South America, *P. chilensis* and *P. fasciculosa* Blanchard (1849, pp. 15, 17) both from Chile, and *P. violacea* Schmarda (1861, p. 154) from Chile. These are too incompletely known to permit comparison. *P. chilensis* was later reported by Grube (1876, p. 60) who reported the presence of 16 pairs of elytra, but figured 29 pairs, hence the latter is clearly not the species described above.

Holotype.—AHF no. 7.

Distribution.—Independencia Bay, Peru; Gorgona Island, Colombia. Intertidal to 21 fms.

Family **Sigalionidae**

The Sigalionidae are largely to be obtained only by dredging. Only a single species, *Sthenelais fusca* Johnson, is know to exist in the intertidal of the northeast Pacific. Many of the known species occur in depths of 500 fms. or over, a few in the subintertidal. The work of the Allan Hancock Pacific Expeditions was done largely in depths of 100 fms. or less, hence the collections are unusually rich in little known, or new, species from shallower waters. Fourteen species in 5 genera are represented. Of these, 1 genus (*Eusigalion* Augener) has not heretofore been known outside of western Africa, and 10 species or subspecies are new to science (see below).

Six genera *(Leanira, Pholoë, Psammolyce, Sigalion, Sthenelais,* and *Sthenelanella)* have been previously reported. Two of these *(Pholoë* and *Sigalion)* are not represented in the present collections. *Pholoë,* in the Pacific, is known only from records for Washington, northward. *Sigalion,* reported only as *S. pourtalesii* Treadwell, is not the same as *S. pourtalesii* Ehlers from the West Indies, but is herein referred to *Eusigalion spinosum,* new species (see page 60).

A key to the genera of SIGALIONIDAE included in this report follows:

1. Prostomial lobe trapezoidal, widest anteriorly, its median antenna small, inconspicuous, inserted on a short base without ctenidia; neuropodial setae bifid distally . . EUSIGALION
1. Prostomial lobe subglobular, the anterior median area concealed by the base of a conspicuous median ceratophore, with a pair of lateral ctenidia 2
2. Third setigerous segment with a dorsal cirrus; elytra with lobular, papillated processes, and encrusted with sand particles . . . . PSAMMOLYCE
2. Third segment without dorsal cirrus; elytra without marginal lobes though often with marginal fringe 3

3. Neuropodial setae distally entire 4
3. Neuropodial setae distally bifid . . . . STHENELAIS
4. Neuropodial setae with smooth, blunt appendage, those in a fascicle similar to one another, forming trim vertical series . . . . STHENELANELLA
4. Some neuropodial setae long, pointed, the appendage transversely canaliculated . . . . LEANIRA

Genus **EUSIGALION** Augener

Prostomium subtrapezoidal, with 3 subequal antennae, including a pair inserted near the anterior margin, and a median antenna posterior to, or between, the eyes. Eyes 4, minute, disposed in a rectangle on the dorsal side of the prostomium. Parapodial structures and elytra resembling those in *Sigalion* Audouin and M. Edwards.

Eusigalion has heretofore been known through a single species, *E. vazensis* Augener (1918, p. 113) from the French Congo, Africa. Two species are herewith added.

Eusigalion spinosum, new species

Plate 11, Figs. 134-140; Plate 12, Figs. 146, 147

Sigalion pourtalesii Treadwell, 1914, p. 183 (not Ehlers, 1887, p. 57).

Collections.—198-37, 780-38, 814-38, 876-38, 887-38, 888-38, 889-38 (Holotype), 891-38, 893-38, 895-38, 896-38, 897-38, 899-38, Acc. 587, Acc. 590. About 45 specimens.

Length 100 mm or over; number of segments 125 to 150. Pale to white, the elytra translucent and more or less completely covering the dorsum. Form depressed, subrectangular in cross section, tapering anteriorly from about the tenth segment to a truncate prostomium, and posteriorly from the median region to a narrow posterior end.

Prostomium trapezoidal in outline, about as broad as long, widest at its anterior margin (pl. 11, fig. 135), with 4 small dark eye spots on the dorsum near the middle, and 3 subequal antennae, a pair at the anterior margin and a median posterior to the eye spots. Palpi long, slender, white, smooth, tapering and extending posteriorly to about the seventh setigerous segment, when laid back.

Elytra are pale or white, translucent, smooth, slightly emarginate at their anterior margin (pl. 11, fig. 134), and with a row of pinnately branched filaments (pl. 11, fig. 139) at their outer lateral margin.

Parapodia are long throughout, the notopodium at first shorter than the neuropodium (pl. 11, fig. 136) and gradually increasing in length so as to extend distally beyond the neuropodium (pl. 11, fig. 138). The notopodium is distally vesicular and terminates in a short cirrus, dorsal to the setal fascicle. Neuropodia are obliquely truncate, terminate dorsally in a triangular lobe in which the aciculum is embedded. Acicula are pale, not extending beyond the fleshy lobes. Ventral cirri are cirriform, taper distally, and are directed ventromedially. They extend distally beyond the neuropodium to which they are attached. Anal cirri include a single long, slender filament about as long as the last 12 segments, and a shorter, similar filament only about half as long.

Notopodial setae are pale, long, slender, directed dorsally and curved somewhat over the dorsum. Under high magnification they show a finely serrated edge (pl. 12, fig. 147). The neuropodial setae include a supraacicular fascicle, emerging from the dorsal side of the neuropodium, and a heavier subacicular fascicle. The superior fascicle consists of about 9 finer, composite setae at the anterior side and 12 to 15 progressively coarser composite setae posteriorly. A few (about 4) have shorter, most of them have longer, appendages (pl. 12, fig. 146). In addition, there are about 7 shorter, simple, spinose setae (pl. 11, fig. 140) in the anterodorsal part of the fascicle. The subacicular fascicle includes a few (about 4) stouter, short-appendaged, composite setae, and a great many (40 to 50) much finer, longer, composite setae. These have a long, slender, articulated appendage with bifurcated tip (pl. 11, fig. 137). The shaft is spiny, hence the specific designation.

No tube or investing sheath has been found with, or on, any of the individuals. Indications are that it burrows through a soft substratum.

Eusigalion spinosum differs from *E. vazensis* Augener, the only known species in this genus, in its prostomial proportions (Augener, 1918, pl. 2, fig. 14), its much greater size, in having spinose setal shafts, and in its elytral details. It resembles *Sigalion ovigerum* Monro (1924, p. 47; 1930, p. 101) in having long, slender neuropodial setae, but in the latter the prostomium lacks a median prostomial antenna.

A single specimen from Ballast Point, San Diego, California, in the collections of the University of California, labelled *Sigalion pourtalesii* (Treadwell, 1914, p. 183) is a *Eusigalion,* identical with the species described above. The genus, *Sigalion* Audouin and M. Edwards, is therefore not known to be in California waters.

Holotype.—AHF no. 8.

Distribution.—Monterey Bay (Holotype), south to southern California; Farallon Islands, Anacapa Island, Santa Barbara Island, Catalina Island, California; Galapagos Islands; Chatham Bay, Cocos Island. In 10 to 65 fms. It is apparently rare or absent from Lower California, Mexico, and areas south, where its nearly related species, *E. hancocki* (see below), is found. The extra-California specimens are pygmies compared with those from Monterey Bay and south-central California.

Eusigalion hancocki, new species

Plate 12, Figs. 141-145, 148-152

Collections.—66-33, 74-33, 126-33, 208-34, 701-37, 745-37, 747-37, 769-38 (Holotype). 10 specimens.

Length of 66 anterior segments about 40 mm; greatest width between segments 15 to 25. Surface smooth, glistening, the midventrum with a slightly thickened ridge in the region between the longitudinal muscle bands. Lower lip with about 12 longitudinal grooves.

Prostomium trapezoidal, slightly longer than wide, the anterior margin with a median convexity, the posterior margin nearly straight (pl. 12, fig. 144). Prostomial antennae small, papillar, the paired ones inserted at the anterior margin, the median between the anterior pair of eyes. In some individuals they are dusky at their tips. The 4 minute black eye spots are on the anterior half of the prostomium. They are deep seated and seen only when looking directly over the area where they are located. A supraoral, biarticulated antenna is inserted medially just over the mouth aperture. Palpi are white, long, slender, smooth, extending posteriorly to the seventh segment when directed backward.

Branchial cirri simple, cirriform, present from fifth setigerous segment, the first as large as those more posterior; they are curved outward and slightly directed toward the preceding parapodium (pl. 12, fig. 143). Dorsal cirri (pl. 12, fig. 145) are proportionately larger than those in *E. spinosum*. Ventral cirri are slender, tapering, extending distally beyond the parapodia in the anterior region but becoming gradually shorter to about the fortieth segment (pl. 12, fig. 145).

Elytra are white or slightly fulvous; they completely cover the dorsum and the bases of the parapodia. The first pair is oval, the others broad, their ectal margins with a delicate fringe of subpalmately branched papillae (pl. 12, fig. 141), otherwise the margin is entire.

Surface is smooth save for a few cirriform papillae along the outer, lateral portion near the marginal fringe (pl. 12, fig. 142).

The parapodial structures are not much different from those in *E. spinosum* (see above), except that the setae vary in details. The notopodial setae are delicately serrated; a few of the inferiormost are much smaller and quite smooth (pl. 12, fig. 148). The neuropodial setae include a few dorsal, simple, spinose setae (pl. 12, fig. 149) and numerous composite setae. These have a smooth (pl. 12, fig. 150) or spinose shaft (pl. 12, figs. 151, 152) and slender, bifurcated appendages, with or without articulations. The secondary tooth is, in most instances, long but does not project beyond the main fang (pl. 12, fig. 150).

Eusigalion hancocki differs from *E. spinosum* (page 60) in its prostomial proportions and in its setae, as described above.

Holotype.—AHF no. 9.

Distribution.—Off San Jose Light, Guatemala (Holotype); Gulf of California, Mexico; Isabel Island, Mexico; La Libertad, Ecuador; Albemarle Island, Galapagos. Sublittoral to 32 fms. Two specimens (74-33) from Albemarle Island were caught with the use of an electric light, at night.

Genus STHENELAIS Kinberg

Body elongate, tapering, consisting of numerous segments; elytra more or less completely covering the dorsum. Prostomium anteriorly rounded, usually with 4 eyes disposed in a rectangle, the anterior pair at the anterior margin of the prostomium, more or less concealed from the dorsum by the median ceratophore, the posterior pair usually on the dorsal side of the prostomium. Median antenna stout, its ceratophore with a pair of lateral, flaring ctenidia. Paired lateral antennae inserted on the first setigerous segment. Palpi long, often exceeding in length the first 10 or more segments. First segment elongate, directed anteriorly, provided with setal fascicles. Parapodia biramous, the notopodium with simple, pointed setae, transversely serrated along one or both edges, or almost smooth; neuropodium with only composite setae, or also with simple, spinose superior setae (pl. 13, fig. 153). A ciliated tentacular cirrus (=branchia) on all or most parapodial appendages, posterior to the first few segments. Area between the tentacular cirrus and the notopodium with a series of ciliated ctenidia.

Sthenelais fusca Johnson

Plate 13, Figs. 153-162

Sthenelais fusca Johnson, 1897, pp. 185-186, pl. 9, figs. 60, 61, pl. 10, fig. 64; 1901, p. 397; Moore, 1909, p. 242; Treadwell, 1914, pp. 183-184; Monro, 1933, p. 16.

Collections.—28-33, 343-34, 745-37, ?770-38, 780-38, 907-38, Acc. 585. 11 specimens.

Notopodial setae are disposed in a full, fan-like fascicle of longer, finely serrated setae, and fewer, shorter, pectinated setae in the inferior part of the fascicle. Neuropodia have superiorly (1) spinose setae (pl. 13, fig. 153) and (2) long-shafted composite setae (pl. 13, fig. 154); medially (3) stout, falcigerous setae with short, bifid appendage (pl. 13, figs. 155 to 157), disposed in a semicircular whorl about the neuroaciculum, the arc open anteriorly (pl. 13, fig. 159); and inferiorly (4) slender, pale composite setae with long appendage in a transverse series of 6 to 10, ventral to the parapodial flange that borders the main setal fascicle. This character is in sharp contrast to the condition in *S. variabilis colorata* Monro (see page 63).

The first elytra are broadly ellipsoid, smaller than those following; the others are excavate at their anterior margin (pl. 13, figs. 160 to 162). There is a row of longer, filiform papillae marginally, and several irregular rows of smaller, submarginal papillae (pl. 13, fig. 161). In some individuals the surface of the elytra is closely covered with minute, wart-like elevations (28-33, Acc. 585), in others the papillated area is much less or almost lacking. Thus, in 343-34, an anterior portion is smooth; in 745-37 and 780-37 (pl. 13, fig. 160) the papillae are limited to an anterior area. Most of the elytral outlines examined are proportionately less broad for their length than has been shown by Johnson (1897, pl. 10, fig. 64). Specimens from Point Loma, near San Diego, California, (in the author's collection) have, however, the elytral proportions approximately as shown by Johnson (pl. 13, figs. 161, 162).

The arrangement of the papillar lobes on the parapodia is more or less constant in all individuals. The notopodium has two or a few larger, stouter lobes on the posterior side, near the point where the notoaciculum emerges. On its anterior side there is a series of 8 to 12 delicate, filiform lobes, along the line where the dorsalmost notopodial setae emerge. The neuropodial lobes are shorter than those of the notopodium, and limited to the anterior side of the podia. The ventral cirrus has a small lobe at its junction with the parapodium, and an elevated flange a short distance from its articulation with the ramus (pl. 13, fig. 158).

A single specimen from 770-37 differs from others in that its peristomial cirri are checkered. In other respects it resembles *S. fusca.*

The specimens identified as *S. fusca* Johnson vary considerably in certain respects. The length ranges from 40 mm (adult female from 28-33) to 110 mm (745-37). The degree of tuberculation on the elytra is variable, as mentioned above; the surface of the elytra is pale in some, and encrusted with rust-colored particles in others. All agree, however, in having similar parapodial parts as described above, and the first elytrum is ellipsoid.

The relation of *S. fusca* Johnson to *S. variabilis colorata* Monro is apparently close. It is only by resort to microscopic parts that notable differences are observable.

Distribution.—Washington, south to Panama; Galapagos Islands. Intertidal to 46 fms. In root masses of eel grass; under stones.

Sthenelais verruculosa Johnson

Plate 14, Figs. 167-175

Sthenelais verruculosa Johnson, 1897, p. 187, pl. 9, fig. 62, pl. 10, fig. 65; Treadwell, 1914, p. 184; Berkeley, 1923, p. 216.

Collections.—287-34, 888-38, 893-38, 894-38, 897-38. About 27 specimens.

Length over 75 mm; width without 4.5 mm, with parapodia 8.5 mm; with setae 13 mm at fifteenth segment. No specimens are posteriorly complete. Dorsum completely covered by elytra. They are fringed on their outer margins; the surface is finely punctate, and marked with a broad greenish gray crescent on the median and posterior third of the scale, approximately marking the line where the preceding elytrum overlaps it. The ventrum of the body is finely and closely pustuled, the papillae similar to those that cover the surface of the elytra.

The prostomium somewhat resembles that in *S. fusca* (see above) except that the anterior pair of eyes is visible from the dorsum, and only partly concealed by the antennal flanges. The posterior eyes are inserted somewhat behind the lateral bases of the median antenna. The latter has broad, lateral expansions (pl. 14, fig. 170). Palpi are white, long, slender, extending distally to the tenth setigerous segment when directed posteriorly.

Parapodial ctenidia are present from the fourth parapodium and occur in threes, the dorsalmost the smallest (pl. 14, fig. 167). Elytral cirri (=branchiae) are long, cirriform, directed ventrally and recurved inward. They extend distally to about the middle of the parapodial base. The whorl about the neuroacicular lobe, from which the median neuropodial setae arise, is closely surrounded by a fringe of elongate papillae. The inferiormost setae are ventral to the papillar whorl (pl. 14, fig. 175). A row of slenderer papillae borders the upper lobe where the notopodial setae emerge from the notopodium. The ventral cirrus has a basal thickening (pl. 14, fig. 167).

The first elytrum is large, with an anterior prolongation that fits snugly about the sides of the prostomium. Others are deeply excavate at their anterior margins. On their proximal margins they are smooth, delicate; laterally there are long fringes, some of which extend over the sublateral margin (pl. 14, fig. 171). The exposed surface is more or less covered with microtubercles subequal in size (pl. 14, fig. 172).

Neuropodial setae include (1) spinose, simple, superiormost (pl. 14, fig. 174), accompanied by (2) a few long jointed, composite setae, (3) median and inferior, long jointed, slender, bifid composite setae (pl. 14, figs. 168, 169). There are no stout, falcigerous median setae such as characterize *S. fusca* Johnson (see above). Notopodial setae are closely serrated (pl. 14, fig. 173).

Distribution.—California; British Columbia; Carros Island, Mexico; San Miguel Island, California. Subintertidal to 30 fms.

Sthenelais variabilis Potts, var. **colorata** Monro

Plate 13, Figs. 163-166

Sthenelais variabilis Potts, 1910, p. 349.

Sthenelais variabilis, var. *colorata* Monro, 1924, pp. 52-53; 1933, pp. 14-16, fig. 7.

Collections.—116-33, 250-34, 450-35, 451-35, 470-35. 6 specimens.

These specimens differ from *S. fusca* Johnson (see above) most notably in their much smaller size. An egg-laden female (450-35) consisting of 42 anterior segments is only 25 mm long and 3.5 mm wide. The first elytrum is about as broad as long and suborbicular. The inferiormost neuropodial setae are inserted dorsal to the ventral parapodial fringe (pl. 13, fig. 166) and the notopodial fringe is terminal rather than oblique in its insertion. The posterior margin of the elytra is neatly beaded, its lateral margin fringed (pl. 13, figs. 163, 164). The surface is papillated, with wart-like elevations, those on anterior elytra finer than those more posteriorly.

The neuropodium terminates in a small lobe (pl. 13, fig. 166) at the place where the aciculum emerges. The ventral cirrus has a dorsal flange at its proximal end. Neuropodial setae include (1) spinose, simple setae, and slender, long shafted composite setae in the superiormost part of the fascicle, the latter with a spinose shaft; (2) stouter composite setae with longer or shorter appendage, the secondary tooth closely appressed (pl. 13, fig. 165); and (3) slender, inferior composite setae.

Distribution.—Eastern Australia; Panama; Costa Rica; Mexico. Subintertidal to 25 fms.

Sthenelais maculata, new species

Plate 15, Figs. 176-187

Collection. — 273-34, 364-35, 373-35, 379-35, 634-37, 639-37, 833-38 (Holotype). 10 specimens.

Length of 50 anterior segments (833-38) is 31 mm, width at fortieth segment across elytra is 3 mm, with setae 4 mm. Another smaller, but nearly complete, individual, lacking the prostomium, is 40 mm for 112 segments (634-37). Dorsum completely covered by elytra. The latter are pale or cream colored, each overlain with a black ring about the elytrophorous region, and a triangular fulvous area median to the ring (pl. 15, figs. 178, 182, 183).

Prostomium trapezoidal, broader than long, widest in its anterior half, without a median sulcus; the anterior eyes are in front of, and at the sides of, the median ceratophore, the posterior pair slightly anterior to the middle of the prostomium. Median ceratophore is about as long as the prostomium, its lateral expansions broad and extending distally beyond the main stalk. The median antenna is about twice as long as its ceratophore. Palpi are white, tapering, and extend distally to the sixth parapodium.

The first parapodium is directed anteriorly, its notopodial setae overlapping medially in front of the prostomium. Branchiae are present from the fourth segment (=second elytrophorous); they are cirriform, recurved, heavily ciliated on their ventral side. Parapodial ctenidia occur in threes, nearly filling the space between the branchial base and the notopodial base (pl. 15, fig. 180).

Elytra are broadly imbricated and laterally fimbriated, the fringes continued submarginally (pl. 15, fig. 181). The first are about as broad as long, suborbicular in outline save at their anterior margin where they are truncate. The next few pairs, to about the sixth pair, are as long as, or longer than, wide with anterior margin only slightly excavate (pl. 15, fig. 178). More posteriorly they are proportionately broader and more distinctly reniform (pl. 15, figs. 182, 183). The dorsal surface is covered with microtubercles which are largest on anteriormost elytra, but inconspicuous throughout.

Parapodia are fimbriated on their anterior sides, the notopodium with about 4 longer papillae at its terminal portion, the neuropodium with about 12 to 15 (pl. 15, fig. 180). The neuroacicular lobe is stout, convex, projecting distally beyond the ventral cirri and notopodial lobe in median parapodia (pl. 15, fig. 180). In anterior parapodia the neuropodia are less developed (pl. 15, fig. 179). Ventral cirri are simple, tapering, with a dorsal flange and a smaller elevation at the proximal, dorsal base. Notopodial setae are elongate, finely serrated. Superior neuropodial setae include simple spinose (pl. 15, fig. 185) and slender composite setae, the appendage with 1 (pl. 15, fig. 176) or 2 articles (pl. 15, fig. 177), the shaft smooth or somewhat spiny. Median neuropodial setae are falcate, the tip bifid, the shaft smooth (pl. 15, figs. 186, 187). Inferior neuropodial setae are long, slender, articulated (pl. 15, fig. 184).

Sthenelais maculata belongs in the group with *S. fusca,* in having simple, spinose neuropodial setae. It differs most conspicuously from others of this group in its neuropodial proportions and the kinds of setae.

Holotype.—AHF no. 10.

Distribution.—Independencia Bay, Peru (Holotype); Callao, Peru; Manta, Ecuador; Tenacatita Bay, Mexico; Gulf of California, Mexico. Shore to 75 fms.

Sthenelais hancocki, new species

Plate 16, Figs. 188-202

Collection.—890-38. 3 specimens.

There are 3 anterior fragments, the longest piece is 34 mm long for 64 segments. The width is 3 mm without, 4.5 mm with parapodia and

6.2 mm with setae. The body and elytra are pale except for black eyes and a few diffuse sooty patches on some of the anterior elytra. Some of the posterior elytra are encrusted with rust-colored granulation.

Prostomium trapezoidal, widest anteriorly, the width slightly exceeding the length; with a pale median longitudinal line but without a median sulcus. Eyes 4, black, the anterior pair at the anteroventral margin, concealed from dorsal view by the antennal ctenidia, and a posterior pair at the sides of, and slightly posterior to, the antennal base (pl. 16, fig. 188). Median antenna similar to the peristomial cirri, but about one third again as long. Palpi are white, tapering, extending distally beyond the prostomial antenna.

Elytra completely cover dorsum; they are broadly overlapping posteriorly and medially. The surface appears smooth to the unaided eye, but under magnification shows numerous low, yellowish, chitinous, simple spines. The margin is entire except for a limited outer border which has a simple fringe (pl. 16, figs. 189, 191, 198, 202). The first elytrum is suboval (pl. 16, fig. 191), narrower than that following, but broadly overlapping the second one. The latter is deeply excavate at the anterior border, the point of attachment proportionately far posterior (pl. 16, fig. 189). Other elytra are increasingly larger toward the median region of the body, the inner half of each scale forming a large lobe at its anterior margin, the outer half less so. In anterior elytra the surface is almost entirely overlain with simple, low spines; in the median and posterior regions the spines are more or less obscured by a rust-colored incrustation. In anterior elytra the prickly area extends over the entire portion, in posterior scales the outer half is nearly or quite smooth (pl. 16, fig. 202). Also, the outer fringe, at first more or less regular, is less so in median and posterior elytra, and the spaces between the longer fringe often filled in with minute, globular papillae (pl. 16, fig. 198). The chitinous spines are low (pl. 16, fig. 195) and when seen in dorsal view appear three-angled (pl. 16, fig. 194).

Parapodia are typical of the genus, the first 3 pairs directed forward at the sides of the prostomial and oral areas, the others laterally. In the first few parapodia, from the second, the neuropodium extends distally beyond the notopodium, but by the tenth segment they extend distally about equally far, and more posteriorly the notopodium is the longer. The first parapodium is uniacicular (pl. 16, fig. 190), with a long dorsal cirrus, a ventral cirrus about half as long, and a shorter, clavate cirrus, dorsoanterior to the dorsal cirrus that represents the transposed prostomial antenna. Its setae are numerous, long, capillary, finely serrated.

In the second to fourth segments, the neuropodium has a few antero-dorsal, composite setae, their appendages long, 1 or 2 articulated, and distally bifid, the shaft is long, strongly spinose (pl. 16, fig. 192). The median and inferior neuropodial setae are less spinose or quite smooth. From the fifth segment the spinose composite setae are replaced by simple, spinose setae (pl. 16, fig. 193), and the median (pl. 16, fig. 197) and inferior setae (pl. 16, fig. 196) are all smooth shafted, the former heavier than the latter. The appendages are 1 to 6 articled, and the tips are finely bifid (pl. 16, figs. 199, 200). From about the thirty-second segment, one or a few of the median composite neuropodial setae are stout, the appendage short, falcate, strongly bifid (pl. 16, fig. 201). Setae and acicula are pale yellow.

A few terminal parapodial fringes are present on the anteriormost segments, but inconspicuous or absent on others, save for a few at the anterior margin at the distal end of the notopodium. The ventral cirrus of the first segment is longer than those following. It extends distally beyond the parapodium. By the fourth segment it is shorter than its respective parapodium, and remains more or less the same more posteriorly.

Sthenelais hancocki approaches *S. neoleanirae* (see below) in having mostly fine neuropodial setae, with a strongly tapering appendage and minute, bifid tip. It differs, however, in almost lacking the parapodial fimbriation which is notable in *S. neoleanirae*. Also, the neuropodial setae, though tapering strongly distally, terminate in a more distinct bifid tip. The elytral spines are proportionately much smaller and lower.

Holotype.—AHF no. 11.

Distribution.—Monterey Bay, off Point Piños, California. In 36 fms.

Sthenelais neoleanirae, new species

Plate 17, Figs. 203-216

Collection.—667-37. One specimen.

This is known only through a single, incomplete anterior fragment, including the prostomium and about 73 segments with 57 pairs of elytra.

The prostomium is wider than long, with 2 pairs of black eye spots, the anterior pair at the frontal margin of the prostomium, concealed by the prostomial antenna. They are larger than the posterior eyes, and spaced a little nearer together. The posterior eyes are immediately below the lateral base of the median ceratophore.

Branchial cirri are minute, papilliform, on the first elytrophore (segment 4), but more or less subequal more posteriorly. The elytra are imbricated, completely covering the dorsum. They are fimbriated along their outer, lateral margin, and some fringes continued submarginally (pl. 17, fig. 209), the anterior margin slightly excavate. Many of the posterior elytra have 3 to 5 larger, simple spines (pl. 17, fig. 210) in a row near the posterior border, in addition to many smaller, similar spines. All of the spines are higher than broad at their base (pl. 17, fig. 208).

Parapodia, from the second, are conspicuously fimbriated in the first 10 or more segments. The fimbriae are long, papillar, bordering the setal and acicular fascicles (pl. 17, figs. 203, 206). They are present more posteriorly, but in diminishing numbers and sizes.

The first parapodium has a long slender dorsal cirrus, more than twice as long as its ventral cirrus. A shorter, clavate cirrus, dorsal and anterior to the dorsal cirrus, represents the transposed prostomial antenna (pl. 17, fig. 207). The setae are all of one kind, long, slender, capillary, minutely serrated, the supraacicular about twice as long and numerous as the subacicular setae.

The second parapodium has 2 or 3 superior composite setae with a long, spinose shaft, and a 5 or 6 articled appendage, the tip obscurely bifid. The other setae resemble those in more posterior parapodia. From segment four, there are simple, spinose setae (pl. 17, fig. 211) in the anterodorsal position of the neuropodial fascicle accompanied by slender composite setae (pl. 17, fig. 204). The median (pl. 17, figs. 212, 213) and inferior setae (pl. 17, figs. 205, 215) have a heavy shaft, with few, or mostly no, serrations, and a rapidly tapering appendage which is 1 to 5 articled, and terminates in a poorly marked bifid tip (pl. 17, figs. 212, 213).

The notopodia, from the second, are at first notably smaller than the neuropodia (pl. 17, fig. 206), but from the tenth segment the notopodium becomes increasingly larger and surpasses the neuropodium (pl. 17, fig. 216). Ventral cirri are tapering, with a terminal lobe (pl. 17, fig. 206).

The unique character of the neuropodial setae and the spiny elytra distinguish this species from others of the genus *Sthenelais.* It is designated *S. neoleanirae* because its composite neuropodial setae taper rapidly to a slender tip, which is, however, bifid.

Holotype.—AHF no. 12.

Distribution.—Escondido Bay, Carmen Island, Gulf of California, Mexico. In 60 fms.

Genus STHENELANELLA Moore

Prostomium subglobular, resembling that in *Sthenelais* Kinberg, with a stout median antenna at the base of which are flaring ctenidia; eyes 4, black, disposed at the anterior face of the prostomium, and near the dorsal bases of the median ceratophore. Paired prostomial antennae inserted on the peristomial segment, as in *Sthenelais.* Elytra inserted as in *Sthenelais.* Notopodial setae numerous, long, slender, hair-like, with fine transverse serrations. Neuropodial setae of one kind, composite, with a smooth, or only slightly spinose, shaft and a smooth, slightly falcate appendage; the dorsalmost neuropodial setae have a proportionately longer, slenderer appendage than those more ventral. Only a single species, *S. uniformis* Moore (1910, p. 391), is known.

Sthenelanella uniformis Moore

Plate 18, Figs. 226-231

Sthenelanella uniformis Moore, 1910, pp. 391-395, pl. 33, figs. 105-112; Treadwell, 1914, p. 184.

Collections.—213-34, 259-34, 876-38, 878-38, 895-38, 900-38. About 12 specimens.

The first elytra are orbicular, with a short, close marginal fringe along the anterior edge (pl. 18, figs. 226, 227). More posterior elytra are subrectangular to rhomboidal (pl. 18, fig. 228) with entire margin. The first 8 to 10 pairs have irregular patches of rust-colored pigment, most conspicuous on their proximal halves (pl. 18, fig. 228). Parapodia are short, blunt, the neuropodial setae in trim, perpendicular fascicles, all of them resembling one another (pl. 18, figs. 229 to 231) except in a few of the anteriormost parapodia, but differing slightly in proportions; the appendages of the superiormost are longest (pl. 18, fig. 231).

From the sixteenth segment, a long trailing fibrillar strand emerges from the notopodium at the aciculum, and projects laterally in long streaming filaments, far beyond the parapodia. They recall the spinning glands of some of the Polyodontidae, and perhaps function in a similar manner.

The original description was based on an incomplete male specimen, taken with "yellow Doris," and was therefore thought to be commensal (Moore, 1910, p. 395). The collections at hand, however, include some in tubes, much like those constructed by *Panthalis pacifica* Treadwell. An individual 26 mm long occupied a tube 65 mm long, by 4-8 mm wide, the walls soft, thick, felted, the lining smooth though not firm, the outer layers containing sand particles.

Distribution.—California; Anacapa Island and Santa Barbara Island, California; Catalina Island; Tangola-Tangola, Mexico; La Plata Island, Ecuador. Moore's unique type came from an unknown locality. Treadwell reported it from San Pedro, California, in 19-38 fms. The available collections extend the known range far to the south (Ecuador). Subintertidal to 40 fms.

Genus **LEANIRA** Kinberg

Prostomium resembles that in *Sthenelais* (see above), with a stout median antenna inserted on a basal ceratophore with flaring ctenidia. Elytra more or less completely covering the dorsum, with or without marginal fringe. Notopodial setae slender, serrulate, distally pointed. Some neuropodial setae are composite, the appendage tapering to a fine, entire point, with or without transverse canaliculations. Differs from *Sthenelais* Kinberg in having pointed composite setae instead of bifid setae.

Leanira fimbriarum, new species

Plate 18, Figs. 217-225

Collections.—216-34, 436-35, 640-37, 667-37 (Holotype), 880-38. About 11 specimens.

Length of 33 anterior segments (667-37) is 24 mm; another larger individual, from 880-38, is 30 mm for 42 segments. General appearance pale, smooth; the elytra leave uncovered a narrow stripe from about the seventh to twentieth segment, and most of the parapodia.

Prostomium pale, broadly oval, with 4 eyes on the anterior half, the anterior pair at the frontal margin, concealed from the dorsum by the broadly expanded antennal ctenidia, the posterior pair smaller, near the dorsal antennal base (pl. 18, fig. 218). Elytra translucent, smooth save for numerous minute punctations, distinguishable only under high magnification. The first pair is subrectangular, with fringe along the exposed margin (pl. 18, fig. 219), the hilum excentric; others are excavate at their anterior margins, the fringe limited to an outer, ectal portion, and consisting of widely spaced, simple filaments (pl. 18, fig. 224).

Branchial cirri are present from the seventh segment, first as minute papillae on the elytrophore, becoming gradually longer, and, from about the eighteenth segment where best developed, they do not extend distally to the notoacicular lobe. Parapodia have 3 widely separated ctenidia, the middle one the largest.

The first parapodium is uniacicular, has a long, tapering dorsal cirrus that extends distally beyond the setae, a ventral cirrus less than half as long, and a smaller, clavate cirrus (transposed prostomial antenna) about two thirds as long as the ventral cirrus inserted anterodorsally to the dorsal cirrus. The proportions and parts are much as those described in the species of *Sthenelais* (see above). Its setae are all of one kind, numerous, long, capillary with fine serrations, the subacicular only about half as long as the supraacicular.

From the second, the parapodia are biacicular, each ramus terminating in numerous digitate lobes (pl. 18, fig. 225). In the second parapodium the notopodium is reduced in size, far surpassed by the neuropodium. Its ventral cirrus is long, slender, extending distally beyond the neuropodium, and nearly as long as the dorsal cirrus of the first segment. The neuropodial setae include (1) one or two superior composite setae, with long spinose shaft, a tapering appendage about as long as the spinose region of the shaft, and (2) numerous larger composite setae with smooth or only slightly spinose shaft and long, tapering, pointed appendage, with no trace of articles or canaliculae.

From the fourth segment, the superiormost neuropodial setae are simple, spinose (pl. 18, fig. 221); the median and inferior setae are all composite and resemble one another except for greater thickness in the median portion of the fascicle. The appendage is long, tapering to a fine point, clear, without canaliculae (pl. 18, fig. 222). The shaft is smooth or only slightly spinose (pl. 18, fig. 222). An inferiormost fascicle of smaller, similar setae emerges ventral to the parapodial fringe. Setae and acicula are pale yellow. Notopodial setae are of two kinds, (1) numerous, fine, bipectinate setae in the upper and median parts of the fascicle (pl. 18, fig. 220), and (2) inferior, simple capillary setae (pl. 18, fig. 223), as also intergradations of these two kinds.

Parapodia have numerous fimbriae, bordering the setal fascicles on the anterior and dorsal faces of the podal rami. These are most conspicuous on the first 15 segments. More posteriorly they diminish in size and number and by the twenty-fifth parapodium are much reduced. A few, however, at the anterodorsal edge of the notopodium and the dorsal edge of the neuropodium are present throughout (pl. 18, fig. 217). A conspicuous feature is the presence of 2 lobes at the ectal margin of the notopodium.

Leanira fimbriarum differs from typical representatives of this genus in that its inferior neuropodial setae are not canaliculate. The prostomium has well-marked eyes, and the elytra are fimbriated.

Holotype.—AHF no. 13.

Distribution.—Escondido Bay, Gulf of California, Mexico (Holotype); Piñas Bay, Panama; Cape of San Francisco, Ecuador; Santa Rosa Island, California. Shore to 60 fms.

Genus PSAMMOLYCE Kinberg

Body elongate, consisting of numerous segments. Prostomium subcircular or oval, widest posteriorly; without eyes or with 4 eyes on the anterior half. A median antenna inserted on a stout ceratophore without ctenidia. The paired prostomial antennae inserted on the peristomial segment. Parapodia subbiramous, the notopodium short, with only fine, hair-like, serrated setae; the neuropodium stout, with composite setae, the shaft smooth or spinose, the appendage usually falcate distally, the tip entire or bifid. Elytra encrusted with sand particles, the margin fimbriated, and produced in lobes at the median, and sometimes also posterior, margins.

Psammolyce spinosa, new species

Plate 19, Figs. 232-243

Collections.—140-34, 780-38 (Holotype).

Length of 73 anterior segments is 55 mm; a posterior end is lacking. Width across elytra is 5 mm, including setae 7 mm. The dorsum is encrusted with sand particles, over the proximal portions of the elytra and the broadly exposed dorsum. The ventrum is marked with a deep, median neural groove, and is almost uniformly covered with filiform papillae, producing a furry appearance. The papillae are continued laterally over the surface of the parapodia, but are for the most part shorter and smaller.

The prostomium is largely concealed by the stout median ceratophore and the peristomial segment. It is narrowest anteriorly (pl. 19, fig. 238). The 4 eyes are black, the anterior pair large, approximately circular, directed anteroventrally, their edge visible in dorsal view of the prostomium. Posterior eyes are much smaller, nearly circular, inserted on the prostomial lobe in line with, but away from, the lateral bases of the median antenna. Median antennal base is large, bulbous, projecting anteroventrally, provided with a slender, tapering antenna that extends distally about as far as the setae of the first segment (pl. 19, fig. 238).

Elytra are imbricated, but do not nearly overlap medially, and leave uncovered the parapodia. They are broad, somewhat triangular anteriorly (pl. 19, fig. 243) and gradually become subquadrate posteriorly (pl. 19, fig. 240). None are incised. The marginal fringe is close, long, where present, but absent along the anterior margin where the elytrum is overlapped by the preceding one. It extends distally not nearly as far as the notopodial setae. In addition, there are knob-like lobes at the inner and posterior margins, from which small capitate papillae arise (pl. 19, fig. 243). The dorsal surface of the elytra is overlain with many long papillae, similar to those at the margin, but mostly shorter.

Parapodia are subbiramous, the notopodium short, blunt, rising from the dorsal face of the neuropodium (pl. 19, fig. 239) and provided with a large, spreading fascicle of many (200 or more) very fine, hair-like, serrated setae that extend upward, laterally and ventrally, more or less concealing the other parapodial structures. The notoaciculum projects slightly from its lobe, but is not visible unless the notopodial setae are lifted away.

The neuropodium is a stout lobe, covered over with elongate papillae, from which the stout aciculum projects a short distance. It is provided with stout, amber-colored, composite setae. The superiormost setae have a long, spinose shaft (pl. 19, figs. 234, 235) (for which the species is named), and long falcate appendage, usually without, but sometimes with, a small accessory tooth. Median neuropodial setae are about as heavy as, or heavier than, the dorsalmost. The shaft is nearly smooth (pl. 19, figs. 236, 237, 241), the appendage shorter, falcate, and the tip entire or bifid. Inferior neuropodial setae are much finer, paler yellow, with much longer appendage and tip entire or nearly so (pl. 19, figs. 232, 233). The neuropodial setae in the first few segments include some with a serrulated shaft and long, bifid appendage (pl. 19, fig. 242). Ventral cirri are long, tapering, extending distally about as far as the neuroacicular lobe (pl. 19, fig. 239).

Psammolyce spinosa approaches *P. farquharensis* Potts (1910, p. 347) from the Indian Ocean, in that the elytra are not incised, their margins fimbriated and provided with lobes. It differs from the latter, however, in that the superiormost neuropodial setae have a distinctly spinose shaft, and the median composite setae are somewhat spinose. In so far as I am aware, no species of the genus *Psammolyce* Kinberg has been described from the eastern Pacific. It is therefore of great interest that these collections should include 4 species, all of which appear to be new to science (see below).

Holotype.—AHF no. 14.

Distribution.—Chatham Bay, Cocos Island (Holotype); Clarion Isle, Mexico. In coral; in white sand, 40 to 46 fms.

Psammolyce fimbriata, new species

Plate 20, Figs. 244-254

Collections.—250-34, 283-34, 745-37 (Holotype). 3 specimens.

Length of 88 anterior setigerous segments is 43 mm. The dorsum is broadly exposed between the inner margins of the elytra, but heavily covered with sand particles, as also most of the surface of the elytra. The ventrum is pilose, overlain with many short hairs, the region immediately posterior to the mouth, on the ventral side, with numerous long hairs, forming a V-shaped area that extends posteriorly at least to the fourteenth segment. From the twentieth or twenty-fifth segment there are longer, filiform papillae, in more or less regular, transverse series inserted in the intersegmental furrows; these become increasingly numerous more posteriorly, appearing fur-like.

The prostomium is ovoid, narrowest anteriorly, largely concealed by the median ceratophore and peristomial structures. Eyes 4 pairs, a larger ventral pair at the frontal margin and a smaller, elongate, posterior pair near the base of the ceratophore (pl. 20, fig. 245). The median antenna is conspicuous, its ceratophore curved downward, the style long, slender (pl. 20, fig. 244).

The everted proboscis (745-37) terminates in 11 dorsal and 11 ventral, soft papillae. Jaws are amber colored, with 2 large dorsal and 2 ventral fangs, but without lateral accessory teeth.

The elytra are visible only after removing the sandy covering. They have long, club-shaped processes along their inner and posterior margins (pl. 20, fig. 252), which project slightly above the sand particles. The surface extends laterally to conceal the parapodia and most of the setae (thus contrasting with the condition in *P. spinosa*). The long, lateral fringe extends laterally nearly as far as the neuropodial setae. The dorsal surface is overlain with papillae to which foreign particles adhere. The elytrophoral scar is elongate, near the inner side, and there is no incision (pl. 20, fig. 252).

Parapodia are much as in *P. spinosa,* the notopodium is short, papillar, with numerous fine, hair-like, serrated notopodial setae (pl. 20, fig. 248). These fascicles are notably smaller and less conspicuous (pl. 20, fig. 251) than in *P. spinosa.* The neuropodia are proportionately shorter, and less papillated except on the ventral surface where the papillae are long, filiform. Neuropodia include stouter, superior (pl. 20, fig. 254) and median setae (pl. 20, fig. 253), and finer, slenderer inferior setae (pl. 20, fig. 247). The superior setae have a somewhat spinose shaft and an appendage that is slightly falcate, its length less than three times its greatest width (pl. 20, fig. 254). The median setae are similar to the superior, but the shaft is almost smooth and the appendage is about as broad as long or only slightly longer (pl. 20, fig. 253). The inferior setae have a long, slender appendage with entire (pl. 20, fig. 247) or bifid tip. The first few parapodia (posterior to the first) have composite neuropodial setae in which the shaft is strongly serrated, the appendage long, slender, with entire tip (pl. 20, figs. 246, 250), or bifid tip (pl. 20, fig. 249).

P. fimbriata differs from *P. spinosa* in that the parapodia are proportionately shorter, the shafts of the superior neuropodial setae are almost smooth, the prostomial structures differ (see figures above).

Holotype.—AHF no. 15.

Distribution.—Isabel Island, Sinaloa, Mexico (Holotype); Thurloe Bay, Gulf of California; Secas Islands, Panama. In 8 to 25 fms.

Psammolyce myops, new species

Plate 21, Figs. 255-264

Collection.—639-37. One specimen.

Length about 45 mm; number of segments 110 or over. A single specimen in 2 pieces, includes anterior and posterior ends but is somewhat macerated; the last few segments are short, crowded, and terminate in a pair of cirriform anal cirri that are about 3 times as long as the anal ring is wide. Surface is pale, encrusted with white sand and shell particles. Dorsum broadly exposed by the elytra but covered over with sand particles, as are also the median halves of the elytra.

Prostomium with median, club-shaped, humped, ceratophore (pl. 21, fig. 261) and slender style. Eyes 4, the larger, ventral pair elongate, rectangular, in an anterior-posterior direction. Dorsal eyes much smaller, elongate, on the side of the base of the median ceratophore (pl. 21, fig. 260).

Elytra much as in *P. fimbriata* (see above), the lobes ornamented with numerous soft papillae, the margins and surface with elongate fringes (pl. 21, fig. 255).

Parapodia with short, papillar notopodia, and robust, truncate neuropodia, the neuroacicular lobe only slightly (pl. 21, fig. 259) or not at all projecting beyond the main body of the lobe except in a few anterior parapodia (pl. 21, fig. 259). Notopodial setae are fine, numerous, and extend distally almost as far as the neuropodial setae. The neuropodia have stouter superior and median setae, and finer, slenderer, inferior setae. The superiormost setae are mostly entire distally but a few are bifid; the median setae have a shorter, stouter appendage than the dorsalmost, and the tip is entire (pl. 21, fig. 262) or bifid (pl. 21, fig. 263). The inferior setae are slenderer and the appendage longer (pl. 21, fig. 264). The first few segments, posterior to the first, include neuropodial setae with entire (pl. 21, fig. 258) or bifid (pl. 21, fig. 257) tips, and the shaft is more or less strongly serrated.

This unique specimen resembles *P. fimbriata* (see above) but differs in that (1) the neuropodia are more distinctly truncate, (2) the anterior eyes are narrow, elongate in a dorsoventral direction, the posterior eyes are smaller patches on the antennal base (pl. 21, fig. 261), (3) the composite neuropodial setae have shafts which are smooth save in the first few segments. The appendages are proportionately shorter and stouter than are those in *P. fimbriata*.

Holotype.—AHF no. 16.

Distribution.—Espiritu Santo Island, Gulf of California. 3-5 fms.

Psammolyce antipoda (Schmarda) anoculata, new subspecies

Plate 22, Figs. 268-272

Pelogenia antipoda Schmarda, 1861, p. 160.

Psammolyce antipoda Augener, 1913, pp. 96-97; Fauvel, 1917, pp. 186-189, fig. 10, pl. 4, figs. 12, 13; Monro, 1924, p. 47; Augener, 1927, p. 340.

Collection.—465-35. One specimen.

Length of about 200 segments is 90 mm; nearly complete, a small posterior portion missing. Body dark purplish brown. The dorsum is almost solidly covered with sand particles, the ventrum is pilose, covered with filiform papillae that are longest at the sides around the parapodial bases.

The prostomium is pale, more or less translucent, to be seen only by lifting away the first elytra and the peristomial ring. Its dorsal margin, at the base of the stout ceratophore, is fused to the peristomial ring (pl. 22, fig. 268), and its lateral and ventral parts are somewhat telescoped in the first segment. No eye spots can be distinguished on any part of the prostomium or ceratophore.

The elytra are triangular (pl. 22, fig. 270) to subquadrate (pl. 22, fig. 269), heavily fimbriated at their exposed parts, and with a single, elongate lobe on the inner ectal margin. The dorsal surface is papillated.

The notopodial fascicle is full, thick, much as in *P. spinosa,* the numerous fine, hair-like setae project laterally far beyond the neuropodial setae. The neuropodium is distally truncate, slightly oblique. The superior and median neuropodial setae are much heavier than the inferior setae. Their shafts have several transverse rows of weak serrations or are quite smooth, the appendages are falcate, distally entire (pl. 22, fig. 272) or bifid. Inferiormost setae have a much longer appendage. Setae of the second segment include some with a spinose shaft, and a long appendage with (pl. 22, fig. 271) or without bifid tip.

In its parapodial and elytral structures, this specimen agrees with the accounts of *P. antipoda* (Schmarda). It differs, however, in that its prostomium is without eyes.

Holotype.—AHF no. 17.

Distribution.—Playa Blanca, Costa Rica. Shore.

Family **Pareulepidae,** new name

PAREULEPIDAE is proposed to replace the family name, EULEPETHIDAE Chamberlin, because the type genus of the family must be changed to *Pareulepis* Darboux (see below, under generic description). Only a single genus, *Pareulepis,* is known.

Genus **PAREULEPIS** Darboux

Eulepis Grube, 1875, p. 71 (not Dalman or Fitzenger. See Chamberlin, 1919, p. 89).

Pareulepis Darboux, 1899, p. 116.

Eulepethus Chamberlin, 1919a, p. 89.

Body short, depressed, consisting of few segments (about 36 to 40). Prostomium with 3 antennae and a pair of palpi. Elytra present to segment 23, disposed as in the SIGALIONIDAE on anterior segments; posterior segments with modified cirri, present on all segments. Setae simple, the notopodia with some slender capillaries, and some stout, curved setae, their distal ends bent sharply at an angle to the main stem (pl. 23, fig. 283). Neuropodial setae include a few smaller, superior pectinated setae (pl. 23, fig. 288) and a deep fascicle of nearly straight setae. Neuropodial acicula have a flattened chitinous piece at their distal ends, embedded in the fleshy part of the lobe (pl. 23, fig. 280).

Eulepis Grube was erected for the species, *E. hamifera* (1878b, p. 71) from the Philippines. *Eulepis,* however, has been shown to be preoccupied by Dalman and Fitzenger (see Chamberlin, 1919a, p. 89). *Pareulepis* Darboux (1899, p. 116) was erected for *Eulepis wyvillei* McIntosh (1885, p. 131), and separated from *Eulepis* Grube on the assumption that *E. wyvillei* lacked a segment between the first and second elytral-bearing segments, that is, that elytra are inserted on segments 2, 3, 4 . . . There is a tendency for segments 3 and 4 to be more or less fused dorsally (Fauvel, 1919, p. 337) which explains why segments 3 and 4 might have been confounded in the description of *E. wyvillei* McIntosh (1885, p. 131). "McIntosh hat sich offenbar geirrt, was aus den schwierig zu untersuchenden Verhältnissen der vordersten Segmente erklärbar ist" (Augener, 1918, p. 156). *Eulepethus* Chamberlin was not proposed until much later (1919a, p. 89).

Eulepis wyvillei McIntosh, from Bermuda, and *E. splendida* Treadwell (1902, p. 189) from Puerto Rico, have been considered identical

(Augener, 1918, p. 155). This conclusion appears justifiable in view of the similarities in the descriptions of the 2 species, even though *E. wyvillei* was said to have about 15 pairs of elytra and *E. splendida* 12 pairs. According to McIntosh's figure of *E. wyvillei* (1885, pl. 20, fig. 2) there were 13 pairs of elytra.

Pareulepis fimbriata (Treadwell), new combination

Plate 23, Figs. 280-288

Eulepis fimbriata Treadwell, 1902, pp. 190-191, figs. 23, 24; Augener, 1918, pp. 153-155, pl. 3, figs. 39-41, fig. 10.

Eulepis geayi Fauvel, 1918, pp. 503-504, fig. 1; 1919, pp. 335-339, pl. 15, figs. 17-21, pl. 17, figs. 76-79; Pruvot, 1930, pp. 17-19, pl. 2, figs. 51-61; Day, 1934, p. 25.

Collections.—216-34, 770-38, Mission Bay, southern California (author's collection).

Number of setigerous segments to 39; length to 40 mm. Elytra 12 pairs, covering the dorsum medially, but leaving the last 7 or 8 segments uncovered. The elytra are white, smooth or slightly wrinkled. In a specimen from Ecuador the first elytrum is suborbicular, with entire margin; in one from Guatemala the anterior margin has 3 to 5 marginal papillae. The second elytrum is reniform in outline, the outer half longer than the inner and with about 5 marginal papillae. Variation in the margins of elytra is observable in comparing specimens from different areas. An eighth elytrum from individuals from Ecuador, Guatemala, and California is indicated in plate 23, figures 287, 281, and 288, respectively. The last, or twelfth pair, is elongate, with a limited marginal fringe (pl. 23, fig. 285).

Dorsal cirri on setigerous segments 3 to 6 are small, conical enlargements just posterior to the dorsal edge of the notopodial fascicle. Ventral cirri of the first setigerous segment are larger than others. They are clavate with an attenuate tip, and extend distally to the end of the parapodia on which they are attached. More posteriorly they are much smaller, though similar in form to the first (pl. 23, figs. 280, 282).

Setal structures are about as shown by Fauvel for *E. geayi* (1919, pl. 17), but the pectinate setae have a longer smooth tip (pl. 23, fig. 288). Many of the coarse notopodial setae have a slender, attenuate tip (pl. 23, fig. 283). Some of the notoacicula are recurved (pl. 23, fig. 284).

The anal cirrus is a very long, slender filament on a short basal stalk, its total length exceeding that of the length of the body. The basal stalk is inserted on the right side, but the cirrus is directed medially. The homologous basal structure on the left side is a small globular stalk without a filament.

The variations observable in the descriptions, as *E. geayi* Fauvel, of specimens from widely scattered areas (West Africa by Augener, Madagascar by Fauvel, New Caledonia by Pruvot) are of approximate magnitudes as are those to be seen in the collections from the western coasts of the Americas. The description of *E. geayi* agrees reasonably well with that of *E. fimbriata* (Augener, 1918, p. 153) and with the collections available for study. The name, *E. fimbriata,* has priority.

This is the first record of this genus from the eastern Pacific and, so far as I am aware, from the northern Pacific. The author has collected several specimens from low littoral areas near the mouth of Mission Bay, southern California, in a substratum of muddy sand. The burrows were 10 inches or more below the surface. No tube was present, and no commensalism or association with other organisms could be detected. The sand flat harbors an *Arenicola,* and a species of *Poecilochaetus,* representative of another family which has not heretofore been recorded from the northeast Pacific.

In life uniform white, glistening, smooth, contrasting with the dark muddy sand it inhabits.

Distribution.—West Indies; Madagascar; New Caledonia; Ecuador; Guatemala; Mission Bay, southern California. Intertidal to 20 fms.

Family **Polyodontidae**

Only 2 genera, *Polyodontes* Renier (=*Acoëtes* Audouin and M. Edwards) and *Panthalis* Kinberg, are represented in the collections of the Hancock Expeditions. These two genera are so nearly related that it has sometimes been doubtful whether a species should be relegated to one or the other of them. Thus, for example, *Panthalis melanonotus* Grube has been regarded as a *Panthalis* (Fauvel, 1919, p. 339) and later transferred to *Polyodontes* (Monro, 1931, p. 8; Fauvel, 1932, p. 37). *P. melanonotus* is provided with penicillate setae (as in *Panthalis*) and some of its parapodia are provided, though sparsely, with branchial lobes (as in *Polyodontes*).

More complete studies of the species in these genera, based on entire individuals, will perhaps disclose more obvious differences than have been found thus far. The differences as now set forth do not clearly warrant the retention of both generic names, though the separation is a convenient one. Unfortunately, many of the species are known only incompletely, often because of fragmentary materials. Many of the descriptions are based on anterior ends. Hence, the portion which might have had branchiae could not have been examined. Moreover, the presence or absence of branchial lobes, which has been used as a diagnostic character in separating these two genera, is sometimes subject to accidents and changes due to fixing and preservation. Because of these difficulties, the presence or absence of branchial structures has herein been ignored in separating the 2 genera, and the presence or absence of true penicillate setae is used.

The only setae that have been found to differ sufficiently to make them of diagnostic value are the superior neuropodial setae, in the segments posterior to the first 2 to 5 segments. These setae are either penicillate (with a bushy top), or elongate hastate, with smooth tip and sides, or somewhat hirsute. The penicillate setae sometimes have the tuft of hairs continued more or less down one side, their tips drawn out in a point (*P. melanonotus* Grube). The hastate setae may have the hirsute condition continued to the tip (as in *P. panamensis* Chamberlin). A transition from the penicillate seta to the hastate seta is thus demonstrable. Most of the species that have been described thus far, however, are not intermediate in this respect, but have setae either of the penicillate type or the hastate type. Though artificial, this means of separation is convenient for most species concerned.

The following definitions and classification for these 2 genera are therefore proposed.

Key to the Genera, *Polyodontes* Renier and *Panthalis* Kinberg

Superior neuropodial setae are elongate hastate, the tip smooth or more or less hirsute . . . . POLYODONTES
Superior neuropodial setae are penicillate . . . . PANTHALIS

Genus POLYODONTES Renier, char. emend.

Prostomium with 3 antennae, a pair of anteriorly directed ommatophores each bearing a conspicuous lenticular eye, and usually a pair of sessile eyes on the prostomium proper. Neuropodia provided with (1) superior, straight, elongate, hastate setae, more or less hirsute (designated pseudo-penicillatae by Horst, 1917, p. 133) but no penicillate setae such as are present in *Panthalis* (see below), (2) median, stout, acicular spine-like setae with (pl. 24, fig. 292) or without a distal arista, and (3) inferior, curved, sickle-like, serrulate setae (pl. 24, fig. 298). Some anterior parapodia, including the first, usually have some slender capillary setae. Branchiae, in the form of digitate parapodial lobulae, are present or absent.

The genus *Polyodontes* Renier includes the following described species:

1. *Panthalis adumbrata* Hoagland (1920, p. 606, pl. 46, figs. 9-14) from the Philippine Islands.
   Panthalis helleri Holly (1934, pp. 148-149, figs. 1, 2) from the Philippine Islands is probably identical with *P. adumbrata.*
2. *Polyodontes atro-marginatus* Horst (1917, pp. 133-134, pl. 29, figs. 5-7) from the Indo-Pacific.
3. *Eupompe australiensis* McIntosh (1885, pp. 135-139, pl. 21, figs. 4, 5, pl. 23, fig. 8, pl. 24, fig. 4) from Australia.
4. *Panthalis panamensis* Chamberlin (1919a, pp. 86-89, pl. 11, figs. 4-8, pl. 12, figs. 1-6) from Panama.
5. *Polyodontes maxillosus* Ranzani (see Fauvel, 1923, pp. 97-98, fig. 37) from southern Europe.
6. *Panthalis oculea* Treadwell (1902, pp. 188-189, figs. 14-18) from the West Indies.
7. *Polyodontes sibogae* Horst (1917, pp. 131-132, pl. 28, figs. 4-10) from New Guinea. According to Fauvel (1932, p. 37) this is identical with *Polyodontes melanonotus* (Grube).

The nature of the superiormost neuropodial setae of the following species is not known.

Eupompe aurorea Grube (1876, p. 71) from unknown locality.

Polyodontes gulo Grube (1876, p. 72) from the Red Sea.

Eupompe indica Beddard (1889, pp. 256-258) from the Mergui Archipelago.

Polyodontes tidemani Pflugfelder (1932, pp. 286-288, figs. 6-7) from the Indo-Pacific.

The following species, that have been described as *Polyodontes,* are transferred to other genera, as indicated:

Polyodontes gracilis Pflugfelder (1932, pp. 288-290, fig. 8) from Sumatra, to *Panthalis.*

Acoëtes magnifica Treadwell (1929, pp. 1-4, figs. 1-7) from the West Indies has penicillate setae. Fauvel (1932, p. 37) considered this identical with *Polyodontes melanonotus* (Grube). It appears, however, in view of the differences in the setae, that this view is not tenable. *A. magnifica* does agree reasonably well with the description of *Panthalis pustulata* Treadwell (1924, pp. 7-9, figs. 10-15) from the West Indies.

Polyodontes mortenseni Monro (1928a, pp. 569-572, figs. 19-24) from Panama has penicillate setae, hence a *Panthalis.*

The collections of the Allan Hancock Pacific Expeditions include 3 species of *Polyodontes* as described below.

Polyodontes oculea (Treadwell)

Plate 24, Figs. 294-299

Panthalis oculea Treadwell, 1902, pp. 188-189, figs. 14-18.

Polyodontes oculea Monro, 1928a, pp. 572-575, figs. 25-30.

Collections.—216-34, 502-36. Three anterior fragments.

The first parapodium (segment 2) is elongated (pl. 24, fig. 294) considerably more than found by Monro (1928a, fig. 26) but lacks the contraction wrinkles indicated by the latter. The second parapodium is notably shorter, resembling those more posteriorly (pl. 24, fig. 296). Median neuropodia are truncate, deepest distally (pl. 24, fig. 295). The superior neuropodial setae are slender, tapering, slightly thickened (pl. 24, fig. 299) where they emerge from the parapodial lobe, the serrations obscure. Median neuropodial setae have a long, slender appendage (pl. 24, fig. 297). Inferiormost setae are only weakly sickle-shaped, the point long, the serrations more or less distinct (pl. 24, fig. 298).

Elytra are entire, the surface smooth, without hooks or spines, translucent, with a narrow black border where they are left uncovered by the preceding elytrum. At the anteroectal edge the margin is recurved dorsally to form a pouch. From the fourth segment, the anterior face of the parapodium has a few, short, branchial lobes.

The base of the median antenna arises near the posterior margin of the prostomium and its surface is covered with minute papillae as shown by Monro (1928a, fig. 25). Because of these characteristics, the identity of *P. oculea* with *P. melanonotus* (Grube) suggested by Fauvel (1932, p. 37) seems unlikely.

Distribution.—West Indies; Panama; Lower California; Mexico. Subintertidal to 20 fms.

Polyodontes panamensis (Chamberlin)

Plate 24, Figs. 289-292

Panthalis panamensis Chamberlin, 1919a, pp. 86-89, pl. 11, figs. 4-8, pl. 12, figs. 1-6.

Collection.—198-34. One specimen.

A single, anterior fragment consists of 36 segments. The prostomium and first segment had withdrawn into the oral area and could be observed only by laying open the proboscidial region. The prostomial parts and its appendages are arranged about as shown by Chamberlin (1919a, p. 86) but the ommatophores are more conspicuous, the large black eyes occupying at least the distal two thirds of the stalk. The first parapodium is larger than the one following, and its ventral cirrus (pl. 24, fig. 290) both thicker and longer than those following (pl. 24, fig. 289). Elytra are circular to transversely elongated (pl. 24, fig. 291), the point of attachment near the external margin. They are translucent, smooth, with entire margin, the texture finely and uniformly reticulated. No parapodial branchiae have been observed.

Setae include a superior fascicle of numerous, long, slender spinose pointed setae, a median fascicle with 6 to 8 heavy, aristate setae (pl. 24, fig. 292), and a ventral fascicle of about 10 serrulated setae (pl. 24, fig. 293).

This species is transferred to the genus *Polyodontes* because it lacks true penicillate setae and has, instead, long, pointed, superior neuropodial setae.

Distribution.—Panama; Galapagos. Shore to 89 fms.

Polyodontes frons, new species

Plate 25, Figs. 300-308

Collection.—443-35 (Holotype). One specimen.

A single, more or less complete individual consists of prostomium and 37 setigerous segments, and a few regenerating segments at the posterior end. It is pale except for black eyes and dusky crescents on the elytra. The dorsum is broadly exposed through about the first 20 segments, where the body is broadest.

The everted proboscis is pale, proximally smooth, and terminates dorsally in a long, tapering median papilla and 6 shorter papillae on each side. The ventral side is similar but the median papilla is smaller. Jaw pieces are amber colored, the 4 main fangs with darker tips; the lateral elongations have 5 teeth on each piece, but the lower left has 6 teeth.

The prostomium is pale, approximately trapezoidal, widest posteriorly. The ommatophores are elongate, inserted near the anterior margin of the prostomium and projecting anteriorly almost as far as the style of the median antenna (pl. 25, fig. 300). The median antenna has a long, basal stalk that extends posteriorly nearly to the posterior margin of the prostomium, its article is tapering and extends slightly beyond the lateral antennae and the ommatophores (pl. 25, fig. 300). The paired prostomial antennae are smaller than the median and inserted ventral to the ommatophores, and continuous with the prostomial lobes. They are only slightly visible when the prostomium is viewed from the dorsum. Palpi are pale, long, tapering, 5 or 6 times as long as the prostomium is wide.

The peristomium or first segment is directed anteriorly at the sides of the prostomium. Its 2 pairs of cirri resemble the prostomial cirri, but they extend distally beyond them (pl. 25, fig. 300). The parapodia of the second segment (first parapodial segment) are directed laterally (pl. 25, fig. 302). They are notably longer than those of the next segment (pl. 25, fig. 303) and have a ventral cirrus that is both longer and thicker. The first parapodium has a small dorsal fascicle of about 10 slender setae, and a larger, fan-shaped ventral fascicle of about 35 setae. The ventral setae are long, slender, tapering, smooth or nearly so, but some of the ventral ones have a slightly enlarged spiny area near the point where they emerge from the parapodial lobe. More posterior parapodia resemble one another more nearly in that the neuropodial lobe is shorter in proportion to its length.

A typical parapodium, from the thirty-fifth segment (pl. 25, fig. 301), has a small papillar notopodium, provided with a slender, pale aciculum, and a few (6 to 10) slender capillary setae, visible only under higher magnification. The neuropodium has pale yellow setae of 3 kinds, (1) a superior fascicle of 15 to 20 pointed, tapering setae, obscurely pectinated at the widest part (pl. 25, fig. 307) with a long, slender stalk, (2) a median fascicle of 12 to 15 stout, acicular, aristate setae (pl. 25, fig. 308), and (3) an inferior fascicle of about 10, sickle-shaped, serrated setae (pl. 25, fig. 305, 306).

The elytra are smooth, translucent along the lateral margins. Submarginally there is a diffuse pigmented crescent, open anteriorly. There are no elytral spines or prickles, but the lateral margins are curved upward and have a depressed pouch external to the elytral scar (pl. 25, fig. 304).

No papillar or lobular branchial structures could be discerned on the first 37 segments. The presence of pointed superior neuropodial setae and the absence of penicillate setae indicate its allocation to the genus *Polyodontes* as restricted above.

Polyodontes frons approaches *Polyodontes adumbrata* (Hoagland) (1920, p. 606) from the Philippine Islands. It has greatly elongate ommatophores and similar parapodial parts. *P. adumbrata,* however, was said to lack capillary notopodial setae, and the elytra do not have lateral pouches such as characterize *P. frons*. *P. maxillosus* Ranzani (see Fauvel, 1923, p. 97) has elongate ommatophores and elytra with lateral pouches, but the prostomium is proportionately much shorter and lacks the median ridge; also, there are branchial lobes from about the thirteenth segment.

Distribution.—Piñas Bay, Panama. In 20 fms.

Genus PANTHALIS Kinberg, char. emend.

Like *Polyodontes* Renier, but differs in that the neuropodial setae consist of the following kinds: (1) superior penicillate setae with a bushy top, the penicillae in some limited almost entirely to the tip, in others carried somewhat subdistally, (2) median stout aristate setae, and (3) inferior, sickle-like, serrulate setae. Some anterior parapodia usually have slender capillary setae. Branchiae, in the form of digitate parapodial lobulae, are absent or present.

The following species that have been described may be considered to be *Panthalis* as thus defined.

1. *Panthalis bicolor* Grube (1878b, p. 157) from Congo, Africa (see Augener, 1918, pp. 119-125). Monro (1928a, p. 572) considers this a likely synonym of *P. melanonotus* Grube.
2. *Eupanthalis evanida* Treadwell (1926, p. 186) from the Philippine Islands (see Hartman, 1938, p. 127).
3. *Panthalis gracilis* Kinberg (1910, p. 26) from Rio de Janeiro, Brazil.

4. *Polyodontes gracilis* Pflugfelder (1932, pp. 288-290) from Sumatra. Penicillate neuropodial setae were described but whether or not parapodial branchiae are present was not stated. The parapodia were said to be like those of *P. tidemani* Pflugfelder, which, in turn, was referred to *Eupolyodontes sumatranus* Pflugfelder (1932, p. 282).
5. *Eupompe grubei* Kinberg (1910, p. 24) from Guajaquil, western South America.
6. *Panthalis jogasimae* Izuka (1912, pp. 68-71) from Japan. Monro (1928a, p. 568) reported this from Gorgona Island.
7. *Polyodontes mortenseni* Monro (1928a, pp. 569-572) from Panama.
8. *Panthalis melanonotus* Grube (1876, p. 71) from the Philippine Islands (see also *P. bicolor* Grube, above).
9. *Panthalis oerstedi* Kinberg (1855, p. 387) from Sweden (see Fauvel, 1923, p. 98, for synonymy).
10. *Panthalis pacifica* Treadwell (1914, pp. 184-186) from southern California.
11. *Panthalis pustulata* Treadwell (1924, pp. 7-9) from the West Indies. This includes *Acoëtes magnifica* Treadwell (1929, pp. 1-4) from the West Indies.

The following species, that have been described as *Panthalis,* are perhaps to be considered as follows:

P. adumbrata Hoagland (1920, p. 606) from the Philippines (see *Polyodontes,* page 82).

P. helleri Holly (1934, pp. 148-149) from the Philippines, identical with *P. adumbrata.*

P. edriophthalma Potts (1910, pp. 345-346) from the Indian Ocean, a *Eupanthalis* (see Fauvel, 1932, pp. 41-42).

P. nigromaculata Grube (1878b, pp. 50-51) from the Philippines, a *Eupanthalis* (see Horst, 1917, pp. 134-135).

P. oculea Treadwell (1902, pp. 188-189) from Puerto Rico, a *Polyodontes* (see Monro, 1928a, pp. 572-573).

P. panamensis Chamberlin (1919a, pp. 86-89) from Panama (see *Polyodontes,* page 82).

Panthalis pacifica Treadwell

Plate 26, Figs. 309-312

Panthalis pacifica Treadwell, 1914, pp. 184-186, pl. 11, figs. 1-7.

Collections.—?244-34, 492-36. Two anterior fragments.

An anterior fragment of about 23 segments (492-36), with elytra more or less firmly attached, retains some pigment in the elytra. The prostomium, with ommatophores, is not quite half again as long as wide. The smaller sessile eyes are located near the lateral margins, the anterior eyes on short, thick stalks. The median antenna is inserted near the middle of the prostomium. There is a shallow median sulcus (pl. 26, fig. 309).

Setae include superior penicillate (pl. 26, fig. 310), median aristate (pl. 26, fig. 311) characterized by their spinose tips, and inferior, scythe-like setae (pl. 26, fig. 312). There are about 7 penicillate setae in the twentieth parapodium, about 14 larger aristate setae and 5 similar smaller ones. The inferior scythe-like setae are strongly spinose.

Another specimen (244-34) is macerated, but agrees with *P. pacifica* in that the ommatophores are short, stout, the median antenna is inserted in the same way, the setae are markedly spinose. Sessile eyes cannot be made out. There is, however, a diffuse dark spot in the area where they would be.

Numerous specimens, in the author's collection, from southern California, indicate that this is the most common species of Polyodontidae in the subintertidal zone, where the substratum is green or black mud. It constructs thick-walled, finely matted, mud masses or balls, from 1 to 6 or 8 inches long. Each mass is usually inhabited by a single individual, but two, lying end to end, have occasionally been seen. The outer color is that of the mud inhabited, the smooth lining is usually rust colored. The tubes, though occurring in soft, oozing mud, are too toughly matted to be torn without disrupting the contents.

Distribution.—Southern California (common); Point Tosca, Lower California, Mexico; ?Bahia Honda, Panama. Subintertidal to 50 fms.

Panthalis marginata, new species

Plate 26, Figs. 313-318

Collection.—770-38 (Holotype). One specimen, fragmentary.

The palpi and tentacular cirri of the first (apodous) segment are transversely barred with black on the dorsal and lateral sides; the elytra are brown, with white margin. The first elytra are elongated in anterior-posterior direction and have an elongated, subrectangular flap at their ectoposterior portion (pl. 26, fig. 313). This flap lies normally over the long ventral cirrus of the first, and all of the second, parapodium.

The first parapodium (second segment) is enlarged, modified, provided with a digitate notoacicular lobe and numerous slender, capillary notopodial setae, and a broad collar-like neuropodium (pl. 26, fig. 314) with a large fascicle of setae. The ventral cirrus is long, stout, tapering. The second parapodium is smaller and resembles those more posteriorly. It has a slender, dorsal digitate notoacicular lobe and a deep neuropodium broadest distally (pl. 26, fig. 315). Its setae resemble those in more posterior parapodia.

A typical parapodium contains slender, capillary notopodial setae, and neuropodial setae as follows: (1) superior penicillate setae in which the tip is drawn out in a point (pl. 26, fig. 317), (2) stout, median aristate setae with an appendage (pl. 26, fig. 318), and (3) inferior, sickle-shaped, serrulate setae (pl. 26, fig. 316). The ventral cirrus is stout, tapering, and does not extend distally so far as the neuropodial setae.

No branchiae have been observed.

P. marginata resembles *Polyodontes gracilis* Pflugfelder (1932, p. 288) from Sumatra (see also page 87) in its penicillate setae and in having brown elytra. *P. gracilis,* however, was said to have parapodia like those of *Eupolyodontes sumatranus* Pflugfelder, presumably therefore with digitate branchiae. The single incomplete fragment available for study does not permit a complete description.

Holotype.—AHF no. 19.

Distribution.—Off San Jose Light, Guatemala. In 7 to 11 fms.

Family **Pisionidae** Levinsen, revised

Elongate, subcylindrical, consisting of numerous similar segments. The proboscis cylindrical, protrusile, provided distally with terminal papillae and with 4 chitinous jaw pieces. Prostomium more or less reduced, depressed, produced dorsally between the first few segments; without attached antennae, or with a median cirriform one at its anterior margin. Eye spots 1 or 2 pairs, those of a side sometimes more or less coalesced. First segment (buccal) greatly elongated and modified so as to project forward at sides and in front of the prostomium, provided with 3 pairs of appendages (cirri), with or without acicula.

Parapodia subbiramous, the notopodium represented only by an aciculum, the neuropodium with an elongated ramus with simple, acicular setae and composite falcigerous hooks.

The PISIONIDAE constitute a small, little known family, known through only a few records. Their affinities are possibly with the HESIONIDAE on the one hand, and with the scale-bearing chaetopods, or more nearly the SIGALIONIDAE, on the other. The proboscis is clearly of the scale-worm type. The paired prostomial antennae are inserted on the peristomial segment, as in some of the SIGALIONIDAE. In the new genus, *Pisionella,* there is a well developed median antenna. Notopodia are inconspicuous, but the neuropodia are stout and well provided with setae.

Two genera, *Pisione* Oersted and *Praegeria* Southern, have been attributed to this family. The type of *Praegeria, P. remota* Southern, sufficiently resembles the type of *Pisione, P. oerstedi* Grube, that the retention of the genus *Praegeria* is unnecessary. *P. oerstedi* Grube and *P. remota* (Southern) differ from one another in the details of their parapodial and setal structures.

More recently, Augener (1924, p. 300) described a *Pisione, P. germanica,* from the North Sea, which agrees with the description of *Praegeria remota* Southern, from Ireland.

Pisione contracta Ehlers (1901, p. 64) from Callao, Peru, has been shown to be the same as *P. oerstedi* Grube (Augener, 1924, p. 298). In conclusion, therefore, 2 valid species are known to occur, *Pisione oerstedi* Grube, from Peru, Ceylon, and New Zealand (Augener, 1924, p. 298; 1926, p. 445) and *Pisione remota* (Southern) from Ireland and the North Sea.

The Hancock collections include another species, *Pisionella hancocki* (described below), clearly of this family, but differing sufficiently in its structure to warrant the erection of a new genus. In several of its characters it is more primitive than are the species of the genus *Pisione.* The prostomial lobe is less reduced, its antennae are cirriform and little modified.

Genus **PISIONE** Grube, Ehlers

Pisione Ehlers, 1901, p. 60.

Praegeria Southern, 1914, pp. 63-64; Augener, 1926, p. 445.

Prostomium produced dorsally between the first few segments, without attached antennae or other appendages, but with 2 pairs of eye spots in which the 2 of a side may be more or less coalesced. Proboscis with 7 pairs of terminal papillae and 2 pairs of stout, chitinous jaws.

First segment modified, provided with a pair of stout acicula and 3 appendages, a small papillar cirrus on its median side (the transposed prostomial antenna) and 2 cirriform, peristomial tentacles laterally.

Parapodia subbiramous, the notopodium represented only by a dorsal cirrus and an aciculum. Neuropodia well developed, provided with stout, simple setae and composite falcigerous setae. Anal cirri 2, long, cirriform.

Pisione oerstedi Grube

Plate 27, Figs. 321-325

Pisione oerstedi Grube, 1856, p. 175; Ehlers, 1901, p. 61; Augener, 1924, p. 298; 1926, p. 445.

Pisione contracta Ehlers, 1901, p. 64.

Collection.—375-35. About 30 specimens.

Length 20 to 48 mm; number of segments 125 to 160. Proboscis, everted in some, with 7 dorsal and 7 ventral terminal papillae (pl. 27, fig. 321) and 2 pairs of stout, curved jaws. The third segment (second setigerous) has a stout cirrophore with an elongate dorsal cirrus (pl. 27, fig. 322). Its simple setae resemble those in more posterior segments. The embedded acicula are either straight, rodlike, or distally curved (pl. 27, fig. 325). Some acicular setae occur singly in a parapodium, or sometimes in twos (pl. 27, fig. 324). Inferior to them are about 6 composite, falcigerous setae (pl. 27, fig. 323).

Distribution.—Peru; Chile. Intertidal. In addition, Augener, who had access to Ehlers' types at the Hamburg Museum, recorded it from New Zealand and Ceylon. The former is based on a single complete specimen, only 2 mm long. This is conspicuously less than the length typical for the Peruvian individuals (see above). The Ceylon record is based on a single specimen, indicated as "unbestimmt"! (Augener, 1924, p. 299).

PISIONELLA, new genus

Prostomium with a conspicuous, median, cirriform antenna, inserted on a cirrophore at the anterior margin of the prostomium. Buccal segment with 3 pairs of cirriform cirri, of which 1 pair perhaps represents the paired prostomial antennae. No acicula or setae in the first segment. Second segment with a ventral cirrus resembling the superiormost cirrus of the buccal segment, and with globular dorsal cirrus, terminating in a slender papilla. Third segment with a long, slender, cirriform dorsal cirrus and a globular ventral cirrus. From the fourth segment posteriorly, both dorsal and ventral cirri are globular. Parapodia subbiramous, the notopodium represented by an embedded aciculum, the neuropodium well developed, provided with an aciculum, 1 or 2 simple, blunt, acicular setae, and several composite setae. These setae consist of a shaft with a longitudinal series of spinelets in 2 rows, disposed along the outer, ectal edge of the shaft, and an appendage with a slender falcate piece, with a row of delicate spinelets along the cutting edge.

Pisionella hancocki, new species

Plate 27, Fig. 326; Plate 28, Figs. 327-333

Collections.—366-35 (Holotype), 375-35. About 14 specimens.

Long, slender, depressed cylindrical, tapering gradually in both directions from near middle of body. Number of segments 120 or more; length of a smaller, 120 mm individual is 35 mm, of a larger, incomplete individual of 80 segments is 28 mm. Greatest width, at about the fiftieth segment, is 1.04 mm without, 2.07 mm with parapodia. The proboscis is visible dorsally through the body wall as a dark streak extending through the first fourteen segments.

Prostomium slightly elevated, produced between the first few segments, extending posteriorly to the fourth segment (third setigerous); provided at its anterior margin with a median cirriform antenna, that is about half as large as the dorsalmost cirrus of the first segment. Two pairs of deep-seated eye spots, of which one or both pairs are more or less fused, are present near the middle of the prostomium (pl. 27, fig. 326). The proboscis (dissected) is lined with dark pigment. It has 2 dorsal and 2 ventral stout jaws (pl. 28, fig. 329), and 19 or 20(?) soft, terminal papillae. Their exact number could not be ascertained after dissection.

First segment greatly modified, enlarged, extending forward at the sides of the prostomium so that its inner, proximal base is in contact with the base of the prostomial antenna. At its terminal end it is provided with 3 tentacular cirri, the dorsalmost about twice as large as the prostomial antenna, the median one about as large as the prostomial antenna, and a long, stout ventral cirrus (pl. 27, fig. 326) about as long as the first 6 normal segments. No setae or acicula have been made out in this segment.

Second segment (first setigerous) provided with parapodia that are less than half as long as those immediately following. It has a stout, subulate ventral cirrus on a well-developed cirrophore (pl. 28, fig. 328) and a globular dorsal cirrus. The third segment has a stout dorsal cirrus and a globular ventral cirrus (pl. 28, fig. 327). From the fourth segment, the dorsal and ventral cirri are globular, with a terminal filament (pl. 28, fig. 331).

In addition to dorsal and ventral cirri, some individuals have a long, cirriform appendage (nephridial papilla?) inserted on the ventral body wall near the point where the foot joins the body (pl. 28, fig. 331). A similar structure has been observed in some individuals of the nearly related *Pisione oerstedi* Grube. When present, it occurs on all segments from the fifth, posteriorly.

Each setigerous segment has yellow dorsal and ventral acicula. That of the second segment differs slightly in shape from those more posteriorly. It is somewhat cuspidate (pl. 28, fig. 330). From the third segment a stout, blunt aciculum emerges from the distal end of the parapodium (pl. 28, fig. 333), and lies just dorsal to the setal fascicle. Composite setae resemble one another throughout. The shaft is provided with 2 longitudinal rows of spinelets, on the dorsal or cutting edge; the appendage is falcate, with a terminal fang and a single row of fine spinelets along the cutting edge (pl. 28, figs. 332, 330). A typical median parapodium has an embedded dorsal aciculum, 2 ventral acicula of which the dorsalmost emerges from the neuropodium, and about 4 composite setae inferior to the aciculum (pl. 28, fig. 331). Anal cirri, if originally present, have been lost from the collections.

Holotype.—AHF no. 20.

Distribution.—Callao, Peru; Independencia Bay, Peru. Intertidal to 8 fms.

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PLATE 1

Figures 1 to 5, *Aphrodita japonica:* Fig. 1, stout superior neuropodial seta from a median parapodium (430-35), x 290; Fig. 2, a median neuropodial seta, with attached sheath, from the same parapodium, x 290; Fig. 3, tip of a long, slender dorsal seta, showing hooked tip, x 290; Fig. 4, inferior neuropodial seta, from same parapodium as that shown in Fig. 1, x 290; Fig. 5, inferior neuropodial seta (632-37) with pilose cap attached, x 130.

Figure 6, *Aphrodita armifera:* Inferior neuropodial seta from a median parapodium (D 93), x 290.

Figures 7 and 8, *Aphrodita refulgida:* Fig. 7, superiormost neuropodial seta from twelfth parapodium, x 290; Fig. 8, inferior neuropodial seta from same parapodium, x 290.

Figures 9 and 10, *Aphrodita parva:* Fig. 9, an inferior neuropodial seta from a median parapodium, showing small lateral spur, x 290; Fig. 10, a superior neuropodial seta from the same parapodium, with pilosity, x 290.

Figures 11 to 15, *Aphrodita falcifera:* Fig. 11, a median neuropodium (287-34), x 32; Fig. 12, tip of an inferior neuropodial seta from same parapodium, x 66; Fig. 13, tip of a superior neuropodial seta from the same parapodium, x 66; Fig. 14, distal end of inferior neuropodial seta, x 290; Fig. 15, prostomial lobe, x 12.5.

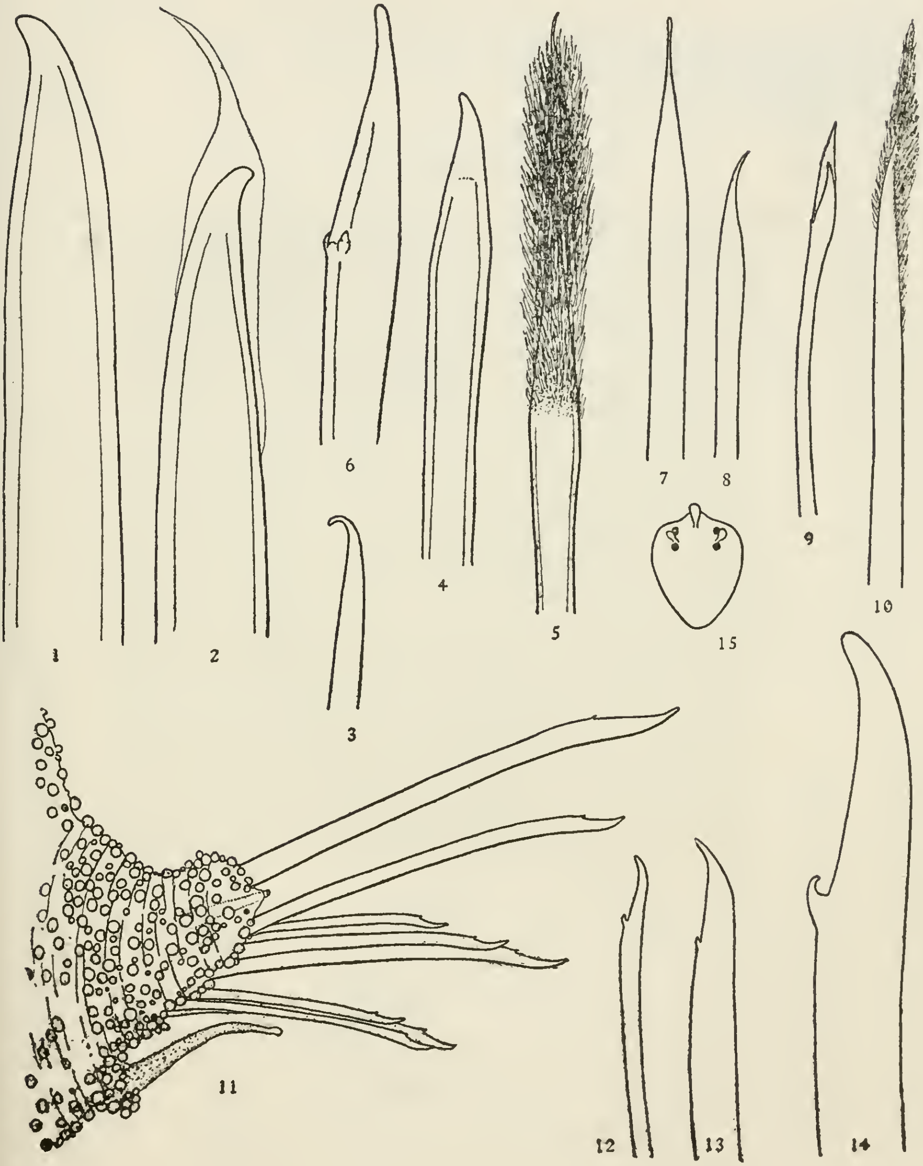
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PLATE 2

Figures 16 to 30, *Pontogenia laeviseta:* Fig. 16, prostomium in dorsal view, ventral eyes indicated by cross bars, median antenna turned unnaturally to the right (863-38), x 25; Fig. 17, a median parapodium, some of the notopodial setae pulled out when the debris was cleared away; scale and dorsal fascicles turned forward so as to indicate the shape of the elytrum; parapodial papillae not shown, x 12.5; Fig. 18, a neuropodium from the median region (244-34), x 32; Fig. 19, a superior neuropodial seta from the second segment, x 290; Fig. 20, a ventralmost neuropodial seta from a median parapodium (244-34), x 130; Fig. 21, tip of a median neuropodial seta from the same parapodium, x 130; Fig. 22, tip of a dorsalmost notopodial seta from a median parapodium, x 66; Fig. 23, a superior neuropodial seta from a posterior parapodium, x 290; Fig. 24, an inferior neuropodial seta from a posterior parapodium, x 290; Fig. 25, part of the basal area from a median elytrum, indicating the distribution of the papillae near the point of attachment, x 130; Fig. 26, parapodium from the third segment, with greatly elongate dorsal cirrus, and heavy notopodial setae, x 25; Fig. 27, distal end of seta shown in Fig. 22, enlarged, x 290; Fig. 28, an inferior neuropodial seta from second segment, with 2 rows of spinelets, x 290; Fig. 29, tip of stout, superior notopodial seta from third segment, x 290; Fig. 30, tip of a ventralmost notopodial seta from a median parapodium, with a few asperities, x 290.


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PLATE 3

Figures 31 and 32, *Iphione ovata:* Fig. 31, tip of a neuropodial seta from a median parapodium, x 290; Fig. 32, distal end of a neuropodium from near middle of body, setae indicated, x 32.

Figures 33 to 37, *Arctonoë vittata:* Fig. 33, anterior end in dorsal view, x 18.5; Fig. 34, neuropodial seta from fifteenth parapodium, x 130; Fig. 35, an inferior neuropodial seta from second segment, x 290; Fig. 36, a notopodial seta from second segment, x 290; Fig. 37, a superior neuropodial seta from second segment, x 290.

Figures 38 to 42, *Eulagisca panamensis:* Fig. 38, tip of a minutely bifid neuropodial seta, x 290; Fig. 39, tenth parapodium in posterior view, some setae indicated; there are actually nearly 100 notopodial setae, some very fine, long, slender, others much thicker but about as long, also, a dorsoanterior series of short, slightly arcuate, nearly smooth setae, x 12.5; Fig. 40, a tapering notopodial seta from tenth parapodium, x 130; Fig. 41, distal end of a neuropodial seta, x 130; Fig. 42, sixth elytrum, from left side, in ventral view, x 12.5.

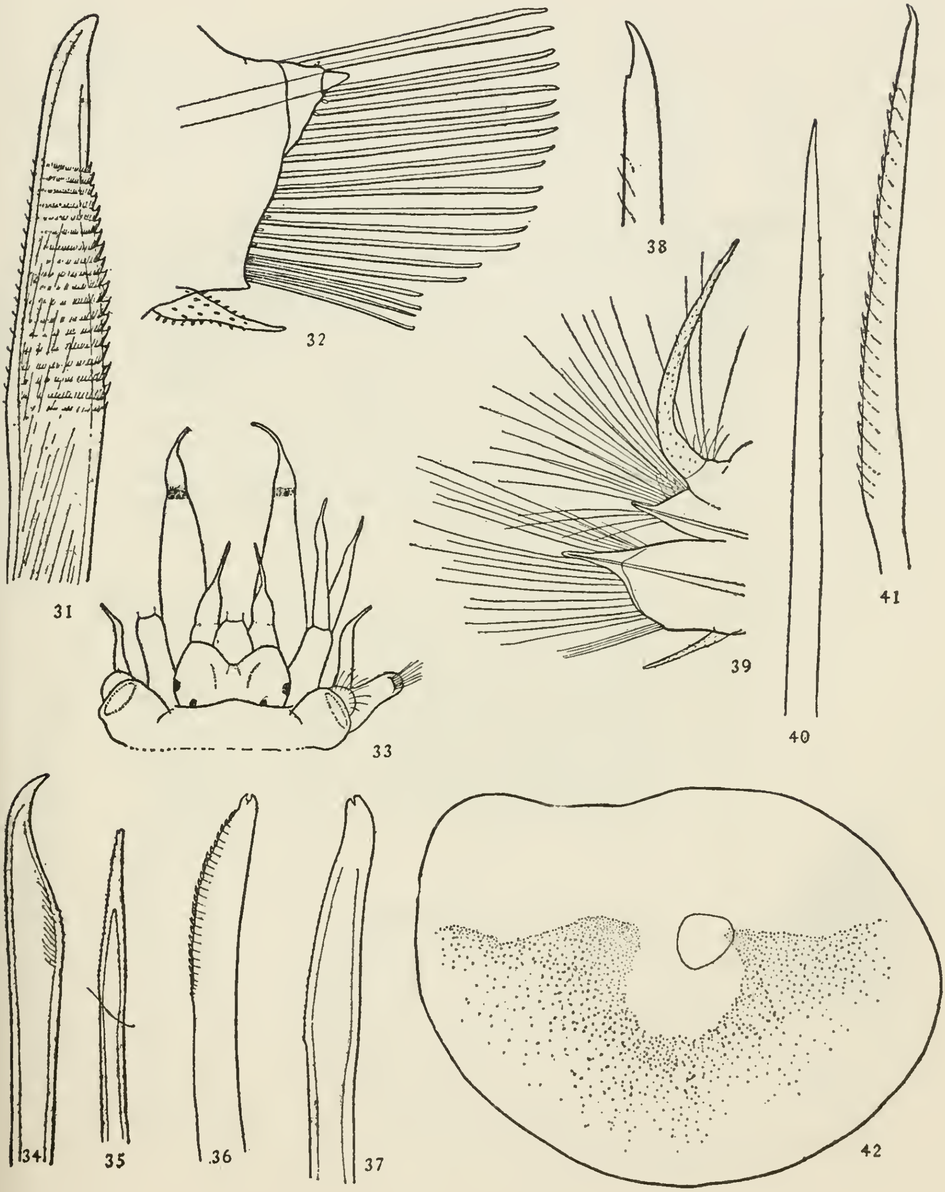
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PLATE 4

Figures 43 to 50, *Halosydna glabra:* Fig. 43, first elytrum from right side, in dorsal view, stippling indicates pigmented pattern, x 12.5; Fig. 44, sixth elytrum from right side, from same individual as that shown in Fig. 43, x 12.5; Fig. 45, first elytrum, in dorsal view, showing distribution of macrotubercles and microtubercles, x 32; Fig. 46, macrotubercles and microtubercles from first elytrum, just posterior to the elytral scar, x 290; Fig. 47, dorsalmost notopodial seta from a median parapodium, x 290; Fig. 48, neuropodial seta from a median parapodium, x 290; Fig. 49, a long, pointed notopodial seta from a median parapodium, x 290; Fig. 50, portion of sixth elytrum from area near anterior concavity, indicating distribution of microtubercles and reticulated pattern, x 290.

Figures 51 to 55, *Halosydna,* sp. A: Fig. 51, a long notopodial seta from a median parapodium, x 290; Fig. 52, a neuropodial seta from a median parapodium, x 290; Fig. 53, a short notopodial seta from a median parapodium, x 290; Fig. 54, an elytrum from the left side, in dorsal view, showing distribution of macrotubercles (larger circles) and microtubercles (small circles), x 12.5; Fig. 55, portion of preceding elytrum over inner end of elytral scar, showing detail of pigmented area, x 290.

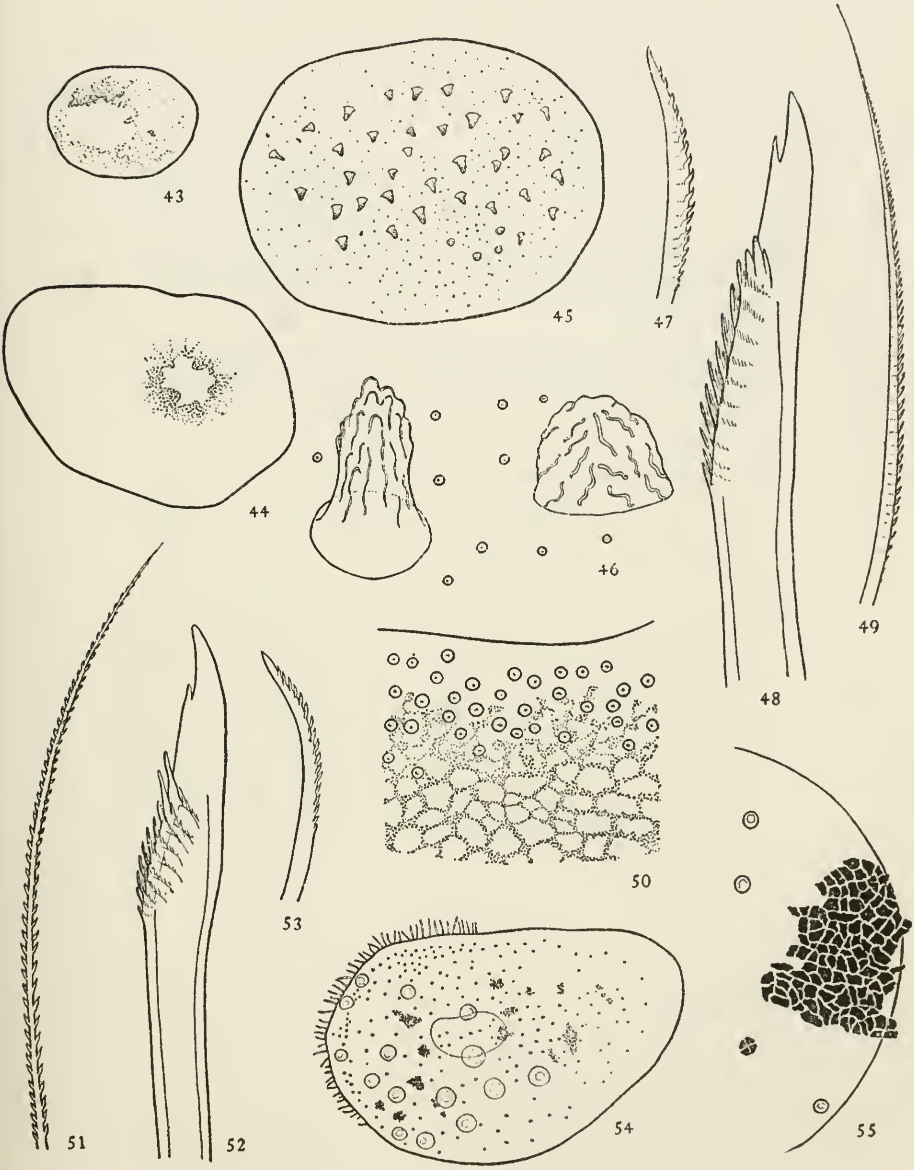
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PLATE 5

Figure 56, *Lepidonotus versicolor:* Third elytrum from left side; fringe almost absent except for a few short filaments on some anterior elytra, x 18.5.

Figures 57 and 58, *Lepidonotus furcillatus:* Fig. 57, tip of a neuropodial seta from first parapodium, distally bifid, x 290; Fig. 58, a neuropodial seta from first parapodium, distally pointed, x 290.

Figures 59 to 61, *Lepidonotus versicolor:* Fig. 59, a superior neuropodial seta from segment 2, x 290; Fig. 60, a ventralmost neuropodial seta from segment 2, x 290; Fig. 61, prostomial lobe with antennae, x 18.5.

Figures 62 to 69, *Lepidonotus crosslandi:* Fig. 62, prostomial lobe, without antennae, x 30; Fig. 63, a dorsalmost neuropodial seta from third segment, x 290; Fig. 64, a ventralmost neuropodial seta from third segment, x 290; Fig. 65, a superior neuropodial seta from fourteenth segment, x 130; Fig. 66, an inferior neuropodial seta from fourteenth segment, x 130; Fig. 67, larger and smaller tubercles from second elytrum, from an area near the posterior margin, x 290; Fig. 68, outline of seventh elytrum, elytral scar indicated, x 12.5; Fig. 69, second elytrum, tubercles indicated by circles, pigmented area by stippling, x 32.

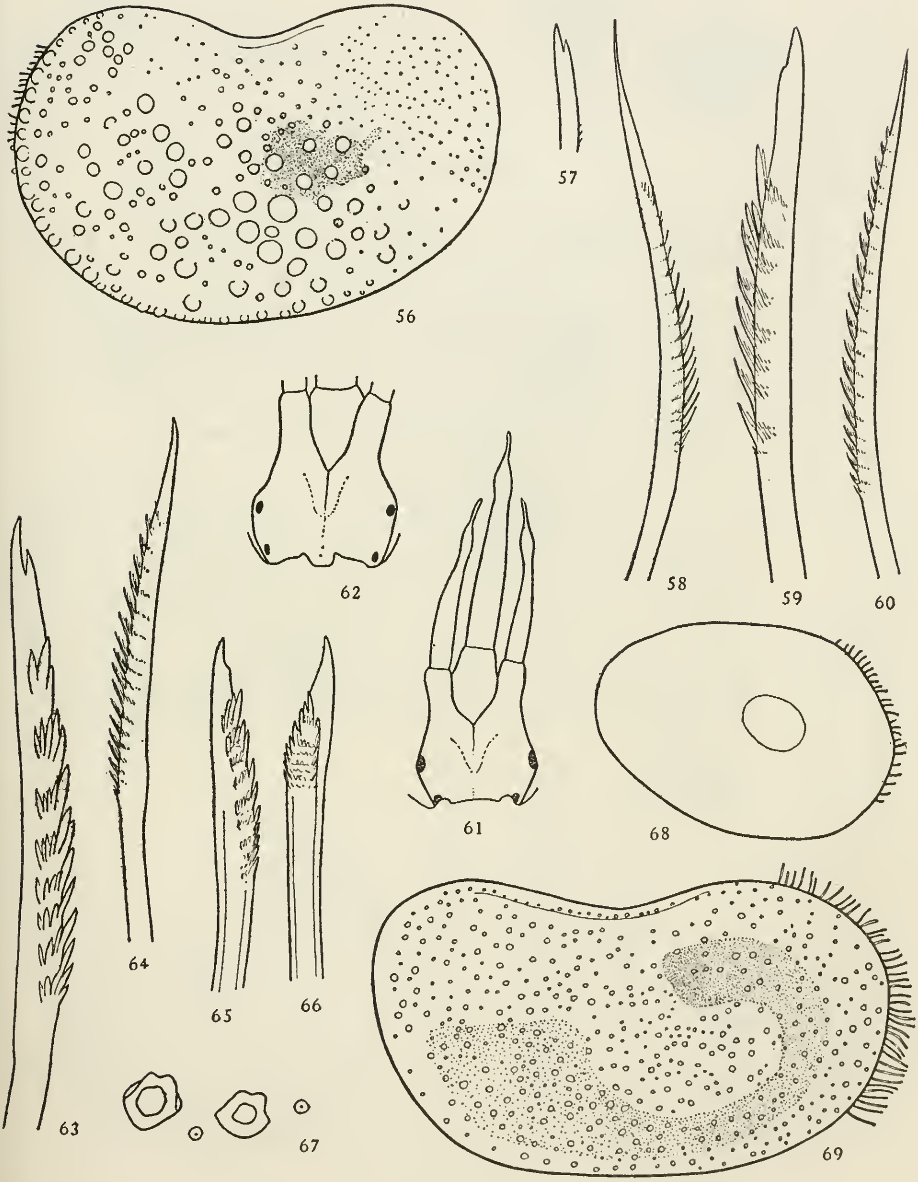
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PLATE 6

Figures 70 to 77, *Lepidonotus pomareae panamensis:* Fig. 70, first elytrum from right side, x 12.5; Fig. 71, sixth elytrum, from left side, x 5; Fig. 72, ninth elytrum, from right side, x 6; Fig. 73, a larger spine from first elytrum, in lateral view, x 66; Fig. 74, another, similar spine in dorsal view, x 66; Fig. 75, sixteenth parapodium, in posterior view, with some setae indicated; there are about 30 dark amber-colored neuropodial setae, x 12.5; Fig. 76, a shorter, falcate, superior notopodial seta from sixteenth parapodium, x 130; Fig. 77, a neuropodial seta from same parapodium, x 130.

Figures 78 to 82, *Lepidonotus hupferi:* Fig. 78, a smaller, pigmented patch, showing smaller and larger tubercles, and distribution of pigment, x 130; Fig. 79, a neuropodial seta from second parapodium, x 290; Fig. 80, a neuropodial seta from third parapodium, x 290; Fig. 81, an inferiormost neuropodial seta from a median parapodium; the dorsalmost are thicker and longer but have similar proportions, x 290; Fig. 82, outer, lateral portion of an elytrum; stippling indicates pigmented areas, circles indicate the larger tubercles, x 12.5.

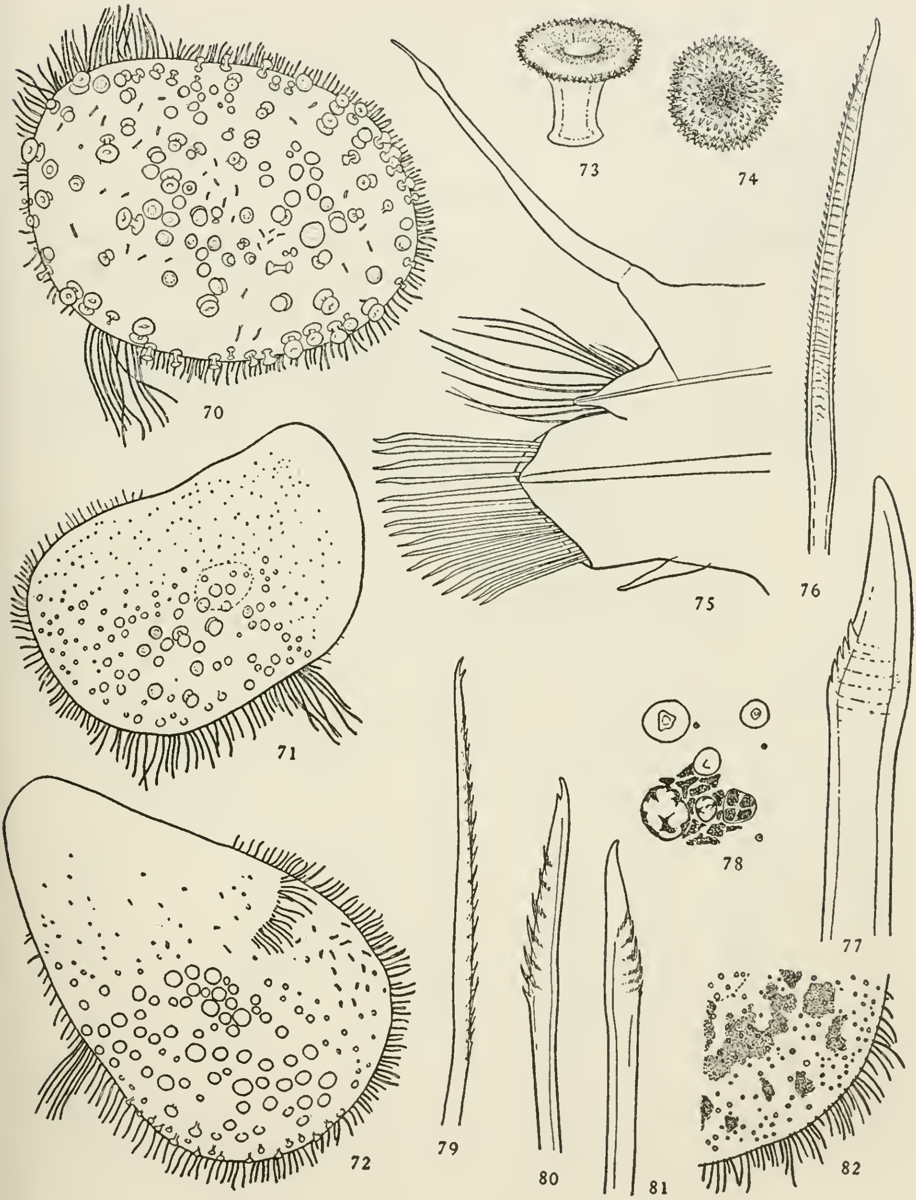
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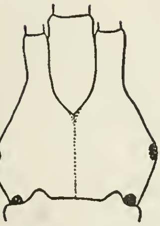
PLATE 7

Figures 83 to 95, *Lepidonotus nesophilus:* Fig. 83, prostomial lobe (814-38), x 32; Fig. 84, outline of tenth elytrum, in ventral view (148-34), x 12.5; Fig. 85, marginal fringe from first elytrum (814-38), x 290; Fig. 86, pattern of reticulated pigment from tenth elytrum, x 290; Fig. 87, first elytrum from right side, in dorsal view (814-38), x 32; Fig. 88, one of medium spines from near external margin, from first elytrum, x 290; Fig. 89, a spine from a posterior elytrum (148-34), x 290; Fig. 90, a tall macrotubercle from near the inner edge, from first elytrum, x 290; Fig. 91, a ventralmost neuropodial seta from first parapodium (second segment), x 290; Fig. 92, a dorsalmost neuropodial seta from the same segment, x 290; Fig. 93, a nearly entire inferior neuropodial seta from a median parapodium, x 290; Fig. 94, a more usual type of neuropodial seta, the superiormost from a median parapodium, x 290; Fig. 95, a notopodial seta from a median parapodium, x 290.

Figures 96 to 98, *Thormora johnstoni:* Fig. 96, prostomial lobe with antennae (525-36), x 32; Fig. 97, sixth elytrum from right side, in dorsal view, x 32; Fig. 98, portion of elytrum from near edge of sixth, x 290.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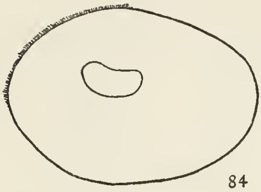
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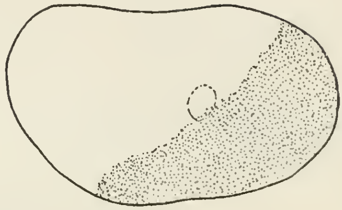
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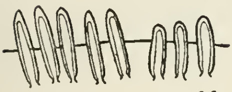
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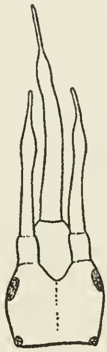
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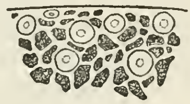
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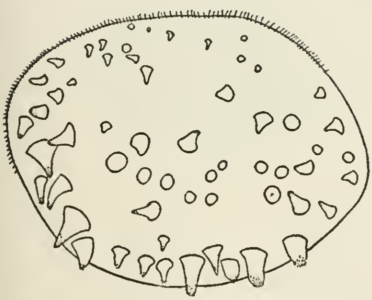
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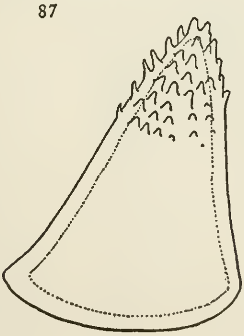
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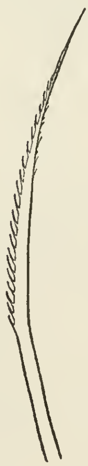
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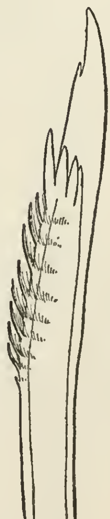
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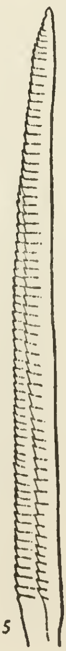
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PLATE 8

Figures 99 to 104, *Lepidametria gigas:* Fig. 99, a superior neuropodial seta from a median parapodium, x 290; Fig. 100, an inferiormost neuropodial seta from the same parapodium, x 290; Fig. 101, an inferiormost neuropodial seta from third parapodium, x 290; Fig. 102, a notopodial seta from third parapodium (only two in a parapodium), x 290; Fig. 103, a median parapodium, x 32; Fig. 104, third parapodium (segment 4), x 32.

Figures 105 to 110, *Lepidametria virens:* Fig. 105, forty-second parapodium in anterior view, x 32; Fig. 106, parapodium from third segment, in anterior view, x 32; Fig. 107, a neuropodial seta from third segment, x 290; Fig. 108, an inferior neuropodial seta from forty-second segment, x 290; Fig. 109, a superiormost neuropodial seta from the same parapodium, x 290; Fig. 110, anterior end, including part of first right elytrum; eyes are deep seated, x 18.5.


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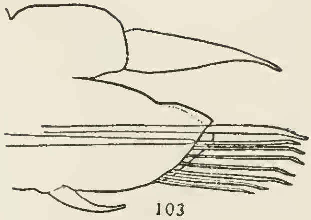
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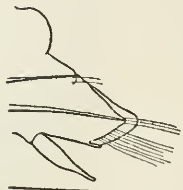
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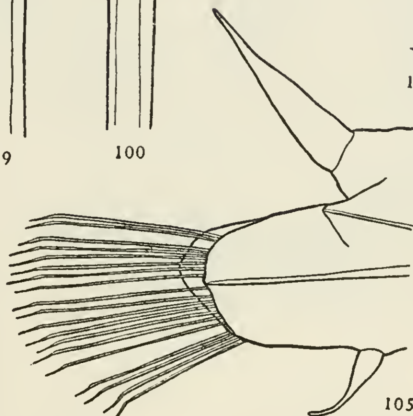
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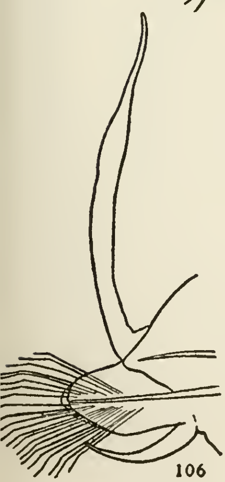
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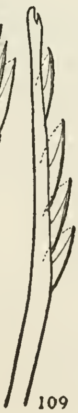
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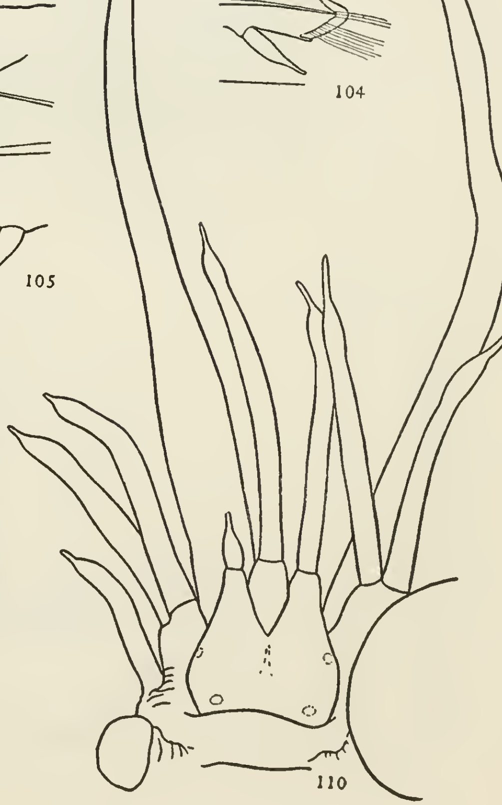
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PLATE 9

Figures 111 to 118, *Hololepida veleronis:* Fig. 111, anterior end in dorsal view, with distal ends of antennae and palpi omitted, x 32; Fig. 112, sixteenth parapodium in posterior view, setae indicated, x 25; Fig. 113, tip of a neuropodial seta, x 290; Fig. 114, acicular notopodial seta from sixteenth parapodium, x 290; Fig. 115, neuropodial seta from same parapodium, x 130; Fig. 116, a supraacicular neuropodial seta from same parapodium, x 290; Fig. 117, a superior neuropodial seta from second segment, x 290; Fig. 118, second parapodium in anterior view, setae indicated, elytrum omitted, x 25.

Figures 119 and 120, *Halosydna fuscomarmorata:* Fig. 119, a median elytrum, x 12.5; Fig. 120, a neuropodial seta from a median parapodium, x 290.

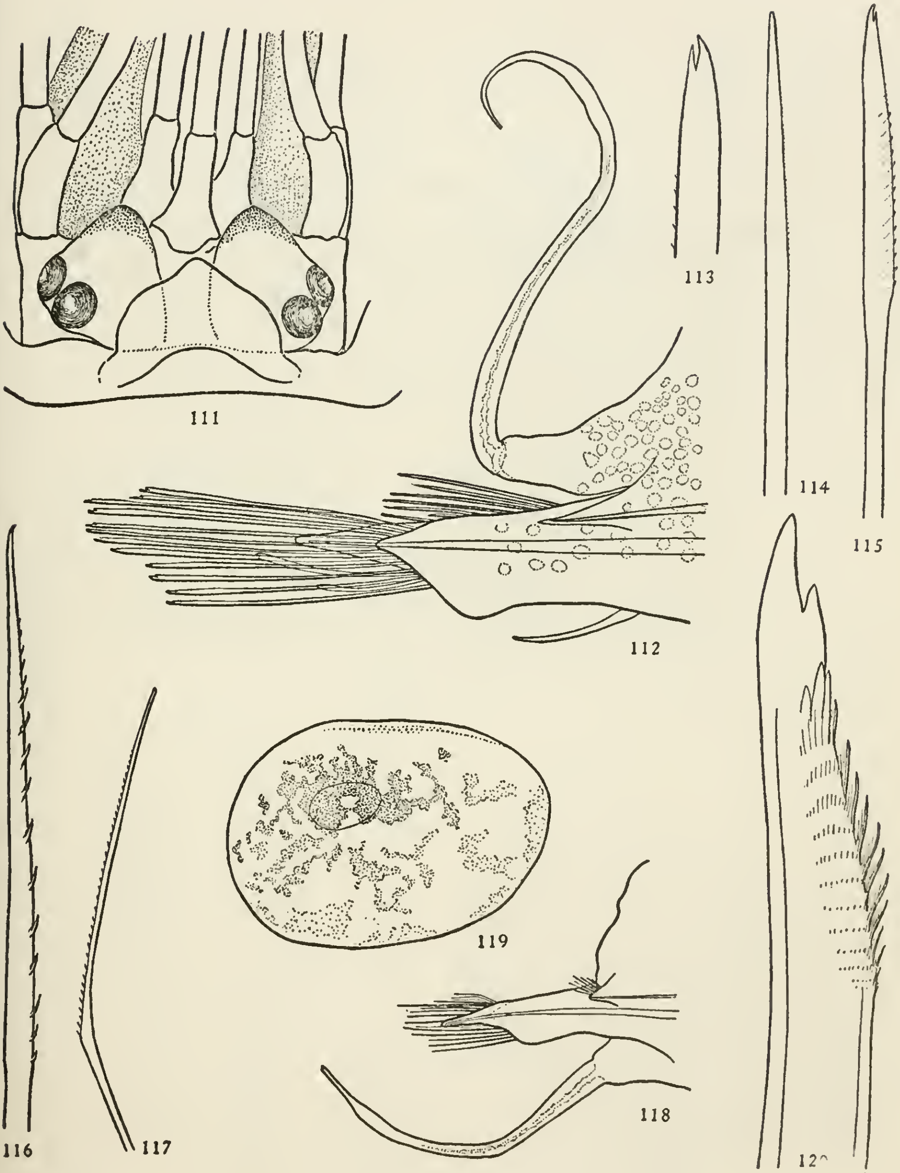
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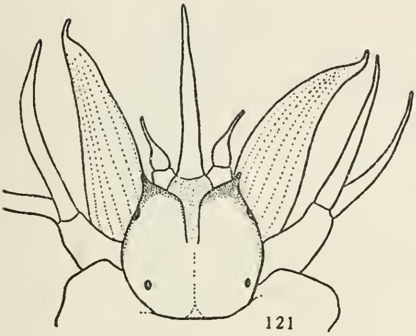
PLATE 10

Figures 121 to 127, *Polynoë veleronis:* Fig. 121, anterior end, x 32; Fig. 122, second parapodium, elytrum omitted, x 32; Fig. 123, first elytrum in dorsal view, elytral scar indicated; stippled area is chocolate brown, preserved, x 32; Fig. 124, twentieth parapodium in posterior view, x 32; Fig. 125, a notopodial seta from twentieth parapodium, x 290; Fig. 126, an inferior neuropodial seta from the same parapodium, x 290; Fig. 127, a superior neuropodial seta from the same parapodium, x 290.

Figures 128 to 133, *Eunoë senta:* Fig. 128, dorsalmost neuropodial seta from a median parapodium, x 130; Fig. 129, an inferiormost neuropodial seta from the same parapodium, x 130; Fig. 130, a short, curved notopodial seta from the same parapodium, x 130; Fig. 131, tip of a long, notopodial seta from the same parapodium, x 130; Fig. 132, elytrum, in dorsal view, loose in vial with specimen, x 25; Fig. 133, one of smaller spines from anterior third of elytrum, x 290.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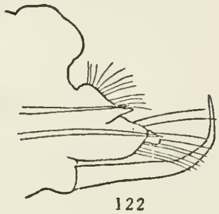
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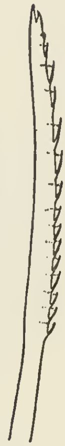
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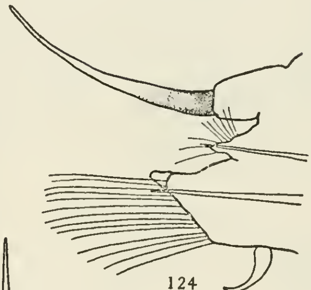
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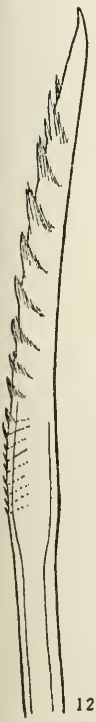
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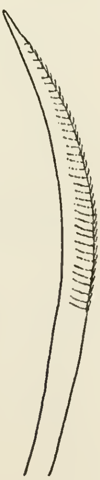
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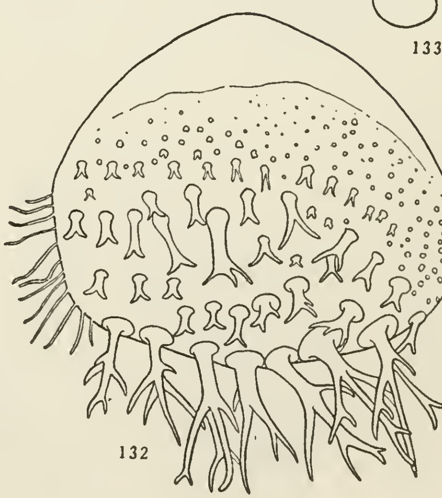
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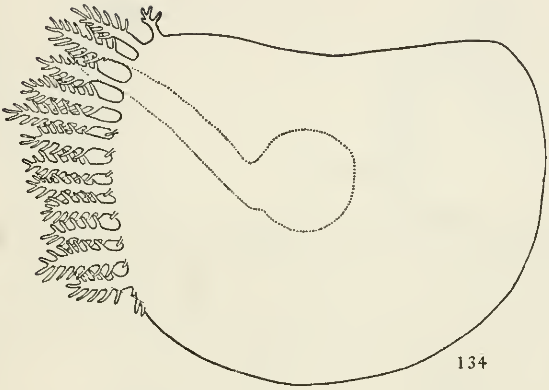
PLATE 11

Figures 134 to 140, *Eusigalion spinosum:* Fig. 134, elytrum, with ventral branchial lobe and scar dotted in, x 25; Fig. 135, prostomial lobe, x 30; Fig. 136, sixth parapodium, setae indicated, x 25; Fig. 137, part of a larger neuropodial seta from the forty-sixth parapodium, numbers at right refer to the number of articles in the appendage, counting from the base, x 290; Fig. 138, forty-sixth parapodium, elytrum turned back and only partly shown, setae omitted, x 25; Fig. 139, part of marginal fringe from the anteroectal margin of an elytrum, x 66; Fig. 140, a superior simple neuropodial seta from forty-sixth parapodium, x 290.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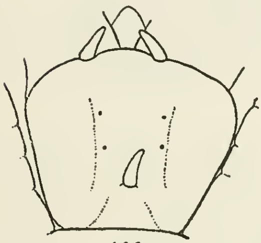
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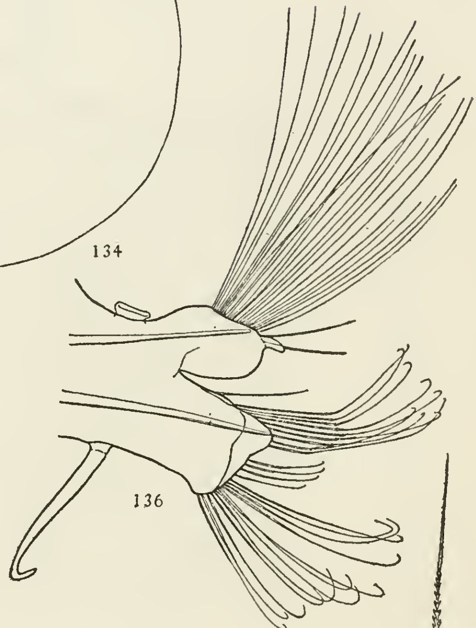
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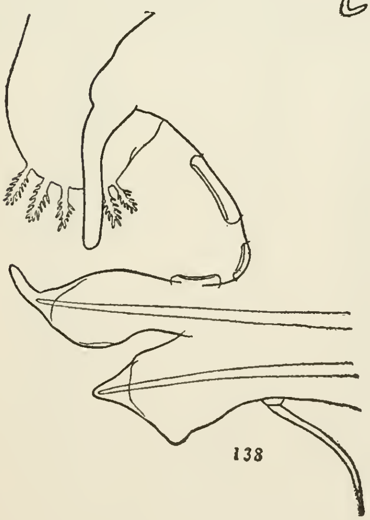
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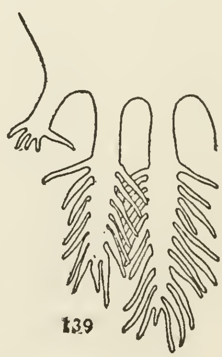
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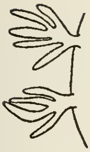
PLATE 12

Figures 141 to 145, *Eusigalion hancocki:* Fig. 141, detail of marginal fringe from ectal edge of a median elytrum, x 66; Fig. 142, outer lateral portion of elytrum from fiftieth segment, in dorsal view, x 25; Fig. 143, outline of elytrum in ventral view, with attached branchial appendage, x 25; Fig. 144, prostomial lobe and part of peristomial segment, x 30; Fig. 145, outline of forty-sixth parapodium, setae omitted, x 32.

Figures 146 and 147, *Eusigalion spinosum:* Fig. 146, portions of shaft and appendage of an articled supraacicular neuropodial seta, x 290; Fig. 147, part of a larger serrated notopodial seta from forty-sixth parapodium, x 290.

Figures 148 to 152, *Eusigalion hancocki:* Fig. 148, a smooth, smaller inferior notopodial seta from forty-sixth parapodium, x 290; Fig. 149, a simple spinose neuropodial seta from same parapodium, x 290; Fig. 150, tip of a neuropodial seta from same parapodium, x 290; Fig. 151, articulated composite neuropodial seta from same parapodium, x 290; Fig. 152, part of a subacicular neuropodial seta from the same parapodium, x 290.



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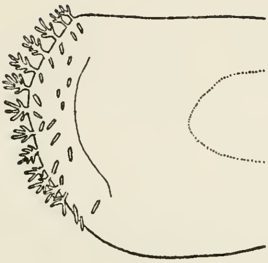

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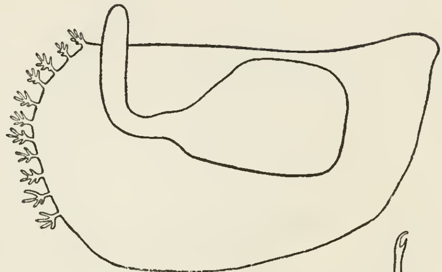

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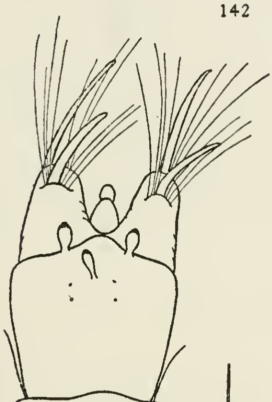

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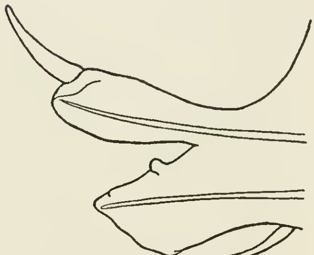

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PLATE 13

Figures 153 to 162, *Sthenelais fusca:* Fig. 153, superior spinose neuropodial seta from one hundred fifth parapodium, x 290; Fig. 154, fine superior composite neuropodial seta from same parapodium, x 290; Fig. 155, median composite neuropodial seta from same parapodium, x 290; Fig. 156, stout dorsalmost neuropodial seta from individual from Point Loma, x 290; Fig. 157, stout dorsalmost neuropodial seta from individual from Sinaloa, x 290; Fig. 158, a ventral cirrus with dorsal processes, x 66; Fig. 159, arrangement of insertion of neuropodial setae in neuroaciculum in a parapodium in anterior third of body; top is dorsal, to the right is anterior, *x* represents simple spinose setae, dots slender composite setae (343-34); Fig. 160, outline of elytrum from fortieth parapodium, from individual from Chatham Bay, stippling represents papillar region, x 12.5; Fig. 161, seventh elytrum from individual from Point Loma, most of surface papillated but not shown, x 32; Fig. 162, elytrum from about thirtieth last segment from individual from Point Loma, papillae covering most of surface not indicated, x 32.

Figures 163 to 166, *Sthenelais variabilis colorata:* Fig. 163, fifth elytrum, elytral scar indicated, surface finely papillated though not shown, x 25; Fig. 164, part of posterior margin from preceding, showing distribution of surface papillae and beaded margin, x 130; Fig. 165, a median neuropodial seta from about forty-fifth parapodium, x 290; Fig. 166, twenty-fifth neuropodium, showing the main papillar series ventral to the inferiormost neuropodial setae, x 66.

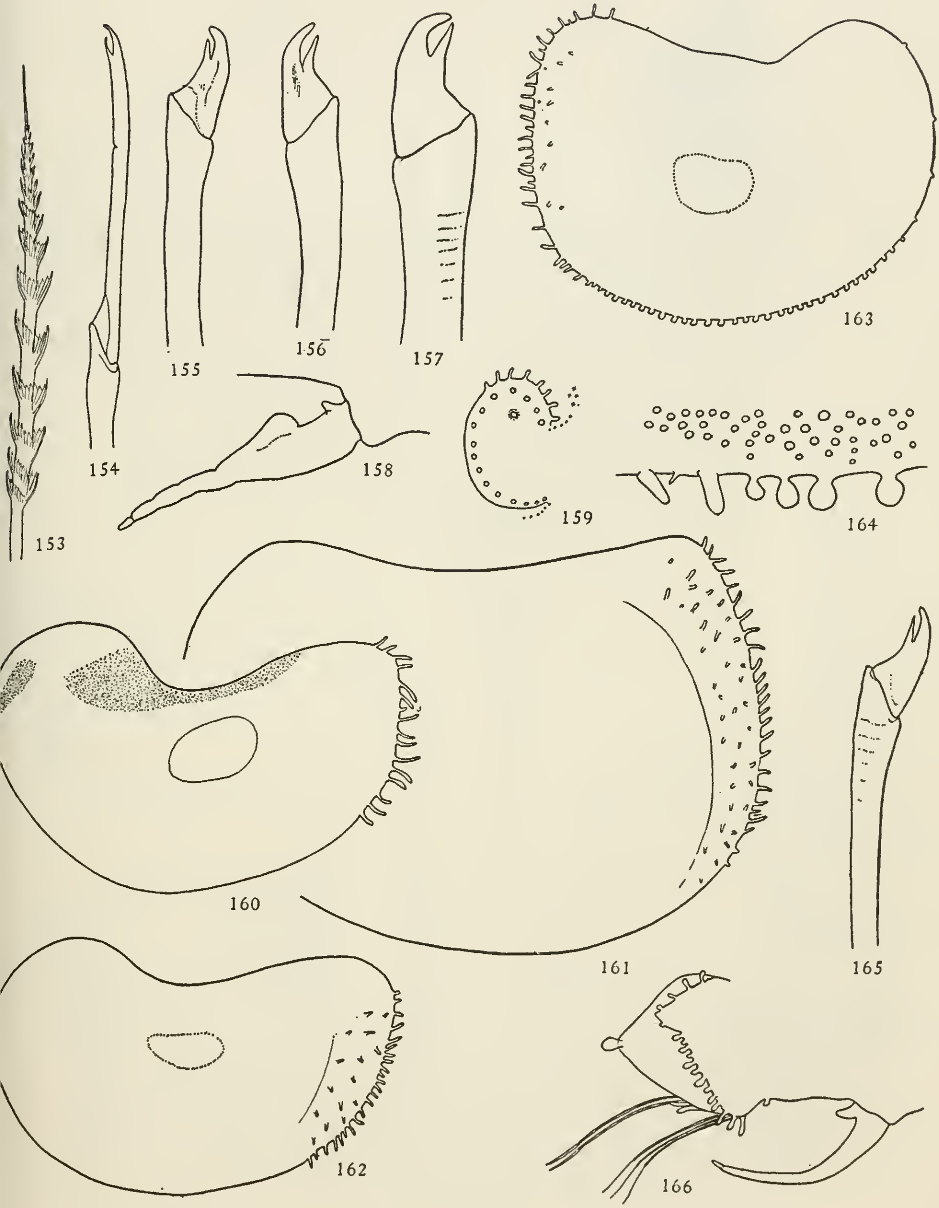
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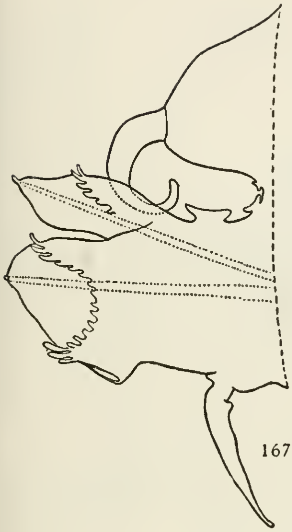
PLATE 14

Figures 167 to 175, *Sthenelais verruculosa:* Fig. 167, sixtieth parapodium in anterior view, x 12.5; Fig. 168, a nine-articulated median neuropodial seta from thirty-fifth parapodium, x 130; Fig. 169, distal end of preceding, x 290; Fig. 170, anterior end in dorsal view, first elytra laid back, left palpus and right peristomial cirrus not shown, x 12.5; Fig. 171, elytrum from thirty-fifth parapodium, small area at lower left indicates part enlarged in next figure; Fig. 172, postectal margin of preceding, circles indicate papillae, x 66; Fig. 173, portion of an inferior notopodial seta, x 130; Fig. 174, superior spinose neuropodial seta, x 130; Fig. 175, thirty-fifth parapodium in posterior view, elytrum omitted, x 12.5.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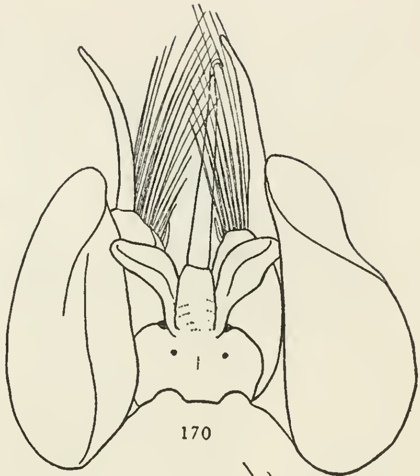
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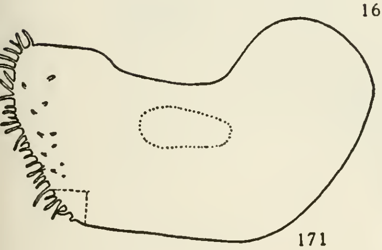
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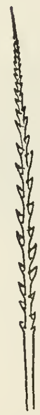
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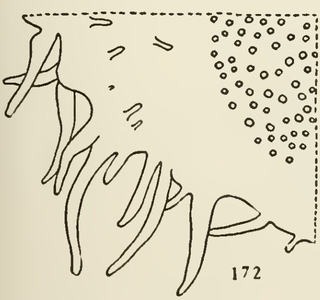
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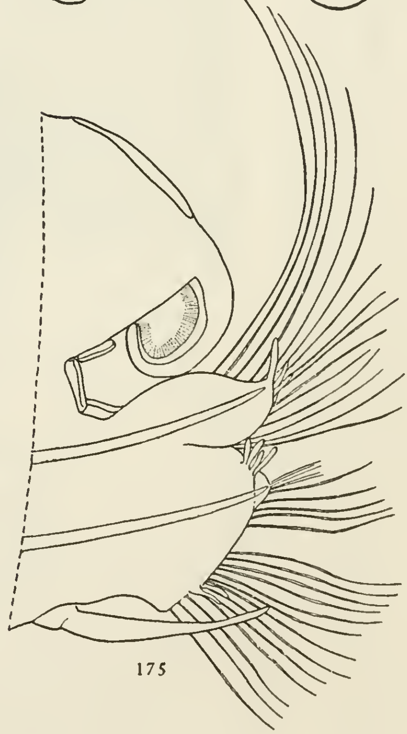
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PLATE 15

Figures 176 to 187, *Sthenelais maculata:* Fig. 176, superior neuropodial seta from a median parapodium, showing biarticulated appendage, x 290; Fig. 177, superior neuropodial seta from same parapodium with one article, x 290; Fig. 178, fifth elytrum from right side in dorsal view, stippling indicates pigmented areas, dorsal surface with fine, wart-like papillae over most of inner two thirds of elytrum, not shown, x 25; Fig. 179, eighth parapodium in posterior view, setae indicated, x 32; Fig. 180, twenty-fifth parapodium in anterior view, setae omitted, x 32; Fig. 181, part of outer lateral margin from eighth elytrum, x 290; Fig. 182, eighth elytrum from right side in dorsal view, stippling indicates pigmented area, x 32; Fig. 183, thirty-eighth right elytrum in dorsal view, x 25; Fig. 184, an inferior neuropodial seta from a median parapodium, x 290; Fig. 185, a superior spinose neuropodial seta from same parapodium, x 290; Fig. 186, distal end of a shorter median neuropodial seta, x 290; Fig. 187, distal end of another short median neuropodial seta, x 290.


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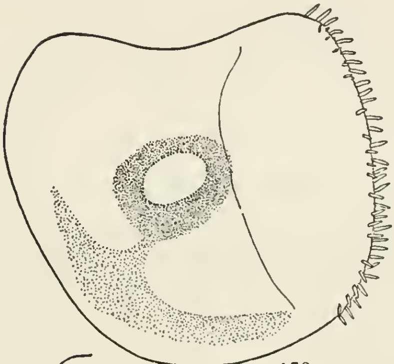
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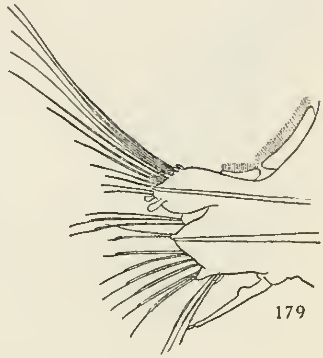
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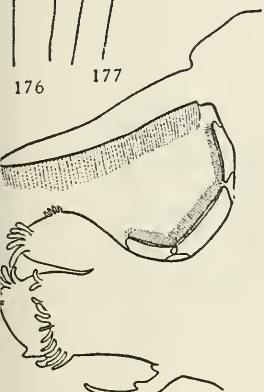
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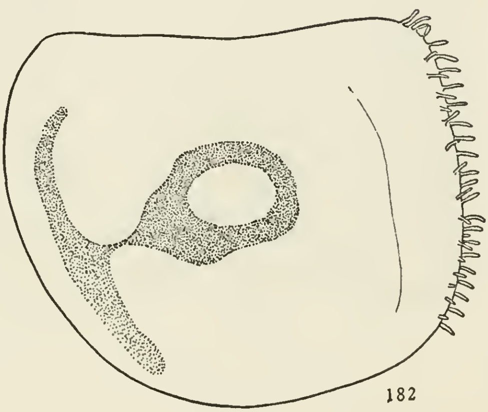
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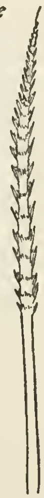
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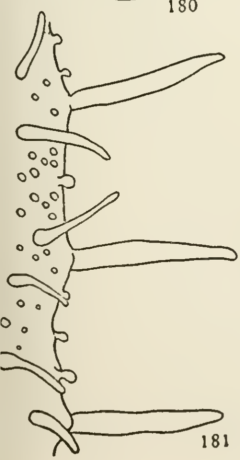
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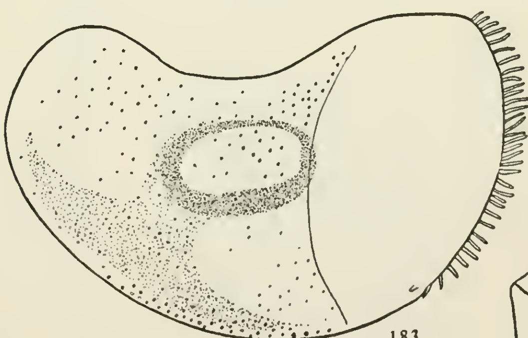
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PLATE 16

Figures 188 to 202, *Sthenelais hancocki:* Fig. 188, prostomial lobe, the anterior eyes stippled but concealed by the lateral ctenidia, x 25; Fig. 189, outline of second elytrum in ventral view, x 25; Fig. 190, first parapodium in anterior view, showing long dorsal cirrus, shorter ventral cirrus and transposed prostomial antenna, x 25; Fig. 191, outline of first elytrum from right side in ventral view, x 25; Fig. 192, superior neuropodial seta from second parapodium, x 290; Fig. 193, superior simple spinose neuropodial seta, x 290; Fig. 194, elytral spines from twenty-second elytrum in dorsal view, x 130; Fig. 195, similar spines in lateral view, x 130; Fig. 196, an inferior neuropodial seta from a median parapodium, x 290; Fig. 197, a slender median neuropodial seta from a median parapodium, x 290; Fig. 198, postlateral fringe from twenty-second elytrum, x 130; Fig. 199, distal end of a median neuropodial seta, x 650; Fig. 200, distal end of an inferiormost neuropodial seta, x 650; Fig. 201, distal end of a blunt median neuropodial seta, x 650; Fig. 202, twenty-second elytrum from right side in dorsal view, x 25.

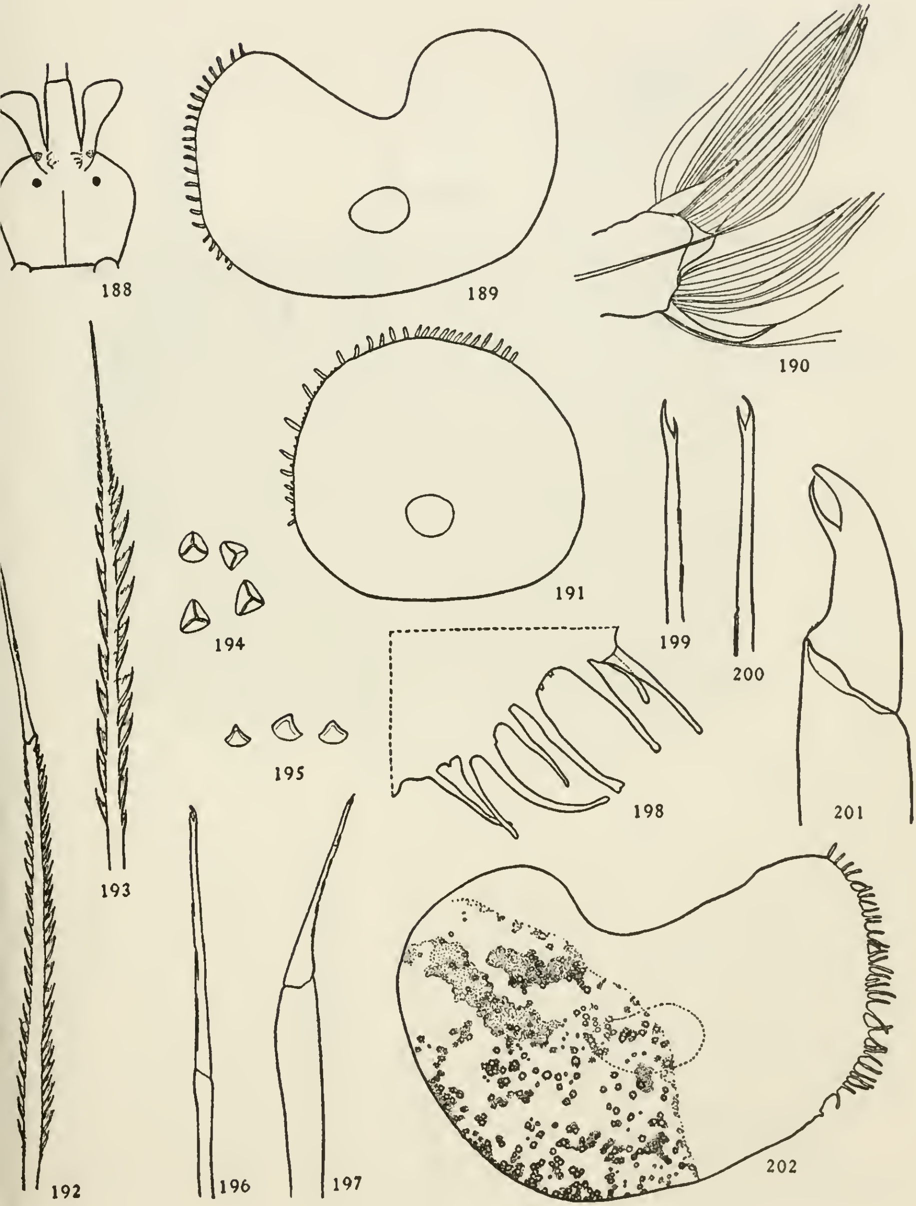
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PLATE 17

Figures 203 to 216, *Sthenelais neoleanirae:* Fig. 203, seventh parapodium in posterior view, setae indicated, x 32; Fig. 204, superior neuropodial seta from thirty-fifth parapodium, the appendage with 5 articles and a bifid tip, x 290; Fig. 205, inferiormost neuropodial seta from same parapodium, x 290; Fig. 206, distal end of seventh parapodium in anterior view, with parapodial lobular processes, setae omitted, x 66; Fig. 207, first parapodium with long dorsal cirrus, shorter ventral cirrus and the transposed prostomial antenna, x 32; Fig. 208, part of elytrum from thirty-fifth parapodium, showing distribution of larger tubercles near the postectal margin, x 66; Fig. 209, outline of elytrum from thirty-fifth parapodium in dorsal view, spines omitted, x 12.5; Fig. 210, one of larger elytral spines from same elytrum as preceding, x 290; Fig. 211, superior spinose neuropodial seta from thirty-fifth parapodium, x 290; Fig. 212, a median neuropodial seta from thirty-fifth parapodium, showing tapering, finely bifid appendage, x 290; Fig. 213, a short appendaged, median neuropodial seta from same parapodium, x 290; Fig. 214, articulation of supraacicular neuropodial seta from seventh parapodium, others are less spiny or quite smooth, x 290; Fig. 215, inferiormost neuropodial seta from same parapodium, x 290; Fig. 216, outline of seventy-second parapodium in anterior view, setae omitted, x 66.

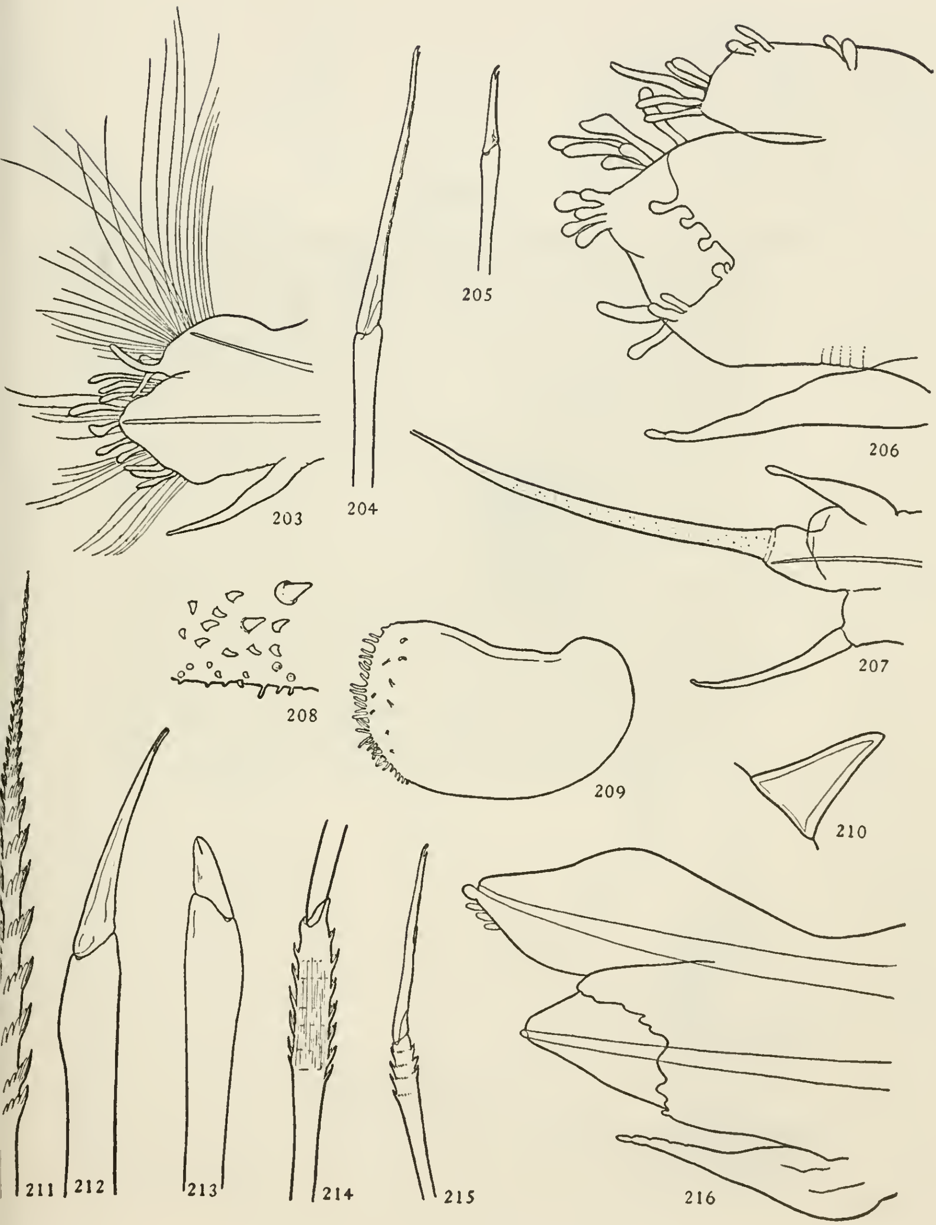
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PLATE 18

Figures 217 to 225, *Leanira fimbriarum:* Fig. 217, thirty-fifth parapodium in posterior view, setae indicated, x 25; Fig. 218, prostomial lobe, anterior eyes concealed by ctenidia, indicated by stippling, x 30; Fig. 219, outline of first elytrum, the anterior margin fimbriated (in some it is quite smooth), x 25; Fig. 220, part of a median serrulated notopodial seta, x 290; Fig. 221, a superior simple spinose neuropodial seta, x 290; Fig. 222, a composite neuropodial seta, the appendage distally pointed, but not canaliculated, x 290; Fig. 223, part of an inferiormost smooth notopodial seta, x 290; Fig. 224, outline of elytrum from thirty-fifth parapodium in ventral view, x 25; Fig. 225, fifth parapodium in posterior view, setae indicated, x 32.

Figures 226 to 231, *Sthenelanella uniformis:* Fig. 226, outline of first elytrum from right side, in ventral view, x 32; Fig. 227, marginal fringe from anterior edge of first elytrum, x 290; Fig. 228, fifth elytrum from right side in dorsal view, the stippling indicates pigmented area, x 32; Fig. 229, inferiormost neuropodial seta from a median parapodium, x 650; Fig. 230, a median neuropodial seta from same parapodium, x 650; Fig. 231, a superior neuropodial seta from same parapodium, x 650.

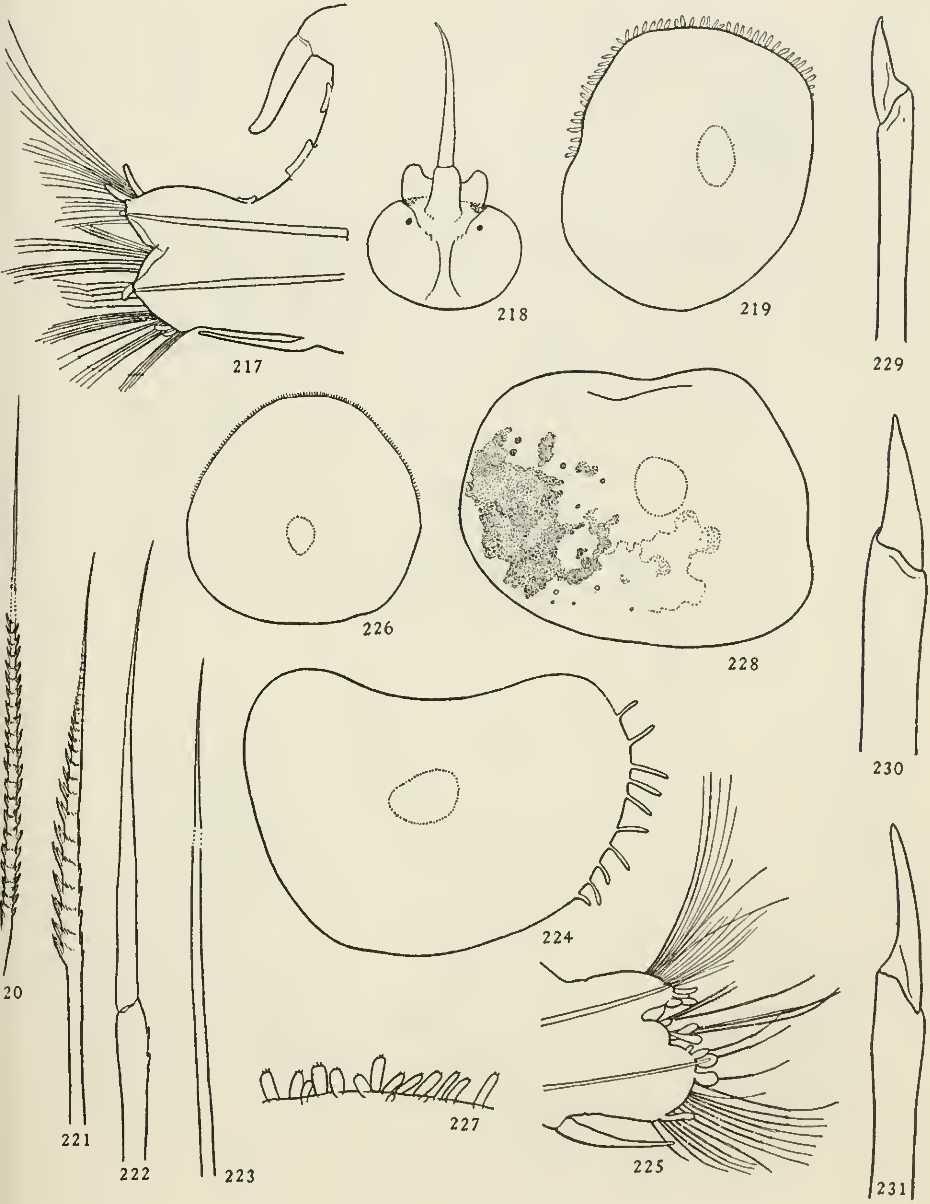
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PLATE 19

Figures 232 to 243, *Psammolyce spinosa:* Fig. 232, longest inferior neuropodial seta from a median parapodium, x 290; Fig. 233, inferior neuropodial seta from seventy-eighth parapodium, x 130; Fig. 234, superior neuropodial seta from a median parapodium, x 290; Fig. 235, superior neuropodial seta from seventy-eighth parapodium, x 130; Fig. 236, a nearly smooth, distally entire neuropodial seta from a median parapodium, x 290; Fig. 237, a median neuropodial seta with bifid tip, from same parapodium, x 290; Fig. 238, anterior end, peristomial cirri and palpi omitted, x 25; Fig. 239, seventy-eighth parapodium in posterior view, setae indicated, x 25; Fig. 240, an elytrum from a posterior region, x 25; Fig. 241, median neuropodial seta from seventy-eighth parapodium, x 130; Fig. 242, a neuropodial seta from second parapodium, x 290; Fig. 243, an elytrum from anterior region, from right side in dorsal view, elytral scar dotted in, x 25.

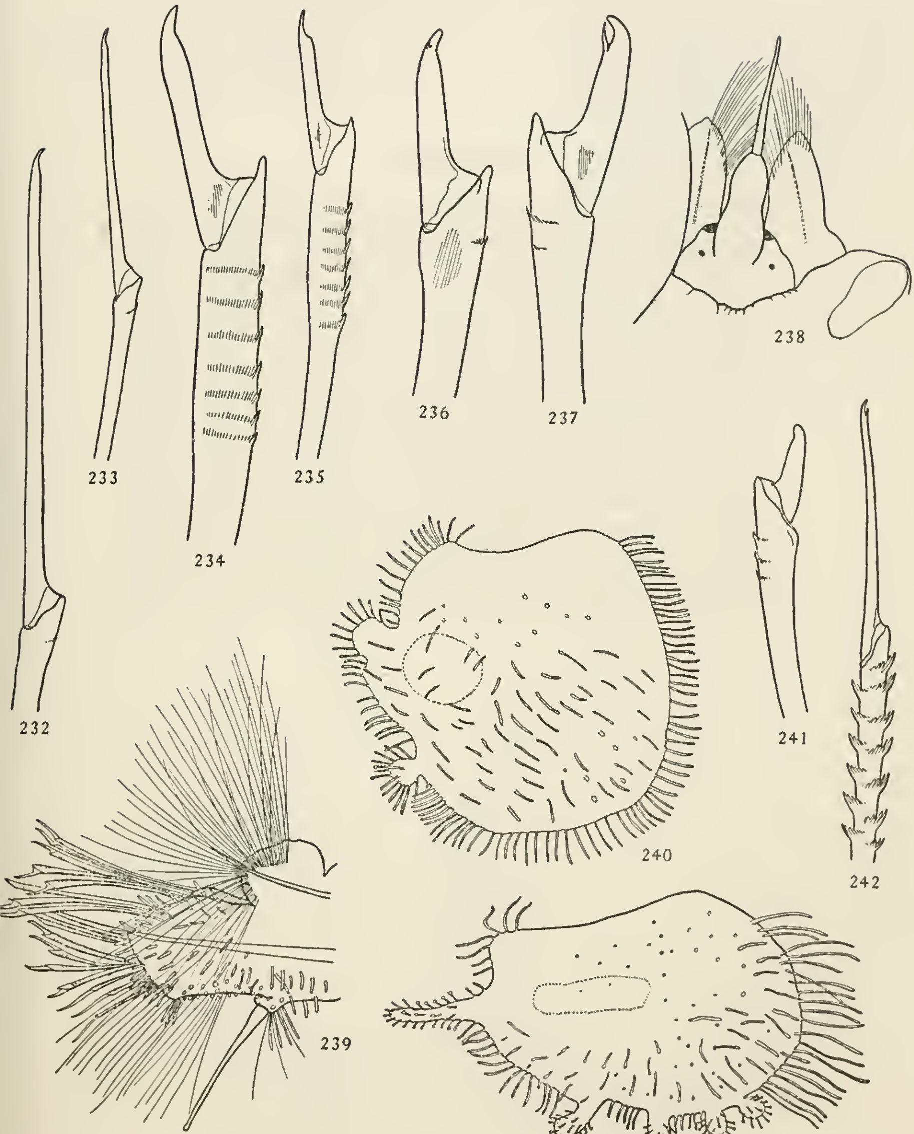
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PLATE 20

Figures 244 to 254, *Psammolyce fimbriata:* Fig. 244, prostomial lobe in lateral view from left side, x 25; Fig. 245, anterior end in dorsal view, including first elytrophoral scars, position of first pair of eyes indicated by stippling, x 25; Fig. 246, a neuropodial seta from second setigerous segment, x 290; Fig. 247, an inferior neuropodial seta from twentieth parapodium, x 290; Fig. 248, part of a notopodial seta from same parapodium, x 290; Fig. 249, a bifid inferior neuropodial seta from third setigerous segment (most are distally entire), x 290; Fig. 250, an entire neuropodial seta from third segment, x 290; Fig. 251, twentieth parapodium in anterior view, x 25; Fig. 252, elytrum from twentieth parapodium, the elongate lobe marks the inner lateral margin, the nonfimbriated edge is anterior, x 25; Fig. 253, a median neuropodial seta from twentieth parapodium, x 130; Fig. 254, a superior neuropodial seta from same parapodium, x 130.

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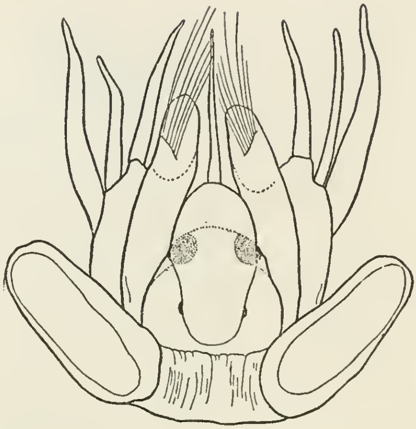

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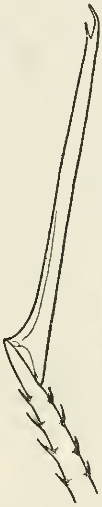

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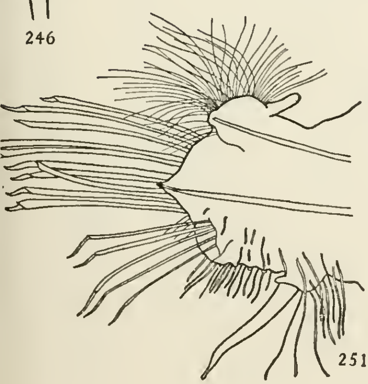

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PLATE 21

Figures 255 to 264, *Psammolyce myops:* Fig. 255, twentieth elytrum from left side in dorsal view, x 25; Fig. 256, twentieth parapodium in anterior view, setae indicated, x 32; Fig. 257, a superior neuropodial seta from third parapodium, x 290; Fig. 258, an inferior neuropodial seta from same parapodium, x 290; Fig. 259, second parapodium in anterior view, setae indicated, x 32; Fig. 260, anterior end in dorsal view, the ventral, elongate eyes concealed by the median ceratophore, indicated by stippling, x 30; Fig. 261, prostomial lobe from right side, showing relation of eyes to median ceratophore, x 30; Fig. 262, a nearly entire, median neuropodial seta, x 290; Fig. 263, a bifid median neuropodial seta, x 290; Fig. 264, an inferior neuropodial seta from a median parapodium, x 290.

Figures 265 to 267, *Halosydna parva:* Fig. 265, surface papillae from sixth elytrum, near outer, lateral margin, x 290; Fig. 266, sixth elytrum from right side in dorsal view, x 25; Fig. 267, a neuropodial seta from a median parapodium, x 290.

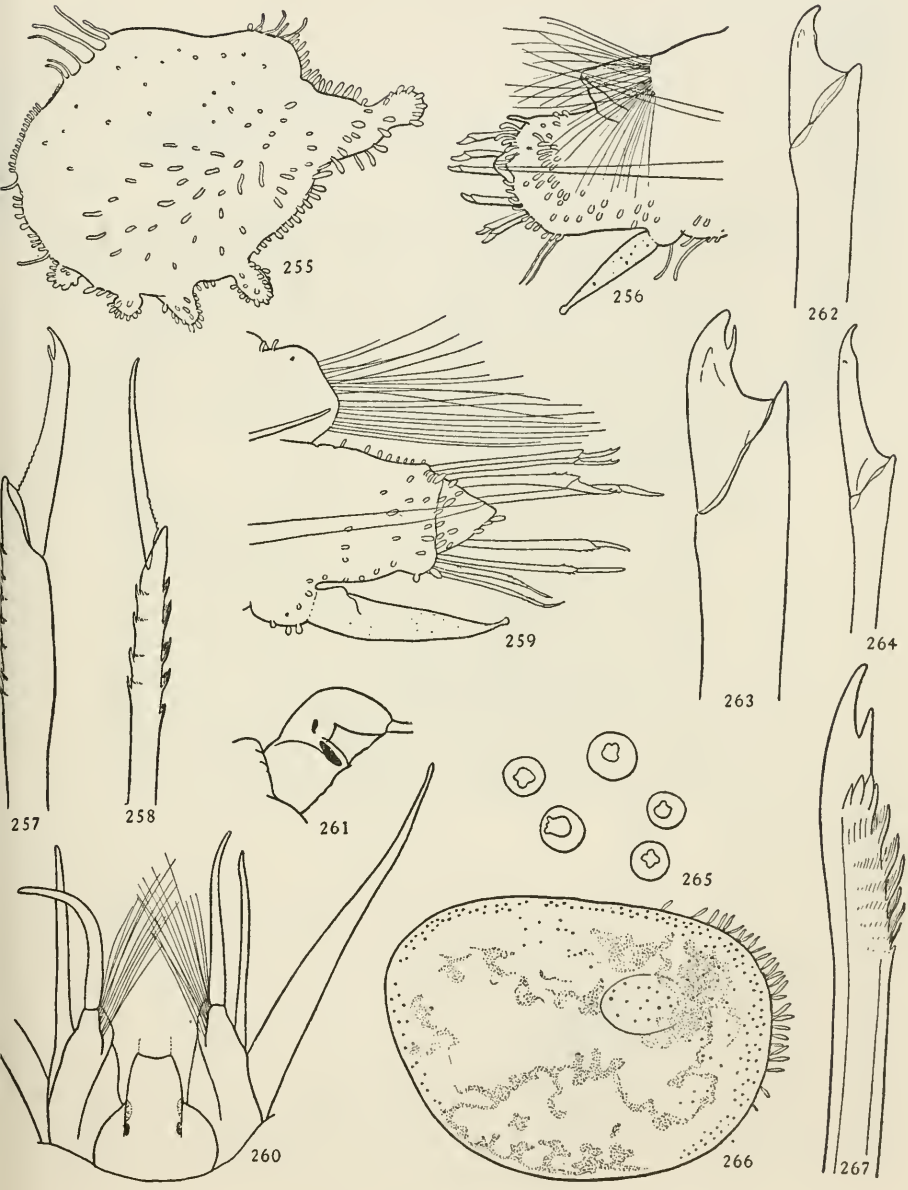
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PLATE 22

Figures 268 to 272, *Psammolyce antipoda anoculata:* Fig. 268, prostomium and peristomium in dorsolateral view, from right side, with peristomium pushed back to disclose prostomial lobe, x 18.5; Fig. 269, outline of an elytrum from posterior region, the elongate lobe marks the inner lateral margin, x 25; Fig. 270, twenty-fifth elytrum from right side in dorsal view, elytral scar indicated, x 25; Fig. 271, bifid neuropodial seta from second parapodium (most of them lack the bifid tip), x 290; Fig. 272, a median neuropodial seta from a posterior parapodium, with shaft somewhat spinose, x 130.

Figures 273 to 279, *Halosydna,* species B: Fig. 273, a ventralmost neuropodial seta from a median parapodium, x 290; Fig. 274, a median elytrum from the right side in ventral view, the part bounded by broken line is enlarged in next figure, x 12.5; Fig. 275, part of median elytrum, near the anterior end, including most of the area of the elytral scar, circles indicate papillae, stippling pigmented pattern, the small area enclosed in the rectangle is enlarged in the next figure, x 32; Fig. 276, microtubercles from preceding, x 290; Fig. 277, a median parapodium, setae indicated, x 32; Fig. 278, a dorsalmost neuropodial seta from a median parapodium, x 290; Fig. 279, a long notopodial seta from same parapodium, x 290.

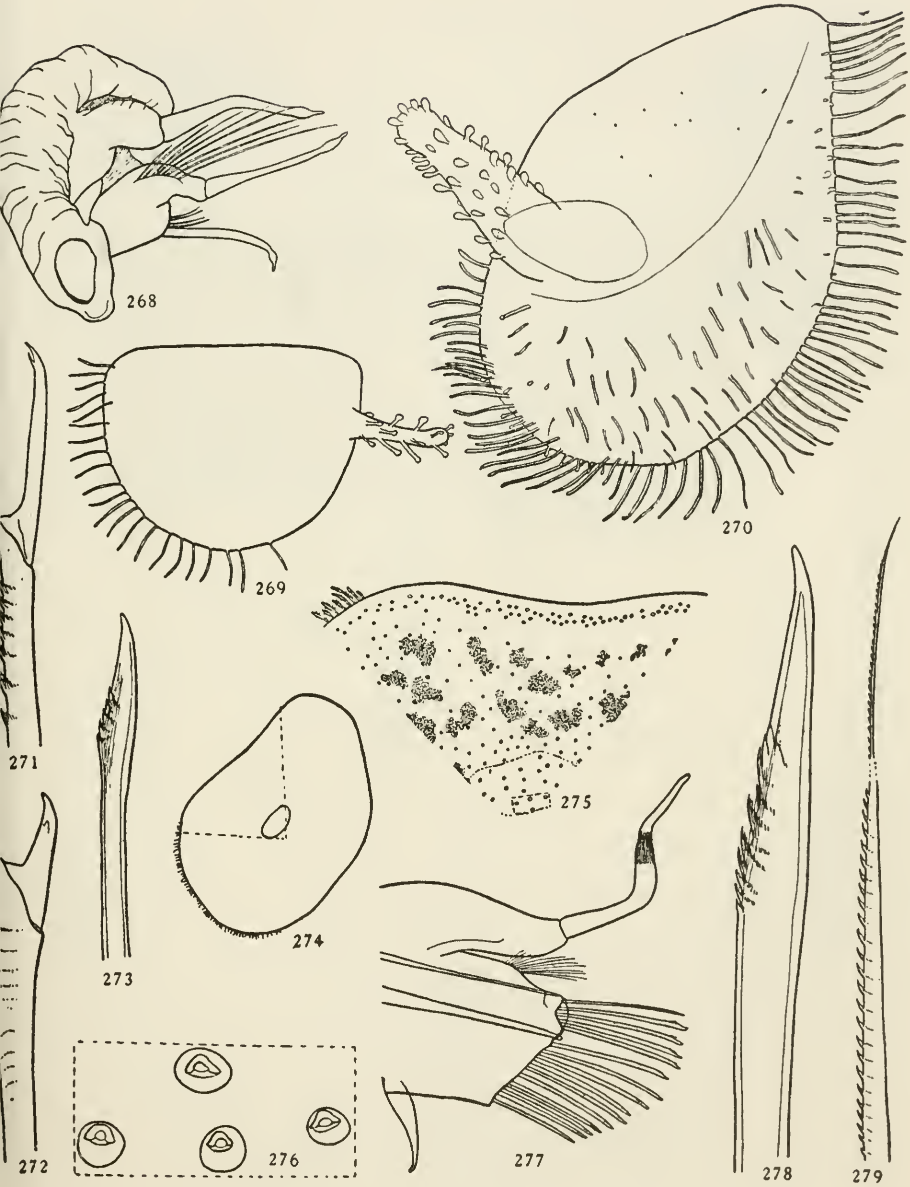
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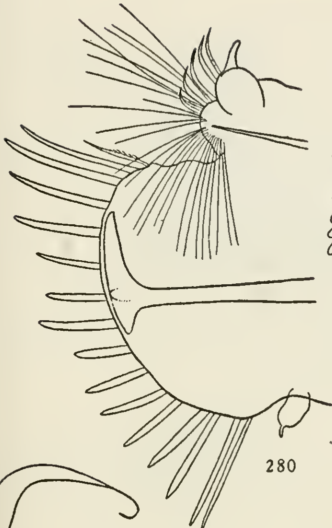
PLATE 23

Figures 280 to 288, *Pareulepis fimbriata:* Fig. 280, fifth parapodium, setae and acicula indicated, x 25; Fig. 281, eighth elytrum from 770-38, x 12.5; Fig. 282, neuropodium from nineteenth parapodium, x 25; Fig. 283, notopodial seta from fifteenth parapodium, the tip drawn out, the recurved free end is flattened, depressed (not seen in this view), x 66; Fig. 284, distal end of a dorsal aciculum from same parapodium, x 66; Fig. 285, twelfth or last elytrum in ventral view, x 7.5; Fig. 286, eighth elytrum from individual from Mission Bay, California, x 12.5; Fig. 287, eighth elytrum from individual from Ecuador, x 12.5; Fig. 288, superior neuropodial seta from nineteenth parapodium, x 290.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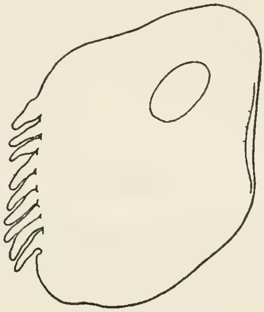
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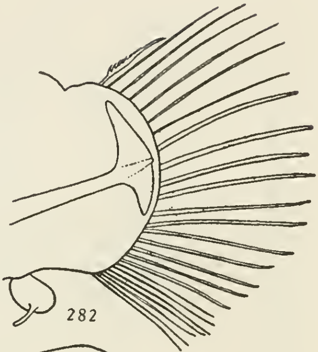
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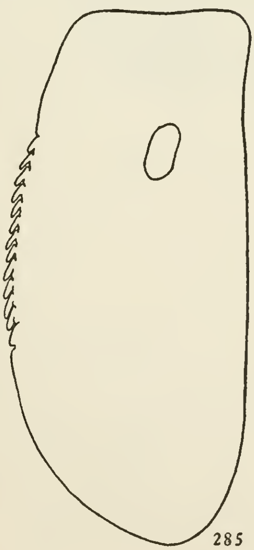
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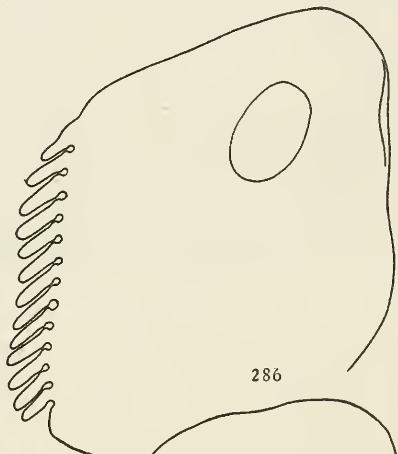
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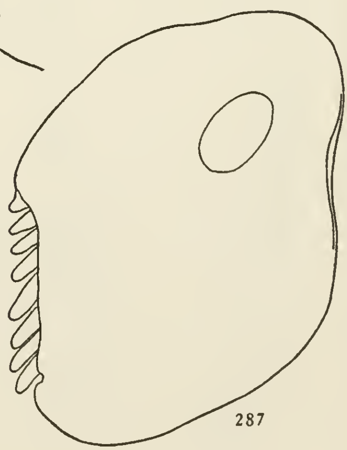
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PLATE 24

Figures 289 to 293, *Polyodontes panamensis:* Fig. 289, thirty-fourth parapodium, setae indicated, x 32; Fig. 290, first parapodium (second segment) showing large ventral cirrus, x 32; Fig. 291, outline of elytrum from anterior region, in ventral view, the elytral scar is nearest the outer lateral margin, x 32; Fig. 292, a median aristate neuropodial seta, x 290; Fig. 293, a spinose inferior neuropodial seta in posterior view, x 290.

Figures 294 to 299, *Polyodontes oculea:* Fig. 294, second parapodium (third segment) with setae indicated, x 32; Fig. 295, thirty-fourth parapodium, setae omitted, x 32; Fig. 296, third parapodium (fourth segment), setae omitted, x 32; Fig. 297, an aristate seta from a median parapodium, x 290; Fig. 298, an inferior neuropodial seta in lateral view, x 290; Fig. 299, a superior neuropodial seta from a median parapodium, x 290.

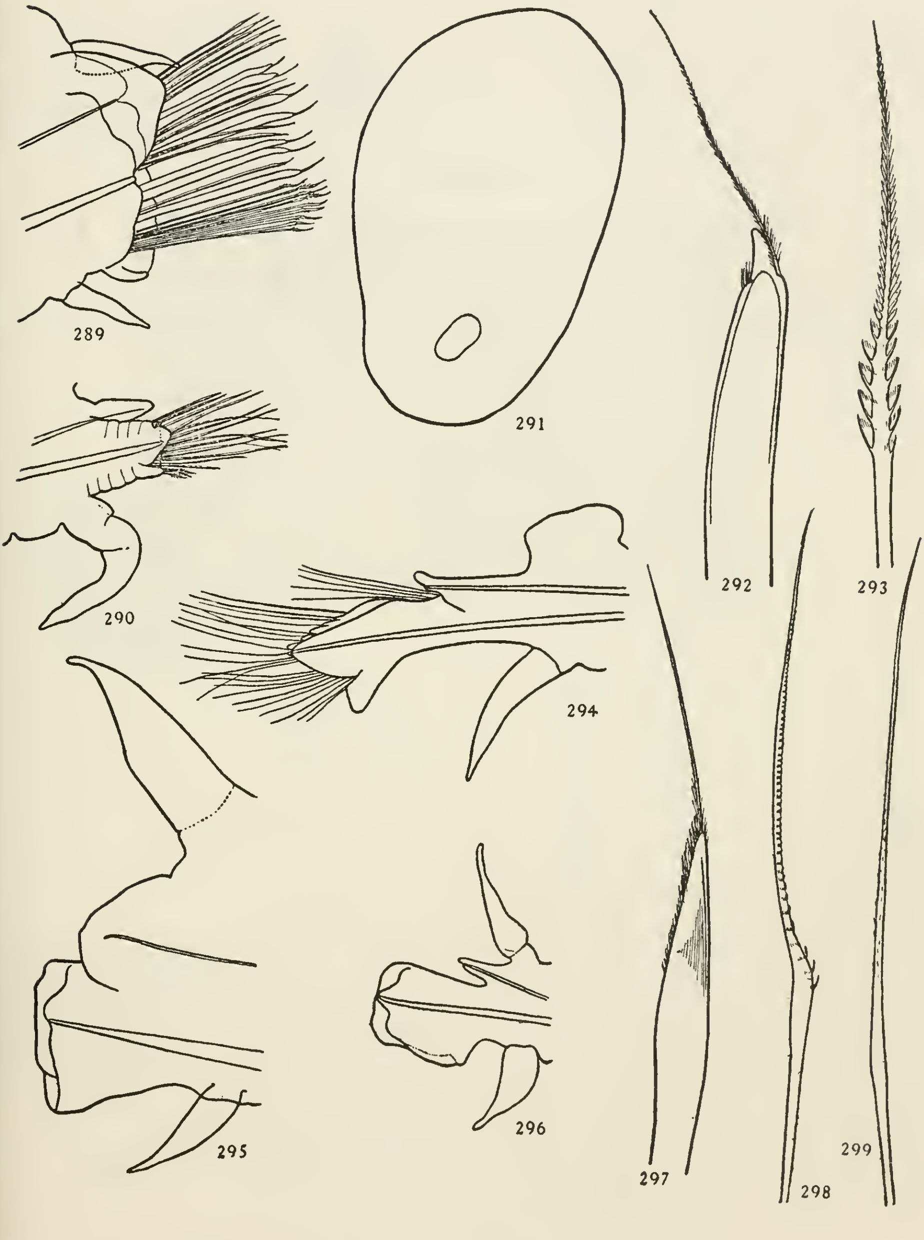
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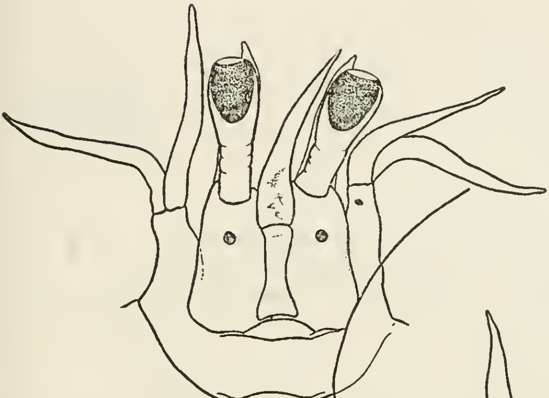
PLATE 25

Figures 300 to 308, *Polyodontes frons:* Fig. 300, anterior end in dorsal view, with part of margin of first right elytrum indicated, palpi omitted, x 32; Fig. 301, thirty-fifth parapodium in anterior view, the fine, hair-like notopodial setae and neuropodial setae indicated, x 32; Fig. 302, second parapodium with elytrum turned back, setae indicated, x 32; Fig. 303, third parapodium from the same individual as the preceding, notopodial setae not shown, x 32; Fig. 304, elytrum from thirty-fifth parapodium in dorsal view, showing outer lateral pouch, x 25; Fig. 305, inferiormost neuropodial seta from thirty-fifth parapodium, in lateral view, x 280; Fig. 306, an inferiormost neuropodial seta in posterior view, x 280; Fig. 307, a superiormost neuropodial seta from thirty-fifth parapodium, x 280; Fig. 308, a median aristate neuropodial seta from same parapodium, x 280.



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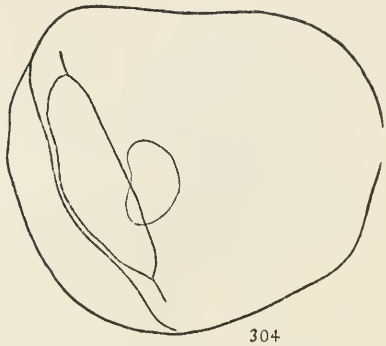

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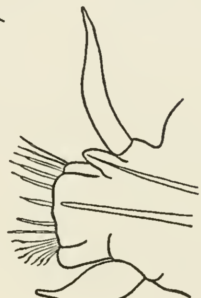

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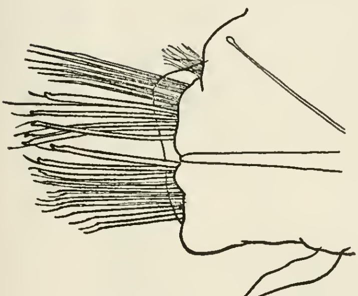

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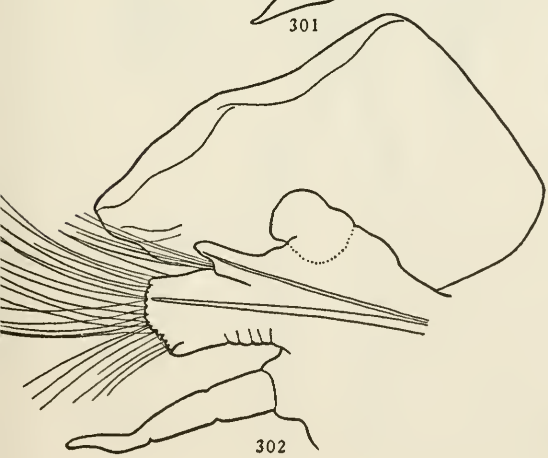

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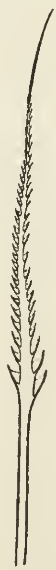

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PLATE 26

Figures 309 to 312, *Panthalis pacifica:* Fig. 309, prostomial lobe in dorsal view, x 32; Fig. 310, a superior penicillate seta from twenty-first parapodium, x 290; Fig. 311, a stout aristate seta from same parapodium, x 290; Fig. 312, an inferior neuropodial seta in lateral view, x 290.

Figures 313 to 318, *Panthalis marginata:* Fig. 313, first elytrum from left side in dorsal view, the elytral scar indicated, x 32; Fig. 314, first parapodium (second segment) with long ventral cirrus, setae indicated, x 32; Fig. 315, second parapodium (third segment), setae omitted, x 32; Fig. 316, inferior neuropodial seta in posterior view, x 290; Fig. 317, a superior penicillate neuropodial seta from a median parapodium, x 290; Fig. 318, a median aristate seta from the same parapodium (there are about 7 of these in a parapodium), x 290.

Figures 319 and 320, *Aphrodita falcifera:* Fig. 319, a long notopodial seta and dorsal cirrus from a median parapodium, showing comparative lengths of parts, stippling on the seta indicates asperities, x 32; Fig. 320, distal end of notopodial seta, shown in Fig. 319, with subterminal asperities and smooth tip, x 290.


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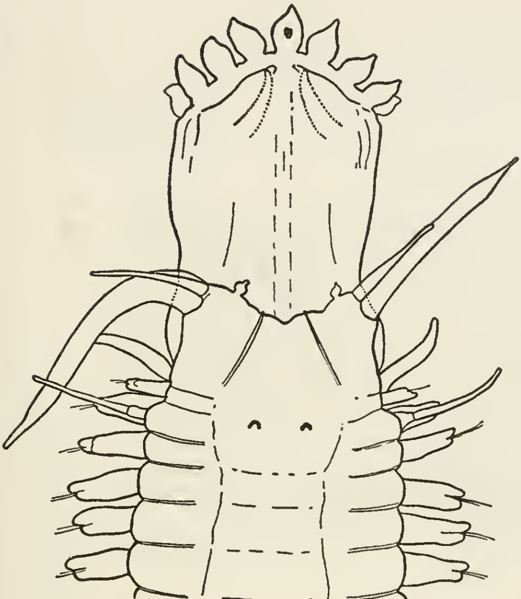
PLATE 27

Figures 321 to 325, *Pisione oerstedi:* Fig. 321, anterior end of a smaller (25 mm long) individual, with proboscis protruded, the dorsal jaws indicated in dotted lines, x 66; Fig. 322, third parapodium, with setae and acicula indicated, x 66; Fig. 323, one of 6 composite setae in a neuropodium from a median parapodium, x 290; Fig. 324, 2 stout, acicular setae from a median parapodium, with distal end of neuropodial lobe, x 290; Fig. 325, a bent, embedded aciculum, located between the simple setae and the composite setae (others are distally straight), x 290.

Figure 326, *Pisionella hancocki:* Anterior end in dorsal view, x 66.



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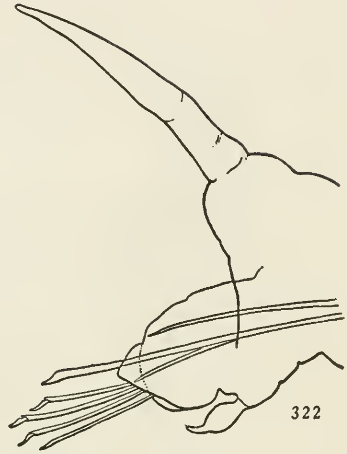

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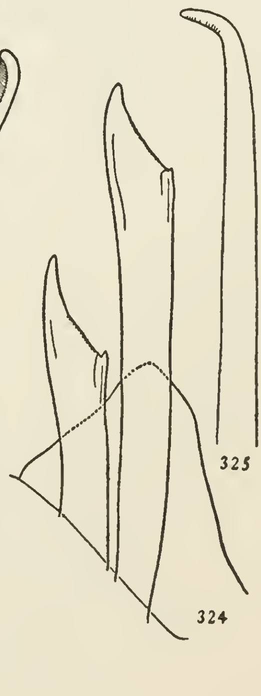

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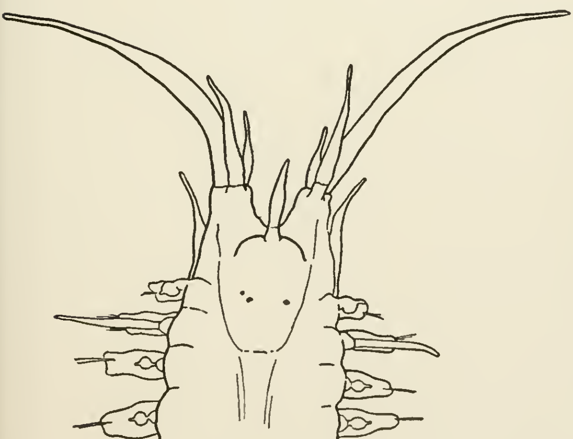

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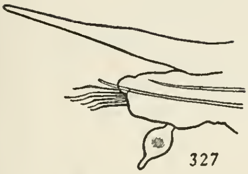
PLATE 28

Figures 327 to 333, *Pisionella hancocki:* Fig. 327, second parapodium, with setae and acicula indicated, x 66; Fig. 328, first parapodium, showing long, thick ventral cirrus and globular dorsal cirrus, x 66; Fig. 329, proboscis dissected open to show the 4 chitinous jaws; the position and number of the terminal papillae could not be accurately determined; the parallel lines indicate the midventral line, x 66; Fig. 330, acicular seta and composite seta from second parapodium, x 290; Fig. 331, a median parapodium, with acicula and setae indicated; the ventral elongation represents perhaps a nephridial papilla, x 66; Fig. 332, 3 composite setae from a median parapodium, the comb plates on the shaft are in paired series, those on the appendage in a single row, x 290; Fig. 333, third parapodium, x 66.



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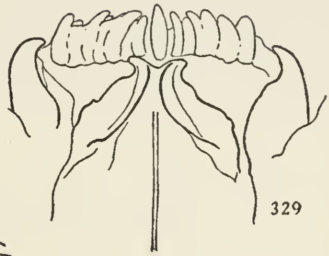

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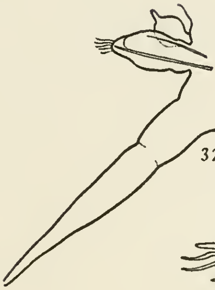

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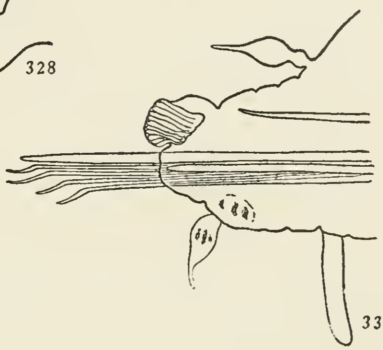

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NEW SPECIES OF POLYCHAETOUS ANNELIDS FROM SOUTHERN CALIFORNIA

with a discussion on the host of one of them.

By OLGA HARTMAN

NEW SPECIES OF POLYCHAETOUS ANNELIDS FROM SOUTHERN CALIFORNIA

with a discussion on the host of one of them.

(PLATES 29, 30)

BY OLGA HARTMAN

Two new species, *Hesionella mccullochae,* new genus, new species, and *Poecilochaetus johnsoni,* new species, are described. The first belongs to a family for which only a single species (*Podarke pugettensis* Johnson) has heretofore been known from California; the second to a small family (DISOMIDAE), not previously reported from the Western Hemisphere. The former is associated with a species of *Lumbrineris,* the status of whose specific name is in some confusion, and for which some observations are made on the life history.

Family **Hesionidae**

HESIONELLA, new genus

Body elongate, depressed, consists of numerous segments. Prostomium with a pair of frontal antennae inserted ventrally, a pair of reduced palpi on the ventral side, and no eyes. First 3 segments each with a pair of long dorsal cirri and a pair of shorter ventral cirri. More posterior segments subbiramous. The notopodium provided with a conspicuous flattened lobe, a small embedded aciculum, and terminating in a simple dorsal cirrus. The neuropodium with a fascicle of composite setae, a heavier aciculum, and cirriform ventral cirrus.

Proventriculus apparently without teeth or chitinous structures; extends posteriorly through about the seventh segment. Anal cirri 2, depressed, distally truncate.

Differs from other genera of HESIONIDAE which have 6 pairs of tentacular cirri and 2 antennae in that the notopodia are provided with flattened dorsal lobes that terminate in short dorsal cirri; the prostomium lacks eye spots, and the anal cirri are short, depressed.

Hesionella mccullochae, new species

Plate 29, Figs. 1-4

General form minute, greatly flattened, tapering slightly anteriorly and posteriorly. Number of segments 37 to 45, the first 3 provided with tentacular cirri, the last 34 to 41 with setae and acicula (pl. 29, fig. 1). Length in life 6.5 mm, width without setae about 0.5 mm. Color in life salmon pink anteriorly, more or less translucent posteriorly, the proventriculus clear, visible through the first 7 segments, resembling a syllid in this respect. No teeth or jaws have been observed.

Prostomium broadly rounded anteriorly, without eye spots or paired pigmented areas, but with a small dark blotch medially near the posterior margin (pl. 29, fig. 1). A pair of cirriform antennae directed anteriorly but inserted ventrally, and a pair of minute (biarticulated?) subglobular, colorless palpi on the ventral side, near the oral aperture. The precise nature of the palpi is difficult to ascertain because of their small size and soft structure. First 3 segments with longer, simple dorsal cirri and smaller ventral cirri, resembling the prostomial antennae in form.

Parapodia unequally biramous (pl. 29, fig. 2), the notopodium with a flattened dorsal lobe, closely appressed to the neuropodium, appearing scalelike, and provided at its distal end with a simple, dorsal cirrus. A weak, colorless aciculum is embedded in the dorsal lobe (pl. 29, fig. 2). The neuropodium is much larger and longer. It contains a single, pale, heavier aciculum, and 4 to 7 composite, falcigerous setae. The ventral cirri are simple, cirriform, and resemble the dorsal cirri, but are longer. Anal cirri 2, flattened, short, only slightly longer than the last segment, inserted side by side (pl. 29, fig. 1).

Setae, present only in the neuropodia, are composite, the shaft smooth, with a heterogomph articulation; the appendage falcigerous, terminates in a simple tooth, the cutting edge bordered with fine, minute hairs (pl. 29, figs. 3, 4). The superiormost setae are larger, stronger (pl. 29, fig. 4), and have a longer appendage than those more ventrally (pl. 29, fig. 3), but all resemble one another.

Hesionella mccullochae is named for Dr. Irene McCulloch, active and stimulating supporter of scientific pursuits, and under whose direct interests these studies have been made possible. It is a great pleasure to dedicate this species to her.

Holotype.—AHF no. 21.

Distribution.—Hesionella mccullochae has been found only in the burrows or coarsely constructed tubes of a common, intertidal species of *Lumbrineris* (see below), always closely associated with the host, but not actually attached. Normally, it lies along the body of the host in the region of some of the median segments. In size, it is greatly dwarfed by its much larger associate, and hence easily overlooked. Thus far it has been found to occur only singly in a burrow. No observations have been made on the means of propagation, although examinations have been made during several months of the year.

The host species, herein identified as *Lumbrineris brevicirra* (Schmarda), is discussed below.

Lumbrineris brevicirra (Schmarda)

Plate 29, Figs. 5-13

Notocirrus brevicirrus Schmarda, 1861, p. 117, 4 figs.
Lumbrinereis brevicirra Monro, 1933, pp. 83-84 (with synonymy).
?*Lumbriconereis zonata* Johnson, 1901, pp. 408-409, pl. 9, figs. 93-100; Moore, 1909, p. 254; Treadwell, 1914, p. 196.
? *Lumbriconereis grandis* Treadwell, 1906, pp. 1170-1171.
? *Lumbriconereis sarsi* Kinberg, 1865, p. 569.

The specimens, believed to belong to this species, as redescribed by Monro and others, represent the most commonly encountered species of *Lumbrineris* in the intertidal zones of California and Lower California, south at least to Enseñada. It is to be found in burrows in sandy beaches, in sand-filled, oblique crevices, and in sand or fine gravel under large beach boulders. It frequently occurs with other species of lumbrinerids, from which it is easily distinguished in the field. From species of *Arabella* it differs in being orange red instead of brownish red; from other species of *Lumbrineris* it differs in that its posterior parapodial lobes are short, and it is proportionately slenderer and shorter.

The synonymy of *L. brevicirra* has been discussed by Monro (1933, p. 83) and others, and additions made to the original brief description. It is still a moot question whether its distribution is cosmopolitan or less extensive. Its identity with the Atlantic form, *L. impatiens* Claparède, seems likely, but this has not been definitely established. The shape of the prostomial lobe, though not a safe criterion for separation, is seemingly different in the two species. In individuals from the Northeast Pacific the lobe is uniformly similar for many individuals examined. It is elongate, conical (pl. 29, figs. 12, 13) in the adult. The maxillary apparatus agrees with that described by Crossland (1924, p. 45). The first parapodium contains a hooded, simple hook in addition to simple limbate setae. There are no composite setae.

Other names that are believed to have been applied to this species are listed in the synonymy above. *L. zonata* Johnson is unquestionably the common west coast species. *L. grandis* Treadwell, from Hawaii, is less obviously so chiefly because maxilla III is shown with a single tooth instead of two. The description of *L. sarsi* Kinberg, from Ecuador, is too brief to permit a comparison of details. An investigation of the type might reveal its identity. If, as seems likely, these names refer to a single, widely distributed species, we may expect *L. brevicirra* to occur on both sides of the Pacific, and in both northern and southern hemispheres.

Developmental stages.—During February various stages of *L. brevicirra* are obtainable in southern California. The large, light green, spherical eggs (pl. 29, fig. 10) are laid in the burrow, without a gelatinous sheath or other investing membrane, and the larvae develop there. The eggs are up to 0.5 mm in diameter. How they leave the body cavity is not known, but obviously not by rupturing the body wall. Well over 100 have been observed in the burrow of one individual. The stage of development is approximately the same for all individuals in any one tube.

The earliest setigerous larva has 3 segments (pl. 29, fig. 9), each segment with a single pair of limbate setae. Most of the space posterior to the prostomial lobe is filled with green yolky material. The prostomium has a pair of diffuse dark spots, and another dark area where the maxillary parts will develop (pl. 29, fig. 9). Ciliary bands are absent save for some short cilia about the oral area.

Increase in length is accompanied by an increase in the number of segments and development of the alimentary tract. In an 8-segmented larva (pl. 29, figs. 7, 8), still bright green, the proboscidial area is well developed (pl. 29, figs. 7, 11), the parapodia are lateral prolongations provided with both limbate setae (pl. 29, fig. 5) and hooks (pl. 29, fig. 6), and the alimentary tract is complete. Cilia are present only around the mouth. When isolated, these larvae forage for themselves, and secrete a mucous sheath in which they lie.

The incidence of setae in an 8-segmented larva is as follows: first segment with 2 limbate setae; second segment with 3 limbate setae and 1 hook; third and fourth segments each with 2 setae and 1 hook; fifth to eighth segments each with 1 seta. In the adult specimen from which these larvae are taken, the arrangement of setae is as follows, counting from dorsal to ventral positions: first segment with 4 limbate setae, 1 simple hook, 1 seta; second segment with 3 setae, 2 simple hooks, 1 seta; third to twenty-eighth segments with similar arrangement as in the second segment, though with increasing number of hooks and fewer setae; posterior to the twenty-eighth segment the ventralmost setae are absent.

Family Disomidae

The family DISOMIDAE has not heretofore been reported from the Western Hemisphere or the eastern Pacific. It is a small family; its affinities are with the Spionidae and Chaetopteridae, but it differs from these in having a setigerous cephalic cage, and in its parapodial structures. It is known through only 2 genera, *Disomides* Chamberlin (=*Disoma* Oersted) and *Poecilochaetus* Claparède.

Three species of *Poecilochaetus* have been described, one since the excellent studies by Allen (1904, pp. 79-151) on the anatomy of this group. These species are:

Poecilochaetus fulgoris Claparède (1874, p. 9), dredged from the eastern Atlantic, off western France, in 725 fms.

Poecilochaetus serpens Allen (1904, p. 79), from northwestern and southern Europe.

Poecilochaetus tropicus Okuda (1937, p. 294), from the South Sea Islands.

Another member of this genus, *Poecilochaetus johnsoni,* new species, has recently been discovered in southern California, near the mouth of Mission Bay.

Genus POECILOCHAETUS Claparède

Prostomium small, subglobular, with 4 eye spots, with an anteroventrally inserted median antenna, and a trifid nuchal organ. Two extensile, elongate palpi, grooved as in the Spionidae. First segment setigerous, robust, directed anteriorly at sides of prostomium, provided with stout setae that form a cephalic cage (pl. 30, fig. 17), its ventral cirrus greatly enlarged (pl. 30, fig. 18).

Parapodia between segments 7 and 11 have dorsal and ventral cirri that are clavate, with bulbous tips (pl. 30, fig. 16); more posteriorly dorsal and ventral cirri are flattened, foliose (pl. 30, fig. 14). Setae include plumose (pl. 30, fig. 22), pointed serrulate (pl. 30, fig. 21), falcate crotchets (pl. 30, fig. 19), and blunt acicular with a bushy tip (pl. 30, fig. 24).

A key to the species of *Poecilochaetus* Claparède

1. Dorsum conspicuously tubercled . . . . *P. fulgoris*
1. Dorsum smooth or at least not tubercled 2
2. Posterior segments provided with heavy spines that replace the dorsalmost notopodial setae; lateral processes of nuchal organ greatly elongated . . . . *P. serpens*
2. Posterior segments without special spines; lateral processes of nuchal organ reduced in length 3
3. Dorsal and ventral cirri reduced, fingerlike from the twenty-first segment; stout spines in median segments not known . *P. tropicus*
3. Dorsal and ventral cirri continuing large through the median region, the ventral cirri large throughout; median segments with stout, blunt spines in notopodia and neuropodia . . *P. johnsoni* (see below)

Poecilochaetus johnsoni, new species

Plate 30, Figs. 14-24

Long, slender; length to 90 mm or over, width to 4 mm at tenth setigerous segment or widest part. Body depressed, tapering gradually posteriorly, the parapodia strictly lateral. Number of segments 150 or over. Most of the integument is delicately punctate, but appears smooth under low magnification. An area about the mouth and the ventral surface of segments 1 and 2, and part of segment 3, is covered with conical tubercles (pl. 30, fig. 18). They are continued in the mouth and on the bases of the ventral cirri of the first segment. On the mid-dorsum of segment 9 there is a dark, chitinous, diamond-shaped, elevated structure.

The prostomium is subspherical; there are 2 minute eye spots near the posterior margin, and 2 somewhat larger spots near the anterior margin (pl. 30, fig. 17). Anteroventral margin with a median, cylindrical antenna that projects forward between the first pair of setal fascicles. A well-developed nuchal organ arises at the posterior margin of the prostomium, its median elongation extends posteriorly to the sixth segment (preserved), its lateral lobes are less conspicuous swellings (pl. 30, fig. 17). There are 2 very long, grooved palpi inserted at the sides of the prostomium. In life, they extend posteriorly to about the thirty-first segment. They are held parallel to the sides of the body and lie along the dorsum, just within the notopodial ridges. They autotomize on fixation.

The first segment is enlarged, and projects forward, almost surrounding the prostomium. Its dorsal cirrus is a slender, fingerlike projection, its ventral cirrus large, clavate, similar in shape and size to the dorsal cirrus of the second segment. Setal fascicles of the first segment are directed anteriorly and medially (pl. 30, fig. 17).

Segments 2 to 6 resemble one another in general appearance. Each is provided with tapering dorsal and ventral cirri, the dorsal the larger. Segments 2 and 3 have each 3 or 4 (a fifth may be embedded in the parapodium) heavy falcate spines in the neuropodia (pl. 30, figs. 15, 19) in addition to a tiny fascicle of a few, fine, capillary setae (pl. 30, fig. 15).

Segments 7 to 13 have flask-shaped dorsal and ventral cirri; the bases are thickened, the neck is long, slender, and terminates in a knob (pl. 30, fig. 16). The notopodia and neuropodia are similar to one another in size and structure. There is, in each, a fan-shaped fascicle of numerous long, capillary setae and a few (2 or 3) shorter, spinose setae.

From segment 14, posteriorly, the dorsal and ventral cirri again resemble those in anterior segments, but are less attenuated distally. The ventral cirri continue large, the dorsal cirri are about as large as the ventral cirri to segment 25, but gradually become smaller posteriorly.

Setal fascicles are fan shaped in the first 46 segments, forming smooth, arcuate series in both notopodia and neuropodia. From the forty-seventh segment, the setae of the notopodia are arranged in whorls, and inserted just anterior to the origin of the dorsal cirrus. Setae consist of 5 kinds, together with intergrading forms. (1) Slender, capillary setae are present in all segments, in both notopodia and neuropodia, though in the neuropodia of segments 2 and 3 they are few and reduced in size. (2) Spinose setae (pl. 30, fig. 21) occur, in small number, in most segments except the most anterior ones. In the seventh segment there is only 1 (or 2) in a segment, and the spinose region is restricted. By the fourteenth segment the longer, superior and inferiormost capillaries are almost entirely replaced by spinose setae. (3) Plumose setae (pl. 30, fig. 22) are present in the proximal portions of the fascicles in both podia (pl. 30, fig. 14). (4) Stout spines with hirsute tips (pl. 30, fig. 24) are present in segments 22 to 46. There are 3 to 6 in a fascicle, inserted just ventral to the dorsal cirrus and dorsal to the ventral cirrus. They have not been observed in the region where the notopodial fascicles are whorled. (5) Stout falcate hooks (pl. 30, fig. 19) are only in segments 2 and 3.

The last 20 or more segments are short, crowded. The anus is subterminal, bounded along its ventral margin with 3 subequal, clavate cirri, and a median cirrus dorsal to the proximal paired cirri.

Color in life golden brown with greenish yellow, especially in the anterior dorsal region; posterior region darker. Color in alcohol cream or drab yellow.

Poecilochaetus johnsoni inhabits long, tortuous burrows, that are surrounded by a loosely constructed covering of rust-colored sand which crumbles readily. The substratum is black, muddy sand that can be walked on without sinking. It is proximal to the open ocean, but cut off by a low sand spit.

It is a pleasure to dedicate this species to Dr. Martin W. Johnson, of the Scripps Institution of Oceanography at La Jolla, California, who made these collections possible.

Holotype.—AHF no. 22.

Distribution.—Mission Bay, southern California, in the low, intertidal zone.

Systematic discussion.—*Poecilochaetus johnsoni* is distinguishable from other species of this genus as indicated in the key above. It approaches *P. tropicus* Okuda more nearly than other species in general appearance and parapodial structures. Okuda was unable to attribute long, paired palpi to *P. tropicus,* but since these structures autotomize readily, they might have been lost from the specimens when examined. The presence or absence of stout, dorsal hooks in the posterior region has not been ascertained for *P. tropicus,* because of incomplete materials. They are absent in *P. johnsoni.* Another notable difference between these two is in the shape of the parapodial cirri after the twenty-first segment. In *P. tropicus* they are slender, cirriform, in *P. johnsoni* these continue broad, foliose (pl. 30, fig. 14).

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PLATE 29

Figures 1 to 4, *Hesionella mccullochae:* Fig. 1, entire individual in dorsal view, the ventral palpi indicated in dotted lines, x 50; Fig. 2, twenty-fifth parapodium in posterior view, setae indicated, x 220; Fig. 3, an inferior seta from the same parapodium, x 494; Fig. 4, a superior seta from the same parapodium, x 494.

Figures 5 to 13, *Lumbrineris brevicirra:* Fig. 5, limbate seta from second parapodium of an 8-segmented larva, x 494; Fig. 6, hooded hook from the same parapodium, x 494; Fig. 7, anterior end in dorsal view of an 8-segmented larva, the proboscidial armature seen through the body wall, x 50; Fig. 8, outline of entire individual of an 8-segmented larva to indicate length/width proportions, x 24; Fig. 9, a 3-segmented larva with large, yolky mass indicated by stippling, x 50; Fig. 10, an unsegmented early stage, x 50; Fig. 11, mandible from an 8-segmented larva, in dorsal view, x 50; Fig. 12, anterior end, from left side, of adult female with numerous larvae, x 9.5; Fig. 13, same in ventral view, x 9.5.

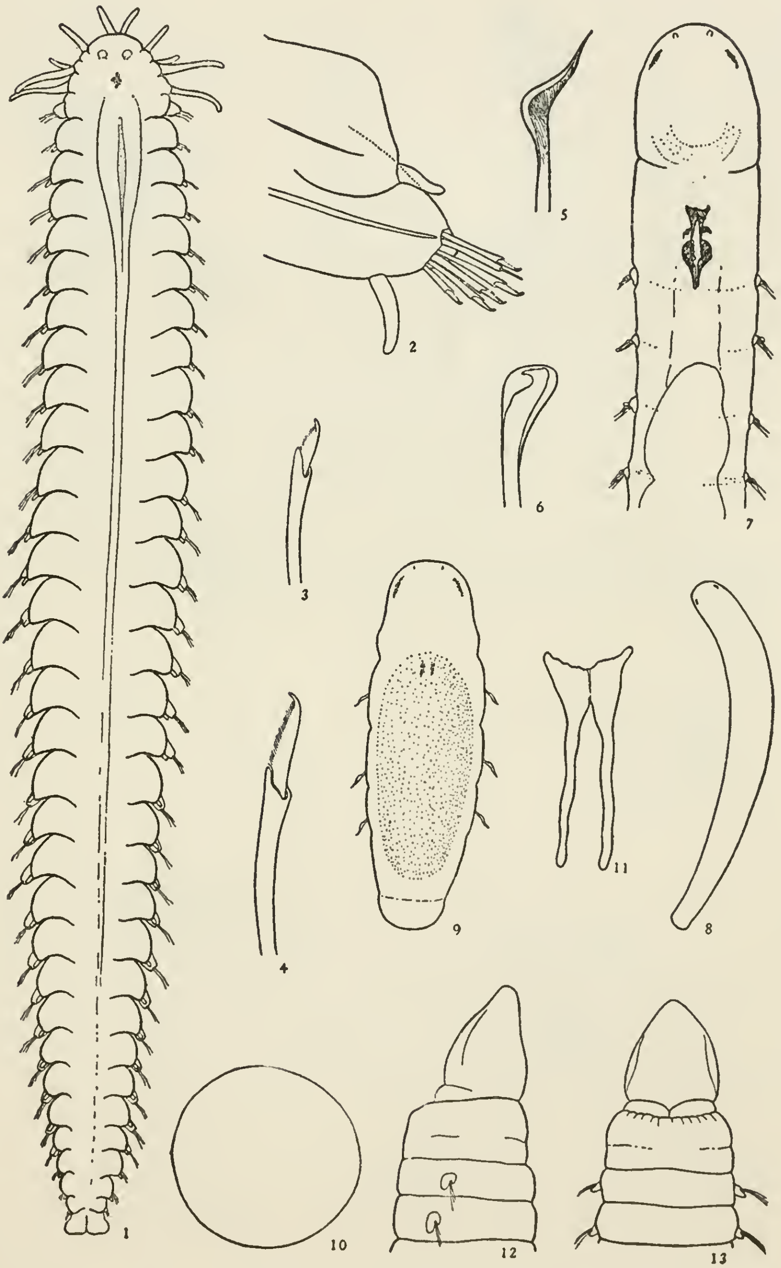
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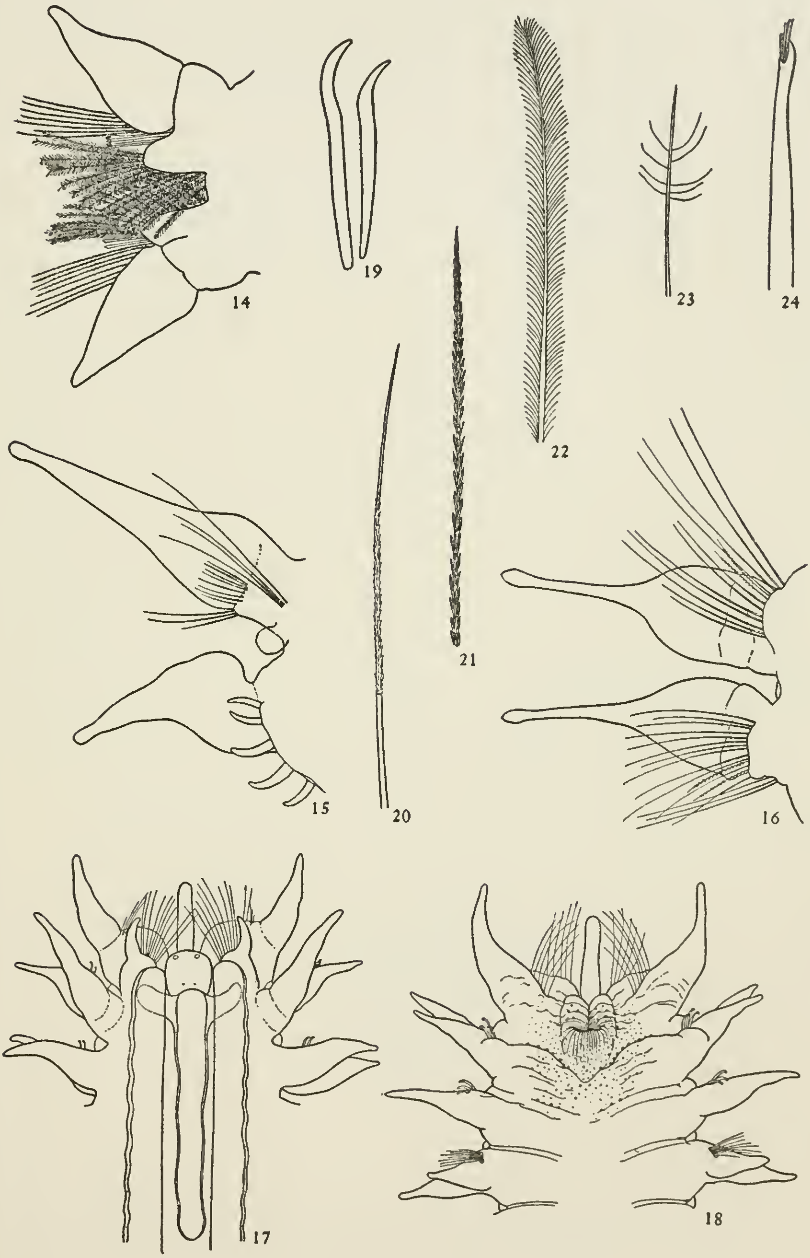
PLATE 30

Figures 14 to 24, *Poecilochaetus johnsoni:* Fig. 14, twenty-fifth parapodium showing distribution of spinose and plumose setae and stout spines, x 32; Fig. 15, second parapodium in anterior view, x 32; Fig. 16, seventh parapodium in anterior view, x 32; Fig. 17, anterior end in dorsal view, the anterior, ventral eyes shown in dotted lines, the long, paired palpi only partly indicated, x 15; Fig. 18, same individual in ventral view, x 15; Fig. 19, two of the 4 stout spines from second parapodium, x 54; Fig. 20, a pilose, notopodial seta from seventh parapodium, x 54; Fig. 21, tip of a spinose seta from twenty-fifth parapodium, x 159; Fig. 22, tip of a plumose seta from same parapodium, x 159; Fig. 23, a shorter, inferior notopodial seta, with algal filaments (?), x 54; Fig. 24, a stout, spine-like seta with distal tuft, from twenty-fifth parapodium, x 159.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ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 7 NUMBER 3

POLYCHAETOUS ANNELIDS

PART II. CHRYSOPETALIDAE TO GONIADIDAE

(PLATES 31-44)

by

OLGA HARTMAN

SMITHSONIAN INSTITUTION
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1940

REPORTS ON THE COLLECTIONS OBTAINED BY ALLAN HANCOCK PACIFIC EXPEDITIONS OF VELERO III OFF THE COAST OF MEXICO, CENTRAL AMERICA, SOUTH AMERICA, AND GALAPAGOS ISLANDS IN 1932, IN 1933, IN 1934, IN 1935, IN 1936, IN 1937, AND IN 1938.

POLYCHAETOUS ANNELIDS

PART II. CHRYSOPETALIDAE TO GONIADIDAE

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POLYCHAETOUS ANNELIDS
Part II. Chrysopetalidae to Goniadidae

(Plates 31-44)

By Olga Hartman

This is the second report on the polychaetous annelids collected by the Allan Hancock Pacific Expeditions from the tropical and subtropical eastern Pacific. It includes the families Chrysopetalidae, Amphinomidae, Euphrosynidae Hesionidae, Stauronereidae, Nereidae, Nephthyidae, Glyceridae, and Goniadidae, in the order named.

A station list, below, includes only those stations of the expeditions which were represented in the families herein considered. Under each are given the species of these families collected.

St. 2-33. Jan. 2, 1933. Tenacatita Bay, Jalisco, Mexico.
Eurythoë complanata (Pallas)

St. 8-33. Jan. 17, 1933. La Libertad, Ecuador. With electric light, at night.
Platynereis polyscalma Chamberlin
Goniada acicula, new species

St. 10-33. Jan. 18, 1933. La Libertad, Ecuador. Rocks south of Pt. St. Elena.
Eurythoë complanata (Pallas)

St. 11-33. Jan. 18, 1933. Same as above. With electric light, at night.
Nereis riisei Grube
Platynereis polyscalma Chamberlin
Pseudonereis gallapagensis Kinberg

St. 12-33. Jan. 19, 1933. Same as above. Dredging along village beach, in 4 fms.
Ceratonereis tentaculata Kinberg
Nereis riisei Grube
Uncinereis agassizi (Ehlers)

St. 13-33. Jan. 19, 1933. Same as above. With electric light, at night.
Eurythoë complanata (Pallas)
Ceratonereis costae (Grube)
Nereis riisei Grube
Platynereis polyscalma Chamberlin

APR 30 1940

St. 16-33. Jan. 20, 1933. Same as above. Rocks south of village.
Pseudonereis gallapagensis Kinberg

St. 19-33. Jan. 21, 1933. Same as above. At Pt. Brava.
Pseudonereis gallapagensis Kinberg

St. 21-33. Jan. 22, 1933. Salango Island, Ecuador.
Nereis paucignatha, new species

St. 22-33. Jan. 22, 1933. La Plata Island, Ecuador.
Eurythoë complanata (Pallas)

St. 27-33. Jan. 25, 1933. Gardner Bay, Hood Island, Galapagos. Rocky pit.
Eurythoë complanata (Pallas)

St. 33-33. Jan. 27, 1933. Black Beach Anchorage, Charles Island, Galapagos. Shore.
Eurythoë complanata (Pallas)

St. 41-33. Jan. 30, 1933. Chatham Island, Galapagos. Dredged east of Wreck Bay, in 4 fms.
Eurythoë complanata (Pallas)

St. 42-33. Jan. 31, 1933. Same as above. Opposite Kicker Rock. Shore.
Eurythoë complanata (Pallas)

St. 48-33. Feb. 2, 1933. Barrington Island. In bay, along shore.
Eurythoë complanata (Pallas)

St. 52-33. Feb. 4, 1933. Academy Bay, Indefatigable Island. Shore.
Eurythoë complanata (Pallas)

St. 59-33. Feb. 6, 1933. Charles Island, Cormorant Bay. Dredged, in 13 fms.
Hesione intertexta Grube

St. 66-33. Feb. 9, 1933. Albemarle Island, Tagus Cove. Dredged, in 10-20 fms.
Uncinereis agassizi (Ehlers)

St. 69-33. Feb. 11, 1933. Albemarle Island, Albemarle Pt. Shore.
Eurythoë complanata (Pallas)

St. 73-33. Feb. 13, 1933. Albemarle Island, Cartago Bay. North Beach.
Eurythoë complanata (Pallas)

St. 74-33. Feb. 14, 1933. Same as above. Dredged, in 3-6 fms.
Eurythoë complanata (Pallas)

St. 94-33. Feb. 22, 1933. Tower Island, Darwin Bay. Coral, from seal beach.
Eurythoë complanata (Pallas)

St. 96-33. Feb. 24, 1933. Same as above.
Eurythoë complanata (Pallas)

St. 99-33. Feb. 25, 1933. Tower Island, Darwin Bay. In tangles.
Nereis riisei Grube

St. 101-33. Feb. 26, 1933. Same as above. Seal beach, on shore.
Eurythoë complanata (Pallas)

St. 114-33. Mar. 10, 1933. Bahia Honda, Panama. Near East Point. In coral, from 2 fms.
Eurythoë complanata (Pallas)
Pherecardia striata (Kinberg)
Ceratonereis tentaculata Kinberg

St. 116-33. Mar. 13, 1933. Puerto Culebra, Costa Rica. Cocos Bay. Dredged, in 2 fms.
Eurythoë complanata (Pallas)
Glycinde multidens F. Müller

St. 120-33. Mar. 17, 1933. Petatlan Bay, Guerrero, Mexico. Shore.
Nereis riisei Grube

St. 124-33. Mar. 19, 1933. Isabel Island, Sinaloa, Mexico. Shore.
Eurythoë complanata (Pallas)

St. 126-33. Mar. 21, 1933. Santa Maria Bay, Lower California, Mexico. Dredged, in 0-25 fms.
Paleanotus chrysolepis Schmarda

St. 127-33. Mar. 21, 1933. Same as above. Shore.
Nereis callaona Grube

St. 132-34. Jan. 4, 1934. Braithwaite Bay, Socorro Island, Mexico. Dredged, in 40 fms. Rock, nullipore fragments.
Nereis riisei Grube
Glycera tesselata Grube

St. 134-34. Jan. 5, 1934. Sulphur Bay, Clarion Island, Mexico. Dredged, in 14 fms. Rocks, with nullipore fragments.
Eurythoë complanata (Pallas)
Hesione intertexta Grube

St. 146-34. Jan. 12, 1934. Albemarle Island, north end. Shore collecting south of point.
Eurythoë complanata (Pallas)
Pherecardia striata (Kinberg)

St. 148-34. Jan. 13, 1934. Tagus Cove, Albemarle Island. Dredged, in 12-15 fms.
Hesione intertexta Grube
Nereis riisei Grube
Uncinereis agassizi (Ehlers)

St. 154-34. Jan. 15, 1934. Albemarle Island, Tagus Cove. Reef, north of hill. Shore.
Pseudonereis gallapagensis Kinberg

St. 161-34. Jan. 17, 1934. Charles Island, Galapagos. Taylor Rock. Dredged, in 0-3 fms.
Chloeia viridis Schmarda
Eurythoë complanata (Pallas)
Notopygos ornata Grube

St. 163-34. Jan. 18, 1934. Same as above. Black Beach, shore.
Eurythoë complanata (Pallas)

St. 167-34. Jan. 19, 1934. Same as above. Post Office Bay. Dredged, in 15 fms. Rock.
Hesione intertexta Grube

St. 169-34. Jan. 20, 1934. Indefatigable Island, Academy Bay. Dredged. Rock, mostly covered with algae.
Hesione intertexta Grube
Uncinereis agassizi (Ehlers)

St. 173-34. Jan. 22, 1934. South Seymour Island, Velero Bay. Dredged, in 5 fms. Sand, with rock patches.
Glycinde multidens F. Müller

St. 177-34. Jan. 23, 1934. Sulivan Bay, James Island, Galapagos. Dredged, in 5-20 fms. Rock, with sand patches.
Chloeia viridis Schmarda
Uncinereis agassizi (Ehlers)

St. 182-34. Jan. 24, 1934. James Bay, James Island, Galapagos. Dredged, in 30 fms. Coarse sand.
Chloeia viridis Schmarda
Uncinereis agassizi (Ehlers)

St. 185-34. Jan. 25, 1934. Albemarle Island, Cartago Bay. 2 miles from white rock. Dredged, in 32 fms. Mud.
Nephthys dibranchis Grube

St. 187-34. Jan. 25, 1934. Same as above. Southwest part of bay. Dredged, in 8-10 fms. Sand, with occasional rock patches.
Nephthys dibranchis Grube

St. 193-34. Jan. 27, 1934. Charles Island, Post Office Bay. Dredged, in 8-10 fms. Sand and rock, with algae.
Uncinereis agassizi (Ehlers)

St. 194-34. Jan. 27, 1934. Same as above. Onslow Island. Coral, inside crater.
Eurythoë complanata (Pallas)

St. 196-34. Jan. 29, 1934. Charles Island, north of island. Dredged, in 8-10 fms. Rough rock.
Chloeia viridis Schmarda
Eurythoë complanata (Pallas)

St. 197-34. Jan. 29, 1934. Same as above. Dredged off point, in 35-40 fms. Rocky.
Ceratonereis tentaculata Kinberg

St. 198-34. Jan. 29, 1934. Same as above. Dredged, in 55-65 fms. Sand.
Chloeia viridis Schmarda

St. 202-34. Jan. 31, 1934. Gardner Bay, Hood Island. Osborn Island, shore.
Chloeia viridis Schmarda
Notopygos ornata Grube

St. 204a-34. Feb. 8, 1934. Albemarle Island, Tagus Cove. From fish trap.
Chloeia viridis Schmarda

St. 209-34. Feb. 9, 1934. La Libertad, Ecuador. North of Pt. St. Elena. Dredged, in 8-10 fms. Rock, with large shells and gorgonids.
Ceratonereis costae (Grube)

St. 210-34. Feb. 9, 1934. Same as above. Between La Libertad and Salinas. Dredged, in 7-10 fms. Rock, with large shells and gorgonids.
Ceratonereis tentaculata Kinberg

St. 210a-34. Feb. 9, 1934. Same as above. From fish trap.
Chloeia viridis Schmarda

St. 213-34. Feb. 10, 1934. La Plata Island, Ecuador. North of anchorage. Dredged, in 7-10 fms. Rocky, with nullipores.
Chloeia entypa Chamberlin
Hesione intertexta Grube
Nephthys dibranchis Grube

St. 218-34. Feb. 12, 1934. Gorgona Island, Colombia. North end of island, shore.
Eurythoë complanata (Pallas)

St. 234-34. Feb. 14, 1934. Port Utria, Colombia. West side of terminal island. Dredged, in 20 fms. Sand and shells.
Uncinereis agassizi (Ehlers)

St. 244-34. Feb. 21, 1934. Bahia Honda, Panama. Medidor and Pacora islands. Dredged, in 30-35 fms. Fine shell, mud, coarse sand.
Chloeia entypa Chamberlin

St. 247-34. Feb. 21, 1934. Same as above. Porites coral.
Notopygos ornata Grube
Pherecardia striata (Kinberg)

St. 248-34. Feb. 22, 1934. Same as above. Off south point of bay. Dredged, in 25-30 fms. Mud and shell.
Chloeia viridis Schmarda
Glycera americana Leidy

St. 250-34. Feb. 22, 1934. Secas Islands, Panama. Dredged, south of islands, in 25 fms. Mud and dead shells.
Chloeia viridis Schmarda
Nephthys dibranchis Grube

St. 259-34. Feb. 28, 1934. Tangola-Tangola, Mexico. Santa Cruz. Dredged, in 15-20 fms. Sand, gravel, shells, mud.
Nephthys magellanica Augener

St. 260-34. Mar. 1, 1934. Same as above. Tangola Island. Shore.
Nereis pseudoneanthes Hartman
Pseudonereis gallapagensis Kinberg

St. 274-34. Mar. 4, 1934. Tenacatita Bay, Mexico. Dredged, in 50 fms. Muddy sand.
Chloeia viridis Schmarda

St. 277-34. Mar. 5, 1934. Isabel Island, Mexico. Dredged, around island, in 10-25 fms. Nullipores.
Chloeia viridis Schmarda
Ceratonereis tentaculata Kinberg

St. 279-34. Mar. 7, 1934. Santa Maria Bay, Lower California. Hughes Point. Dredged, in 10 fms. Rough, rocky.
Chloeia viridis Schmarda
Nephthys magellanica Augener

St. 280-34. Mar. 7, 1934. Same as above. South of Hughes Point. Dredged, in 30-40 fms. Sand.
Chloeia viridis Schmarda
Glycera americana Leidy

St. 283-34. Mar. 9, 1934. Thurloe Bay, Lower California. Off Thurloe Point. Dredged, in 8-10 fms. Rock with gorgonids.
Nereis pelagica Linnaeus
Uncinereis agassizi (Ehlers)
Glycera tesselata Grube

St. 284-34. Mar. 9, 1934. Same as above. Northwest of Thurloe Point. Dredged, in 30 fms. Coarse sand.
Nephthys californiensis Hartman

St. 285-34. Mar. 9, 1934. Same as above. Dredged, in 30 fms. Shells.
Nephthys magellanica Augener
Glycera tesselata Grube

St. 288-34. Mar. 10, 1934. South Bay, Carros Island. Shore.
Nereis pseudoneanthes Hartman

St. 289-34. June 8, 1934. Socorro Island, Mexico. East of Cape Rule. Dredged, in 4-15 fms.
Hesione intertexta Grube

St. 305-34. June 11, 1934. Clarion Island, Mexico. South of anchorage. Dredged, in 15 fms.
Leocrates chinensis Kinberg

St. 310-34. Dec. 3, 1934. Marchena Island, Galapagos. North Bay. Tangles, in 15 fms.
Hesione intertexta Grube

St. 315-34. Dec. 8, 1934. Indefatigable Island. In coral, opposite Gordon rocks.
Eurythoë complanata (Pallas)

St. 326-34. Dec. 10, 1934. Albemarle Island, Tagus Cove, south side. Dredged, in 15 fms.
Nereis pseudonereis, new species

St. 336-34. Dec. 12, 1934. James Island, Sulivan Bay. Dredged, in 20 fms. Red algae.
Hesione intertexta Grube

St. 357-34. Dec. 17, 1934. Hood Island, Galapagos. In coral.
Eurythoë complanata (Pallas)

St. 364-35. Jan. 10, 1935. Callao, Peru. Parallel with Lorenzo Island. Dredged, in 3 fms.
Nereis pseudonereis, new species
Uncinereis agassizi (Ehlers)

St. 366-35. Jan. 10, 1935. Callao, Peru. Between rocks south of Lorenzo Island. Dredged, in 8 fms.
Hesione simplex Grube

St. 373-35. Jan. 12, 1935. Independencia Bay, Peru. East of Vieja Island. Dredged, in 12 fms.
Nereis veleronis, new species

St. 374-35. Jan. 12, 1935. Same as above.
Nereis pseudonereis, new species

St. 375-35. Jan. 13, 1935. Independencia Bay, Peru. Lee side of Vieja Island. Shore.
Hesione intertexta Grube

St. 376-35. Jan. 13, 1935. Same as above. Dredged, in 7 fms.
Glycera papillosa Grube

St. 379-35. Jan. 13, 1935. Same as above. Dredged, in 20 fms.
Nephthys caecoides ferruginea, new subspecies
Glycera americana Leidy

St. 380-35. Jan. 14, 1935. Same as above. East side of bay. Shore.
Pseudonereis gallapagensis Kinberg
Glycera americana Leidy

St. 381-35. Jan. 14, 1935. Same as above. East side of bay, off black cliff. Dredged, in 5 fms.
Glycera americana Leidy

St. 384-35. Jan. 14, 1935. Same as above, ¾ mi. offshore. Dredged, in 5 fms.
Nereis pseudonereis, new species
Nereis veleronis, new species
Uncinereis agassizi (Ehlers)

St. 385-35. Same as above, 1¼ mi. offshore. Dredged, in 9-10 fms. Red algae and gastropods.
Nereis veleronis, new species

St. 391-35. Jan. 17, 1935. Lobos de Afuera, Peru. Main island, with light. Shore, with rocks.
Eurythoë complanata (Pallas)
Uncinereis agassizi (Ehlers)

St. 395-35. Jan. 17, 1935. Same as above. South bay. Dredged, in 14-16 fms.
Nereis veleronis, new species
Uncinereis agassizi (Ehlers)

St. 405-35. Jan. 22, 1935. Gorgona Island, Colombia. Shore, below sandy beach.
Eurythoë complanata (Pallas)

St. 412-35. Jan. 22, 1935. Same as above. In coral, off coconut beach.
Eurythoë complanata (Pallas)
Notopygos ornata Grube
Euphrosyne panamica Chamberlin

St. 413-35. Jan. 23, 1935. Port Utria, Colombia. Lee beach of island. Shore.
Eurythoë complanata (Pallas)

St. 421-35. Jan. 25, 1935. Same as above. Dredged, in 40 fms. Soft mud.
Nephthys dibranchis Grube

St. 431-35. Jan. 27, 1935. Octavia Bay, Colombia. North of Octavia, south end of channel. Dredged, in 45 fms. Sand and gravel.
Chloeia entypa Chamberlin

St. 433-35. Jan. 27, 1935. Same as above. Island off peninsula. Shore, rock shingle.
Eurythoë complanata (Pallas)

St. 436-35. Jan. 28, 1935. Piñas Bay, Panama. Shore.
Euphrosyne panamica Chamberlin
Nephthys dibranchis Grube

St. 438-35. Jan. 29, 1935. Piñas Bay, Panama. North of first small island. Dredged, in 25 fms. Coarse sand.
Nephthys magellanica Augener

St. 439-35. Jan. 29, 1935. Same as above. Dredged, in 20 fms. Mud and sand.
Euphrosyne aurantiaca Johnson

St. 443-35. Jan. 29, 1935. Same as above. N.N.E. of Pt. Isle. Dredged, in 20 fms. Mud.
Chloeia viridis Schmarda

St. 445-35. Feb. 2, 1935. Panama. Shore.
Nereis riisei Grube

St. 446-35. Feb. 4, 1935. Secas Islands, Panama. Small grass-covered island, with reef. Shore.
Eurythoë complanata (Pallas)
Euphrosyne panamica Chamberlin

St. 446b-35. Feb. 4, 1935. Same as above. Main island south of anchorage. Shore.
Eurythoë complanata (Pallas)
Notopygos ornata Grube

St. 447-35. Feb. 4, 1935. Same as above. Large open cove on main island. In coral.
Eurythoë complanata (Pallas)
Notopygos ornata Grube
Pherecardia striata (Kinberg)

St. 451-35. Feb. 5, 1935. Same as above. Toward anchorage from small island. Dredged, in 12 fms.
Nephthys panamensis Monro

St. 454-35. Feb. 6, 1935. Same as above. Coral tide flat. Shore.
Pherecardia striata (Kinberg)

St. 456-35. Feb. 6, 1935. Same as above. Dredged, in 12 fms.
Nephthys magellanica Augener

St. 463-35. Feb. 8, 1935. Playa Blanca, Costa Rica. Off southeast point. Dredged, in 25 fms. Broken shells. Little life.
Glycera tesselata Grube

St. 465-35. Feb. 8, 1935. Same as above. Shale outcrop between beach and rocky reef. Shore.
Eurythoë complanata (Pallas)

St. 466-35. Feb. 9, 1935. Parker Bay, Costa Rica. Small island at north shore.
Eurythoë complanata (Pallas)

St. 473-35. Feb. 9, 1935. Same as above. In coral.
Notopygos ornata Grube

St. 477-35. Feb. 11, 1935. Salinas Bay, Costa Rica. Lee side of island, toward sand spit. Dredged, in 2 fms.
Glycinde multidens F. Müller

St. 481-35. Feb. 11, 1935. Same as above. Off end of island, toward rock to west. Dredged, in 6 fms.
Chloeia viridis Schmarda

St. 492-36. Feb. 16, 1936. Pt. Tosco, Lower California. Dredged, in 45 fms. Green mud.
Nephthys caecoides ferruginea, new subspecies
Nephthys dibranchis Grube
Glycera americana Leidy

St. 495-36. Feb. 18, 1936. East of Cape San Lucas, Lower California. Dredged, in 10-15 fms. Sand.
Chloeia viridis Schmarda
Nereis riisei Grube
Platynereis polyscalma Chamberlin
Uncinereis agassizi (Ehlers)
Nephthys assimilis (Oersted)

St. 498-36. Feb. 19, 1936. San Lorenzo Channel, south of Espiritu Santo Island, Gulf of California. Dredged, in 5-15 fms. Coralline algae.
Eurythoë complanata (Pallas)
Ceratonereis tentaculata Kinberg
Nereis riisei Grube

St. 499-36. Feb. 19, 1936. Same as above. In sand.
Nephthys panamensis Monro
Glycera americana Leidy
Goniada acicula, new species

St. 500-36. Feb. 20, 1936. Espiritu Santo Island, Gulf of California. Sand and rock beach opposite anchorage. Shore.
Eurythoë complanata (Pallas)

St. 501-36. Feb. 20, 1936. Same as above. In coral heads, in 1-6 fms.
Eurythoë complanata (Pallas)

St. 503-36. Feb. 21, 1936. La Paz Bay, Gulf of California. Off lighthouse. In corallines, in 5 fms.
Hesione intertexta Grube
Platynereis polyscalma Chamberlin

St. 510-36. Feb. 22, 1936. Espiritu Santo Island, Gulf of California. Cove south of Ballena Bay. Shore.
Eurythoë complanata (Pallas)

St. 513-36. Feb. 24, 1936. Off San Francisco Island, Gulf of California. Dredged, in 30 fms. Corallines.
Chloeia viridis Schmarda
Nephthys dibranchis Grube

St. 516-36. Feb. 25, 1936. East of San Francisco Island, Gulf of California. Dredged, in 120-150 fms.
Chloeia viridis Schmarda

St. 518-36. Feb. 25, 1936. North bay of San Francisco Island, Gulf of California. Shore.
Eurythoë complanata (Pallas)

St. 525-36. Feb. 28, 1936. Channel west of Coronados Island, Gulf of California. Dredged, in 3-10 fms. Corallines.
Ceratonereis tentaculata Kinberg

St. 530-36. Mar. 1, 1936. Off San Francisquito Bay, Gulf of California. Dredged, in 10-20 fms. Coral, kelp, nullipores.
Uncinereis agassizi (Ehlers)
Nephthys magellanica Augener
Glycera tesselata Grube

St. 532-36. Mar. 2, 1936. Same as above. Dredged, in 20 fms. Sand and kelp.
Uncinereis agassizi (Ehlers)

St. 533-36. Mar. 2, 1936. Same as above. Dredged, in 40 fms. Broken shell, sand.
Notopygos ornata Grube
Nephthys magellanica Augener
Glycera tesselata Grube

St. 536-36. Mar. 2, 1936. Middle of Angeles Bay, Gulf of California. Dredged, in 20 fms. Mud.
Chloeia viridis Schmarda

St. 545-36. Mar. 4, 1936. In Puerto Refugio, Angel de la Guardia Island, Gulf of California. Dredged, in 60 fms. Broken shell.
Eurythoë complanata (Pallas)

St. 546-36. Mar. 5, 1936. North of Angel de la Guardia Island. Dredged, in 40-70 fms.
Chloeia viridis Schmarda
Nephthys squamosa Ehlers

St. 549-36. Mar. 6, 1936. East of Angel de la Guardia Island. Dredged, in 40 fms.
Notopygos ornata Grube
Ceratonereis tentaculata Kinberg
Uncinereis agassizi (Ehlers)
Nephthys magellanica Augener
Glycera tesselata Grube
Goniada acicula, new species

St. 558-36. Mar. 9, 1936. Off Isla Partida to the south. Dredged, in 20 fms. Gravel and shell.
Chloeia viridis Schmarda

St. 559-36. Mar. 9, 1936. Off Isla Partida to the south. Dredged, in 45 fms. Sand.
Euphrosyne bicirrata Moore
Nephthys magellanica Augener
Glycera tesselata Grube

St. 561-36. Mar. 9, 1936. South of Isla Partida to the south. Dredged, in 40 fms. Coral, sand.
Chloeia viridis Schmarda
Glycera tesselata Grube

St. 563-36. Mar. 10, 1936. South end of Tiburon Island, Gulf of California. Dredged, in 40-55 fms. Muddy sand.
Chloeia viridis Schmarda
Uncinereis agassizi (Ehlers)

St. 567-36. Mar. 11, 1936. Bay, south end of Tiburon Island. Dredged, in 4 fms. Ulva and sand.
?*Uncinereis agassizi* (Ehlers)

St. 576-36. Mar. 13, 1936. Between anchorage and Tortuga Island, south end, Gulf of California. Dredged, in 21 fms. Volcanic sand.
Chloeia viridis Schmarda
Hesione intertexta Grube

St. 577-36. Mar. 13, 1936. Off south end of Tortuga Island. Dredged, in 40 fms. Sand.
Nephthys magellanica Augener

St. 585-36. Mar. 14, 1936. Concepcion Bay, Gulf of California. Coyote Bay. Dredged, in 2-3 fms. Kelp.
Hesione intertexta Grube

St. 607-36. Mar. 21, 1936. San Lorenzo Channel, Espiritu Santo Island, Gulf of California. Dredged, in 24 fms. Corallines.
Ceratonereis tentaculata Kinberg

St. 610-37. Feb. 15, 1937. Santa Rosalia Bay, Gulf of California. Dredged, in 15 fms. Sand, kelp.
Uncinereis agassizi (Ehlers)

St. 616-37. Mar. 2, 1937. San Juanico Bay, Gulf of California. Dredged, in 16 fms. Kelp and rock.
Nephthys caccoides Hartman

St. 620-37. Mar. 3, 1937. Cabeza Ballena, east of Cape San Lucas, Gulf of California. Dredged, in 25 fms.

Nephthys magellanica Augener

St. 622-37. Mar. 3, 1937. Same as above. With electric light, at night.

Platynereis polyscalma Chamberlin

St. 623-37. Mar. 4, 1937. Same as above. Shore.

Eurythoë complanata (Pallas)

St. 626-37. Mar. 5, 1937. Ensenada de la Muertos, Gulf of California. Shore.

Eurythoë complanata (Pallas)

St. 627-37. Mar. 5, 1937. Same as above. Dredged, in 5 fms. Sand.

Chloeia viridis Schmarda
Hesione intertexta Grube

St. 628-37. Mar. 5, 1937. Same as above. Dredged, in 10-12 fms. Corallines.

Nephthys magellanica Augener

St. 632-37. Mar. 6, 1937. San Gabriel Bay, Espiritu Santo Island, Gulf of California. Dredged, in 24 fms. Sandy mud.

Nephthys squamosa Ehlers
Glycera americana Leidy

St. 633-37. Mar. 6, 1937. Same as above. Dredged, in 18 fms. Corallines.

Eurythoë complanata (Pallas)
Leocrates chinensis Kinberg
Ceratonereis tentaculata Kinberg
Nereis riisei Grube
Nephthys inermis Ehlers

St. 634-37. Mar. 6, 1937. Same as above. Shore, corals.

Eurythoë complanata (Pallas)
Ceratonereis tentaculata Kinberg

St. 638-37. Mar. 7, 1937. Same as above. Shore, corals.

Eurythoë complanata (Pallas)
Ceratonereis tentaculata Kinberg

St. 639-37. Mar. 7, 1937. San Lorenzo Channel, Espiritu Santo Island. Dredged, in 3-5 fms. Sand, algae, corallines.

Ceratonereis tentaculata Kinberg
Platynereis polyscalma Chamberlin

St. 643-37. Mar. 8, 1937. Off Ballena Bay, Espiritu Santo Island. Dredged, in 8 fms. Corallines.
Nereis riisei Grube

St. 661-37. Mar. 10, 1937. Agua Verde Bay, Gulf of California. Anchorage. With electric light, at night.
Chloeia viridis Schmarda

St. 662-37. Mar. 11, 1937. Same as above. Off San Marcial reef. Dredged, in 8 fms.
Chloeia viridis Schmarda
Ceratonereis tentaculata Kinberg
Nephthys magellanica Augener

St. 664-37. Mar. 11, 1937. Same as above. San Marcial reef. Shore.
Eurythoë complanata (Pallas)

St. 667-37. Mar. 12, 1937. Escondido Bay, Gulf of California. Off Carmen Island. Dredged, in 60 fms.
Chloeia viridis Schmarda
Nephthys dibranchis Grube

St. 668-37. Mar. 12, 1937. Same as above. Dredged, in 20 fms. Mud and sand.
Chloeia viridis Schmarda
Nephthys dibranchis Grube

St. 669-37. Mar. 12, 1937. Same as above. Off Danzante. Dredged, in 34 fms.
Nephthys squamosa Ehlers

St. 675-37. Mar. 15, 1937. Off Pulpito Rock, Gulf of California. Dredged, in 55 fms. Sand, small rocks.
Chloeia viridis Schmarda
Nereis pelagica Linnaeus
Nephthys magellanica Augener

St. 677-37. Mar. 15, 1937. Ildefonso Island, Gulf of California. Dredged, in 50 fms.
Chloeia viridis Schmarda
Nephthys magellanica Augener

St. 683-37. Mar. 15, 1937. Outside Concepcion Bay, Gulf of California. Dredged, in 12 fms. Corallines.
Ceratonereis tentaculata Kinberg
Uncinereis agassizi (Ehlers)

St. 688-37. Mar. 16, 1937. Concepcion Bay. Dredged, in 12 fms. Sand and mud.
Hesione intertexta Grube
Ceratonereis tentaculata Kinberg
Glycera americana Leidy

St. 692-37. Mar. 17, 1937. Tortuga Island, Gulf of California. Dredged, in 18 fms.
Chloeia viridis Schmarda
Nephthys magellanica Augener

St. 696-37. Mar. 18, 1937. Same as above. Dredged, in 45 fms. Sand.
Nephthys magellanica Augener
Glycera tesselata Grube

St. 701-37. Mar. 20, 1937. Angeles Bay, Gulf of California. Dredged, in 32 fms. Sand and shell.
Chloeia viridis Schmarda

St. 702-37. Mar. 20, 1937. Same as above. Dredged, in 18 fms. Coarse sand.
Ceratonereis costae (Grube)
Nephthys magellanica Augener

St. 704-37. Mar. 20, 1937. Puerto Refugio, Angel de la Guardia Island, Gulf of California. Dredged, in 20 fms. Corallines.
Glycera tesselata Grube

St. 705-37. Mar. 20, 1937. Same as above. Dredged, in 15 fms. Coarse sand.
Nephthys magellanica Augener

St. 706-37. Mar. 20, 1937. Same as above. Dredged, in 8-10 fms. Ulva.
Uncinereis agassizi (Ehlers)
Nephthys magellanica Augener

St. 707-37. Mar. 20, 1937. Same as above. Shore. Rocky.
Eurythoë complanata (Pallas)

St. 708-37. Mar. 21, 1937. Same as above. Dredged, in 60 fms. Sand.
Eurythoë complanata (Pallas)

St. 711-37. Mar. 21, 1937. Same as above. Dredged, in 40 fms. Sand.
Chloeia viridis Schmarda

St. 714-37. Mar. 23, 1937. Willards Point, Gonzaga Bay, Gulf of California. Dredged, in 16-30 fms. Rock, mud.
Chloeia viridis Schmarda

St. 719-37. Mar. 24, 1937. Consag Rock, Gulf of California. Dredged, in 10-25 fms.
Hesione intertexta Grube

St. 725-37. Mar. 26, 1937. North of Lobos Point, Sonora, Mexico. Dredged, in 10 fms. Sand.
Chloeia viridis Schmarda
Nephthys magellanica Augener

St. 728-37. Mar. 27, 1937. San Esteban Island, Gulf of California. Shore, rocky.
Leptonereis glauca moniloceras, new subspecies
Nereis flavipes Ehlers

St. 732-37. Mar. 28, 1937. Tiburon Island, Gulf of California. Dredged, in 12 fms.
Nephthys magellanica Augener
Glycera tesselata Grube

St. 733-37. Mar. 29, 1937. San Pedro Nolasco Island, Gulf of California. Dredged, in 45 fms. Rock, sand.
Glycera tesselata Grube

St. 734-37. Mar. 29, 1937. Same as above. Dredged, in 75 fms. Sand.
Chloeia viridis Schmarda
Nephthys magellanica Augener

St. 735-37. Mar. 29, 1937. Same as above. Dredged, in 110 fms. Sand.
Nephthys squamosa Ehlers

St. 739-37. Mar. 30, 1937. Ensenada de San Francisco, Sonora, Mexico. Shore. Rock shingles.
Eurythoë complanata (Pallas)

St. 740-37. Mar. 31, 1937. San Ignacio Bay, Sinaloa, Mexico. Dredged, in 3-5 fms. Sand.
Glycera americana Leidy

St. 745-37. Apr. 2, 1937. Isabel Island, Sinaloa, Mexico. Dredged, in 10-18 fms. Corallines, nullipores.
Hesione intertexta Grube
Glycera tesselata Grube

St. 746-37. Apr. 2, 1937. Same as above. West of anchorage. Shore. Corallines.
Eurythoë complanata (Pallas)

St. 747-37. Apr. 2, 1937. Same as above. Dredged, in 10-18 fms. Corallines.
Nephthys magellanica Augener

St. 751-37. Apr. 4, 1937. Los Frailes, Lower California. Dredged, in 5-15 fms. Sand and algae.
Chloeia viridis Schmarda

St. 770-38. Jan. 5, 1938. Off San Jose Light, Guatemala. Dredged, in 7-11 fms. Black sand, shell, mud.
Nephthys dibranchis Grube
Nephthys assimilis Oersted
Glycera convoluta Keferstein

St. 779-38. Jan. 14, 1938. Off Nuez Island, Cocos Island, Costa Rica. Dredged, in 30-50 fms. Rock, coral and corallines.
Chloeia viridis Schmarda

St. 782-38. Jan. 16, 1938. Darwin Bay, Tower Island, Galapagos. Shore. Rock, at Seal Beach.
Eurythoë complanata (Pallas)

St. 783-38. Jan. 16, 1938. Same as above. Dredged, in 40-70 fms. White sand, rock.
Notopygos ornata Grube

St. 784-38. Jan. 17, 1938. Same as above. Shore. Rock, at Middle Beach.
Eurythoë complanata (Pallas)

St. 786-38. Jan. 18, 1938. Northeast of Indefatigable Island. Dredged, in 392 fms. Sand.
?*Glycera oxycephala* Ehlers

St. 788-38. Jan. 19, 1938. South and east of Daphne Major Island, Galapagos. Dredged, in 55 fms. Coral, shell.
Nereis riisei Grube

St. 789-38. Jan. 19, 1938. South Seymour Island, Galapagos. Shore. Rocky.
Eurythoë complanata (Pallas)

St. 796-38. Jan. 21, 1938. Sulivan Bay, James Island, Galapagos. Shore. Rocky.
Eurythoë complanata (Pallas)

St. 811-38. Jan. 26, 1938. Barrington Island, Galapagos. In coral.
Eurythoë complanata (Pallas)
Hesione intertexta Grube

St. 814-38. Jan. 28, 1938. North of Hood Island, Galapagos. Dredged, in 20-40 fms. Sand, shell.
Chloeia viridis Schmarda

St. 820-38. Feb. 6, 1938. San Nicholas Bay, Peru. Dredged, in 10-25 fms. Mud.
Nephthys caecoides ferruginea, new subspecies

St. 823-38. Feb. 7, 1938. San Juan Bay, Peru. Dredged, in 30-40 fms. Mud.
Nephthys caecoides ferruginea, new subspecies

St. 826-38. Feb. 7, 1938. Same as above. Dredged, in 20-30 fms. Sand, shell.
Nephthys lobophora, new species
Glycera americana Leidy

St. 832-38. Feb. 10, 1938. Independencia Bay, Peru. Dredged, in 10 fms. Shells, sand, algae.
Nephthys lobophora, new species

St. 833-38. Feb. 10, 1938. Same as above. Off north entrance. Dredged, in 8 fms. Sand, shell.
Nephthys magellanica Augener
Glycera americana Leidy

St. 834-38. Feb. 10, 1938. Same as above. Off east rocky point. Dredged, in 21 fms. Mud.
Nephthys caecoides ferruginea, new subspecies

St. 835-38. Feb. 10, 1938. Same as above. South end. Dredged, in 18 fms. Sand, shell, rock.
Glycera americana Leidy

St. 837-38. Feb. 11, 1938. North Chincha Island, Peru. Shore. Rocky.
Pseudonereis gallapagensis Kinberg

St. 843-38. Feb. 14, 1938. Lobos de Afuera Island, Peru. Dredged, in 25-30 fms. Sand, shell.
Uncinereis agassizi (Ehlers)
?*Nephthys magellanica* Augener
Glycera americana Leidy

St. 844-38. Feb. 14, 1938. Same as above. Shore. Rocky.
Eurythoë complanata (Pallas)

St. 845-38. Feb. 15, 1938. Sechura Bay, Peru. Dredged, in 9½ fms. Coarse sand, red algae.
Uncinereis agassizi (Ehlers)
Nephthys magellanica Augener

St. 846-38. Feb. 15, 1938. Same as above. Dredged, in 6 fms. Sand and fine broken shell.
Hemipodus simplex (Grube)

St. 855-38. Feb. 24, 1938. Gorgona Island, Colombia. North of island. Dredged, in 10-20 fms. Mud, rocks.
Chloeia entypa Chamberlin

St. 856-38. Feb. 25, 1938. Port Utria, Choco, Colombia. Dredged, in 15-30 fms. Mud, sand.
Nephthys squamosa Ehlers

St. 863-38. Mar. 1, 1938. Bahia Honda, Panama. Off north island. Dredged, in 30-50 fms. Rock, sand.
Nephthys inermis Ehlers
Glycera tesselata Grube

St. 867-38. Mar. 2, 1938. Secas Islands, Panama. Shore. Coral.
Eurythoë complanata (Pallas)
Pherecardia striata (Kinberg)

St. 870-38. Mar. 8, 1938. Isabel Island, Mexico. Dredged, in 10-15 fms. Corallines.
Nephthys magellanica Augener

St. 871-38. Mar. 11, 1938. 4¾ miles east of Coronados Island, Mexico. Dredged, in 14 fms. Sand, kelp.
Nephthys californiensis Hartman

St. 874-38. Aug. 1, 1938. Northeast of Anacapa Island, California. Dredged, in 45 fms. Dead shell.
Euphrosyne aurantiaca Johnson
Nereis pelagica Linnaeus

St. 876-38. Aug. 1, 1938. Same as above. Dredged, in 45 fms.
Chloeia entypa Chamberlin
Nephthys caecoides Hartman
Nephthys caecoides ferruginea, new subspecies
Glycera americana Leidy

St. 881-38. Aug. 2, 1938. East of Santa Rosa Island, California. Dredged, in 10 fms.
Uncinereis agassizi (Ehlers)

St. 882-38. Mar. 3, 1938. South of San Miguel Island, California. Dredged, in 15 fms. Sand and shell.
Uncinereis agassizi (Ehlers)

St. 885-38. Aug. 4, 1938. San Luis Obispo Bay, California. Dredged, in 8-14 fms.
Nereis latescens Chamberlin
Nephthys caecoides Hartman

St. 886-38. Aug. 5, 1938. Off Half Moon Bay, California. Dredged, in 16 fms. Coarse gravel.
Nephthys caecoides Hartman
Glycera americana Leidy

St. 887-38. Aug. 7, 1938. East of Middle Farallon Island, California. Dredged, in 37 fms.
Cheilonereis cyclurus (Harrington)
Nephthys caecoides Hartman
Glycera americana Leidy
?*Glycera oxycephala* Ehlers
Glycera rouxii Audouin and Edwards
Goniada maculata Oersted

St. 888-38. Aug. 8, 1938. Monterey Bay, California. Dredged, in 10-13 fms. Fine sand.
Uncinereis agassizi (Ehlers)
Nephthys caecoides Hartman

St. 889-38. Aug. 8, 1938. Monterey Bay, off Pt. Piños, California. Dredged, in 36 fms. Broken shell.
Nephthys caecoides Hartman
Glycera americana Leidy
?*Glycera oxycephala* Ehlers
Goniada maculata Oersted

St. 890-38. Aug. 8, 1938. Same as above. Dredged, in 49-54 fms.
Glycera americana Leidy
Glycinde multidens F. Müller

St. 891-38. Aug. 8, 1938. Outside Monterey Bay, California. Dredged, in 26 fms.
Nephthys caecoides Hartman
Glycera americana Leidy
Glycinde multidens F. Müller

St. 892-38. Aug. 9, 1938. In and around Carmel Bay, California. Shoal, to 40 fms.
Nephthys caecoides Hartman
Glycera americana Leidy
Glycinde multidens F. Müller

St. 893-38. Aug. 10, 1938. Off Pt. Arguello, California. Dredged, in 15-30 fms. Sand and algae.
Nephthys caecoides Hartman
Glycinde multidens F. Müller

St. 894-38. Aug. 10, 1938. South of San Miguel Island. Dredged, in 5-15 fms. Kelp.
Nephthys caecoides Hartman

St. 896-38. Sept. 12-14, 1938. San Miguel Island, California. Dredged.
Nephthys caecoides Hartman

St. 897-38. Same as above.
Nereis pelagica Linnaeus
Nephthys caecoides Hartman
Glycera americana Leidy

St. 898-38. Same as above.
Uncinereis agassizi (Ehlers)

St. 900-38. Nov. 18, 1938. Off Long Point, Catalina Island. Dredged, in 40 fms. Brachiopod and sponge clusters.
Nereis pelagica Linnaeus
Leptonereis glauca moniloceras, new subspecies
Uncinereis agassizi (Ehlers)
Nephthys squamosa Ehlers
Glycera tesselata Grube

St. 901-38. Nov. 20, 1938. Point Fermin, California. Shore.
Nereis neonigripes Hartman

St. 902-38. Nov. 21, 1938. Portuguese Bend, California. Shore.
Pareurythoë californica (Johnson)
Podarke pugettensis Johnson
Nereis mediator Chamberlin

St. 903-38. Dec. 5, 1938. Anaheim Slough, California. Shore. Fine sand and mud flats, with some Zostera.
Nephthys caecoides Hartman
Glycera americana Leidy
Glycera convoluta Keferstein
Glycera longissima Arwidsson
Goniada uncinigera Ehlers

St. 904-38. Dec. 6, 1938. Laguna Beach, California. Shore, near pier.
Pareurythoë californica (Johnson)
Nereis mediator Chamberlin
Nereis latescens Chamberlin

St. 905-38. Dec. 7, 1938. Same as for St. 903-38.
Nephthys caecoides Hartman
Glycera americana Leidy

St. 906-38. Dec. 8, 1938. Portuguese Bend, California. Reefs at southern end. Shore.
Euphrosyne aurantiaca Johnson
Pareurythoë californica (Johnson)
Nereis mediator Chamberlin
Nephthys californiensis Hartman

St. 907-38. Dec. 9, 1938. Bluff Cove, between Portuguese Bend and Redondo Beach, California. Shore.
Pareurythoë californica (Johnson)

St. 908-39. Jan. 28, 1939. Off White's Point, Catalina Island. Dredged, in 45 fms. Coarse sand.
Nephthys caecoides Hartman

St. 909-39. Jan. 29, 1939. Off Emerald Bay, Catalina Island. Dredged, in 60-90 fms. Mud.
Nephthys caecoides Hartman
Glycinde multidens F. Müller

St. 910-39. Feb. 12, 1939. Portuguese Bend, California. Shore. Rocky beach.
Neanthes brandti (Malmgren)
Glycera americana Leidy
Hemipodus borealis Johnson

St. 911-39. Feb. 18, 1939. San Clemente Island, California. Wilson Cove. In 60-85 fms.
Nereis pelagica Linnaeus

St. 913-39. Feb. 18, 1939. Same as above. Pyramid Cove. In 35-46 fms.
Nereis mediator Chamberlin
Nephthys caecoides Hartman
Nephthys squamosa Ehlers

St. 914-39. Feb. 19, 1939. Same as above. In 214 fms.
?*Glycera oxycephala* Ehlers
Glycera tesselata Grube

The following are collections in The University of Southern California, made by various people, previous to the Allan Hancock Pacific Expeditions.

D-53. Seal Beach, southern California. Dredged, in 3 fms.
Glycera americana Leidy

D-88. East from breakwater, near San Pedro, California. Dredged, in 8 fms.
Glycera americana Leidy

D-93. Near Rocky Point, southern California. Dredged.
Uncinereis agassizi (Ehlers)
Nephthys californiensis Hartman

D-103. Off White's Point, Catalina Island. Dredged.
Glycera americana Leidy

D-104. Off Catalina Island. Dredged.
Uncinereis agassizi (Ehlers)

Mission Bay, southern California.
Nephthys caecoides Hartman
Nephthys punctata Hartman
Glycera convoluta Keferstein
Glycera dibranchiata Ehlers
Glycera robusta Ehlers
Hemipodus borealis Johnson
Glycinde multidens F. Müller

TABLE I

	LOCALITIES							
Name of Species	*California*	*Gulf of Calif.*	*W. Mexico, Costa Rica*	*Panama*	*Colombia*	*Ecuador & Peru*	*Cocos Island*	*Galapagos*
Chrysopetalidae								
Paleanotus chrysolepis			126					
Amphinomidae								
Chloeia entypa	876			213, 431	855	213		
C. pinnata	914, 915							
C. viridis		numerous	277, 481, 725, 779	248, 250, 443				numerous
Eurythoë complanata		numerous	numerous	numerous	numerous	numerous		numerous
Notopygos ornata		533, 549	473	274, 446, 447	412			161, 202, 783
Pareurythoë californica	numerous							
Pherecardia striata				numerous				146
Euphrosynidae								
Euphrosyne aurantiaca	874, 906			439				
E. bicirrata		559						
E. panamica				436, 446	412			
Hesionidae								
Hesione intertexta		numerous	134, 289, 745			213		numerous
Leocrates chinensis		633	305					
Podarke pugettensis	902							
Nereidae								
Ceratonereis costae		702				13, 209		

Name of Species	LOCALITIES							
	California	*Gulf of Calif.*	*W. Mexico, Costa Rica*	*Panama*	*Colombia*	*Ecuador & Peru*	*Cocos Island*	*Galapagos*
C. tentaculata		numerous	277	114		12, 210		197
Cheilonereis cyclurus	887							
Leptonereis moniloceras	900	728						
Neanthes brandti	numerous							
Nereis callaona		127						
N. flavipes		728						
N. latescens	numerous							
N. mediator	902-906							
N. neonigripes	901							
N. paucignatha						21		
N. pelagica	numerous	283, 675						
N. pseudoneanthes		288	260					
N. pseudonereis						364, 374, 384		326
N. riisei		numerous	120, 132	445		11, 12, 13		99, 148, 788
N. veleronis						373, 384, 385, 395		
Perinereis monterea	numerous							
Platynereis polyscalma		495, 503, 622, 639				8, 11, 13		
Pseudonereis gallapagensis						11, 16, 19, 380, 387		154, Tagus, Marchena
Uncinereis agassizi	numerous	numerous	563		234	numerous		numerous

Name of Species	LOCALITIES							
	California	*Gulf of Calif.*	*W. Mexico, Costa Rica*	*Panama*	*Colombia*	*Ecuador & Peru*	*Cocos Island*	*Galapagos*
Nephthyidae								
Nephthys assimilis		495	770					
N. caecoides	numerous	616						
N. ferruginea	876	492				379, 820, 823, 834		
N. californiensis	numerous	284, 871						
N. dibranchis		492, 513, 667, 668	770	250, 436	421	213		184, 185
N. inermis		633		863				
N. lobophora						826, 832		
N. macroura peruana						823, 833		
N. magellanica		numerous	259, 725, 747, 870	438, 456		833, ?843, 845		
N. panamensis		499		451				
N. punctata	Mission B.							
N. squamosa	900, 913	546, 632, 669, 735			856			
Glyceridae								
Glycera americana	numerous	numerous	740	248		numerous		
G. convoluta	Mission B., 903		770					
G. dibranchiata	Mission B.							
G. longissima	903							
?G. oxycephala	887, 889, 914							786

Name of Species	LOCALITIES							
	California	*Gulf of Calif.*	*W. Mexico, Costa Rica*	*Panama*	*Colombia*	*Ecuador & Peru*	*Cocos Island*	*Galapagos*
G. papillosa						376		
G. robusta	Mission B.							
G. rouxii	887							
G. tesselata	900, 914	numerous	132, 463, 745	863				
Hemipodus borealis	Mission B., 910							
H. simplex						366, 375, 846		
Goniadidae								
Glycinde multidens	890, 893, 909, Mission B.		116, 477					173
Goniada acicula		499, 549				8		
G. maculata	887, 889							
G. uncinigera	903							

Family **Chrysopetalidae**

Genus **PALEANOTUS** Schmarda

Differs from *Chrysopetalum* Ehlers in that the notopodium is provided with 2 kinds of setae: (1) broad spatulate in the supraacicular fascicle, and (2) narrower, more pointed setae in the subacicular fascicle. Includes *Heteropale* Johnson.

Paleanotus chrysolepis Schmarda

Paleanotus chrysolepis Schmarda, 1861, p. 163, pl. 37, figs. 326-329; Augener, 1913, pp. 76-78; Monro, 1933, p. 19; Day, 1934, p. 29.

Heteropale bellis Johnson, 1897, pp. 163-164, pl. 6, figs. 20-23; Berkeley, 1923, p. 212; 1932, p. 311.

Collection.—126-33. One specimen.

The single individual is ovigerous, incomplete posteriorly. Its small size, inconspicuous coloration, and fragility do not favor its discovery in collections, although it is perhaps much more commonly present than its incidence in collections would indicate.

Distribution.—Cape of Good Hope; north and east Pacific, from British Columbia south to Peru. Littoral.

Family **Amphinomidae**

Seven species in 5 genera are represented in the collections. These are separable as follows.

1. Body long, subcylindrical; branchiae arborescent, forming compact tufts along the notopodial ridge; caruncle a smooth or sinuate crest (pl. 31, fig. 1) 2
1. Body short, depressed oval; branchiae tuftlike or pinnatified; caruncle forms a plaited crest or is laterally lamellated . . . 3
2. Caruncle reduced, extends posteriorly to middle of second setigerous segment; posterior bifurcated neuropodial setae with one or several denticulations on the main fang (pl. 31, fig. 6); smaller, to 50 mm long . . *Pareurythoë californica,* p. 203
2. Caruncle larger, conceals much of the prostomium and extends posteriorly beyond the third setigerous segment (pl. 31, fig. 1); most of the posterior bifurcated setae are smooth; larger, to about 350 mm long . . . . *Eurythoë complanata,* p. 202

3. Caruncle with paired series of elongate lamellations; the dorsum of each segment marked with 8 to 12 lines parallel to one another, but discontinuous at the intersegmental furrows. . . . . *Pherecardia striata,* p. 207

3. Caruncle with a plaited crest; the dorsum of each segment with or without pigmented pattern, but not with numerous lines parallel to one another 4

4. Branchiae form compact tufts over the notopodial ridge; dorsum with a pair of broken stripes; caruncle with a high median crest and a pair of spreading lateral crenulated lobes . . . . *Notopygos ornata,* p. 207

4. Branchiae pinnatified, recurving over dorsum; caruncle with a plaited crest, the lateral lobes proximal to the median . . . . *Chloeia* 5

5. Posterior bifurcated notopodial setae with smooth distal fang, the secondary fang very short so as to resemble only a blunt projection; dorsal pigmented pattern consists of 3 longitudinal stripes . . . . *C. viridis,* p. 205

5. Some posterior bifurcated notopodial setae with some serrations on the main fang; secondary fang much larger 6

6. Posterior bifurcated notopodial setae serrated on the outer side of the main fang, the serrations directed downward (pl. 32, fig. 15); dorsum with a single, broad, longitudinal stripe *C. entypa,* p. 205

6. Posterior bifurcated setae with serrations on the inner side, the serrations directed distally (pl. 31, fig. 12); dorsum without a pigmented pattern . . . . *C. pinnata,* p. 206

Genus EURYTHOË Kinberg

Eurythoë complanata (Pallas)

Plate 31, Figs. 1-4

Eurythoë complanata Augener, 1913, pp. 87-89 (synonymy); Monro, 1933, pp. 4-5; Okuda, 1937, pp. 263-266, figs. 1-2.

Collections.—2-33, 10-33, 13-33, 22-33, 27-33, 33-33, 41-33, 42-33, 48-33, 52-33, 69-33, 73-33, 74-33, 94-33, 96-33, 101-33, 114-33, 116-33, 124-33, 134-33, 146-34, 161-34, 194-34, 196-34, 218-34, 315-35, 357-35, 391-35, 405-35, 412-35, 413-35, 433-35, 446-35, 447-35, 465-35, 466-35, 498-36, 500-36, 501-36, 510-36, 518-36, 545-36, 623-37, 626-37, 633-37, 634-37, 638-37, 664-37, 707-37, 708-37, 739-38, 782-38, 784-38, 789-38, 796-38, 811-38, 844-38, 867-38. About 300 specimens.

The largest specimen (Galapagos Islands) is about 350 mm long; its width without, 17 mm, with setae, 20 mm. An individual from 626-37 has dark dorsal and ventral cirri, otherwise it is pale, as usual. Another, from 446-35, has an accessory lateral caruncle. A small individual from 708-38, only 23 mm long, has a regenerated prostomium and first setigerous segment.

Augener (1922, p. 172) studied collections of *E. paupera* (Grube) from Chile and Juan Fernandez and *E. complanata* (Pallas) from the tropical Pacific, and concluded that the two were identical, except for size, and that *E. complanata* is typically much larger than *E. paupera,* but that they intergrade.

The collections available for study range from the Gulf of California south to Peru and west to the Galapagos Islands. Only one species, *E. complanata,* is apparently present. The largest individuals (to 350 mm long) came from Hood Island, the smallest from the Gulf of California. In the details of their structure, however, they do not differ (see also discussion under *Pareurythoë californica).*

Distribution.—Circummundane, in tropical seas. Common in intertidal zones to 10 fms. Less common in depths to 60 fms (Gulf of California). Found only rarely off southern California, in the intertidal zone, and perhaps may be considered as not occurring, typically, north of the Gulf of California, except from dredged materials.

Genus **PAREURYTHOË** Gustafson

Pareurythoë Gustafson (1930, p. 393) was erected to include those species that resemble *Eurythoë* Kinberg, in which the caruncle is simple, in contradistinction to those in which the caruncle consists of dorsal and ventral lobes. To this genus were assigned 4 species: *Eurythoë californica* Johnson, *E. chilensis* Kinberg, both from the eastern Pacific, *Pareurythoë japonica* Gustafson from Japan, and *P. gracilis* Gustafson from the Marshall and Gilbert islands. *Eurythoë spirocirrata* Essenberg (1917, p. 66) may belong here.

Pareurythoë californica (Johnson)

Plate 31, Figs. 5-9

Eurythoë californica Johnson, 1897, pp. 159-161, pl. 5, figs. 8-14; Moore, 1909, p. 242; Treadwell, 1914, p. 179.
Pareurythoë californica Gustafson, 1930, pp. 307, 308, 391.
Eurythoë paupera Chamberlin, 1918, p. 173.
?*Eurythoë californica* Ehlers, 1901, p. 34.

Collections.—902-38, 904-38, 906-38, 907-38. 10 specimens.

Pareurythoë californica, originally described from southern California (Johnson, 1897, p. 159), was later made the subject of comparison with *Eurythoë paupera* (Grube) from western South America by Ehlers (1901, p. 34) and the two were concluded to be the same. Chamberlin (1918, p. 173) identified some specimens from Monterey Bay, California, as *E. paupera* and corroborated Ehlers' synonymy. These records intimate a discontinuous distribution of a single species, *E. complanata,* over widely separated areas, central California and western Chile, which our field collections have not substantiated. *E. complanata* occurs very rarely in collections from southern California. *P. californica,* however, which is typically much smaller than *E. complanata,* is common in southern California, but only rarely taken in central California.

For purposes of comparison of these two species, smaller representatives of *E. complanata* from the Gulf of California and typical *P. californica* from southern California have been used. The most striking differences are: (1) In *E. complanata* the prostomium and caruncle are compressed between the first 4 setigerous segments, the anterior margin of the ocular lobe is posterior to the first segment (pl. 31, fig. 1); in *P. californica* the ocular lobe is not compressed between the first segments, the caruncle extends posteriorly through less than 2 segments, and the anterior margin of the ocular lobe is anterior to the first segments (pl. 31, fig. 5). (2) The general appearance of *E. complanata* is spinous, of *P. californica* notably smoother. (3) In *E. complanata* the anterior margin of the prostomium is medially incised or concave (pl. 31, fig. 1); in *P. californica* it is convex (pl. 31, fig. 5). (4) The hastate acicular setae are distally triangular in *E. complanata,* subquadrate in *P. californica* (pl. 31, fig. 7). (5) All neuropodial setae of posterior parapodia are ornamented with one or a few denticulations in *P. californica* (pl. 31, fig. 8); in *E. complanata* most are smooth (pl. 31, fig. 2), some of the longer setae have a few oblique teeth (pl. 31, fig. 3). The serrated notopodial setae are coarser, relatively, in *P. californica* (pl. 31, fig. 9).

Pareurythoë californica and *P. chilensis* Kinberg (1910, pl. 12, fig. 9) are different in that *P. chilensis* has a caruncle that extends posteriorly to the third setigerous segment. According to Kinberg, the setae also are different.

Distribution.—Southern California. Common in the intertidal zones. On the under sides of rocks, in crevices; sometimes in the burrows of other chaetopods.

Genus **CHLOEIA** Savigny

Chloeia viridis Schmarda

Chloeia viridis Schmarda, 1861, p. 144; Monro, 1928, pp. 77-78 (synonymy); 1933, pp. 9-10, fig. 4.

Chloeia euglochis Ehlers, 1887, pp. 18-24, pl. 1, figs. 1, 2, pl. 2, figs. 1-8, pl. 3, figs. 1-4.

Collections.—161-34, 177-34, 182-34, 196-34, 198-34, 202-34, 248-34, 250-34, 274-34, 277-34, 279-34, 280-34, 443-35, 481-35, 495-35, 513-36, 516-36, 536-36, 546-36, 558-36, 561-36, 563-36, 576-36, 627-37, 661-37, 662-37, 667-37, 668-37, 675-37, 677-37, 692-37, 701-37, 711-37, 725-37, 734-37, 751-37, 779-38, 814-38. About 100 specimens.

These individuals have the characteristic dorsal longitudinal stripes, if not throughout, at least in an anterior region, posterior to the prostomial caruncle. The largest measure 77 mm long and 24 mm wide (536-36, Gulf of California). They agree with the description given by Monro (1933, p. 9).

Distribution.—West Indies; Gulf of California, Mexico, south to Panama; Galapagos and Cocos islands. In depths of 5 to 150 fms.

Chloeia entypa Chamberlin

Plate 32, Figs. 14-20

Chloeia entypa Chamberlin, 1919, pp. 30-31, pl. 13, figs. 8, 9, pl. 14, figs. 1, 2; Treadwell, 1937, p. 147.

?*Chloeia pinnata* Monro, 1933, pp. 7-8, fig. 3 (not Moore, 1911; see below).

Collections.—213-34, 244-34, 431-35, 855-38, ?876-38. 6 specimens.

Number of segments 28 to 30; length 30 to 40 mm, width 6.5 to 7.5 mm without, 12 to 14 mm with, setae. Bipinnate branchiae are present from segment 4 to the end, but on at least the last 5 segments they become rapidly and progressively smaller. The dorsum has a single broad, diffuse reddish-brown, continuous stripe throughout its length. The branchial rachis has a similar pigment, densest at the base; the filaments are pale. Dorsal cirri are deep purple, ventral cirri pale.

The caruncle has about 25 folds on either side. It extends posteriorly to beyond the middle of the fourth setigerous segment. Eyes 4, the anterior pair much the larger, situated at the anterolateral base of the stout median antennal base. Posterior eyes much smaller, at the sides of the prostomial lobe (pl. 32, fig. 14). A dusky spot is present just anterior to the bases of the frontal paired antennae. The latter are nearly in contact at their bases; they are pale for a short distance and deep purple more distally (pl. 32, fig. 14).

In general appearance and size this species resembles *Chloeia viridis.* The dorsum, however, is marked with a single broad, longitudinal stripe in place of the 3 stripes; also, the body is less firm in preservative (alcohol), the setae more translucent or yellowish.

A single small, perhaps juvenile, individual, only 8 mm long, with 18 setigerous segments, is of interest because of its origin far to the north (Anacapa Island, California) of the typical *C. entypa* Chamberlin, from western Mexico. The dorsal pigmented pattern is absent, perhaps because of its immature condition, but the more posterior notopodia have bifurcated notopodial setae that are serrated on the outer side (pl. 31, fig. 19), as is typical of *C. entypa* from the Gulf of California (pl. 31, figs. 15, 16, 20). The smooth notopodial and neuropodial setae, likewise, resemble those of larger individuals (pl. 31, figs. 17, 18). The prostomial lobe is more rectangular, the posterior eyes proportionately larger, and the caruncle with folds hardly developed. There is a diffuse dusky spot just anterior to the frontal antennae, such as Moore described for *C. pinnata* (1911, pp. 239-243, pl. 15, figs. 1-6) from southern California. In its setal structures, however, it agrees with those of *C. entypa* (see also *C. pinnata,* below).

Distribution.—Western Mexico; Ecuador; Colombia; Bahia Honda, Panama; California. In depths of 7 to 66 fms.

Chloeia pinnata Moore

Plate 31, Figs. 10-13

Chloeia pinnata Moore, 1911, pp. 239-243, pl. 15, figs. 1-6; ?Monro, 1933, pp. 7-8, fig. 3 (see above).

Collections.—914-39, 915-39. 4 specimens.

Length to 17 mm. General color pale salmon, without bands or other pigmented pattern but with minute dark specks dispersed over the dorsum. Caruncle with a dark median stripe and similar, though paler, pigment over the paired folds. Eyes dark purple, the larger anterior eyes circular, but more or less completely merging with the smaller, posterior eyes that are also circular (pl. 31, fig. 10).

Ceratophores of dorsal cirri dark purple, the anteriormost dorsal cirri pale, but from about the forty-fifth segment they are increasingly darker purple. Ventral cirri pale. Branchiae pinnate, present from the fourth setigerous segment, to the posterior end.

Notopodia provided with bifurcated setae, some of which have minute serrations on the inner side of the main fang, the serrations directed distally (pl. 31, figs. 12, 13). These are, thus, in sharp contrast with the condition in *C. entypa* (see above). Anal cirri are elongate, cylindrical, directed posteriorly (pl. 31, fig. 11).

These specimens have been identified with *C. pinnata* Moore because of the presence of the unique, serrated notopodial setae. In this character it differs distinctly from the other two species, *C. viridis* and *C. entypa,* reported from the eastern Pacific (see above).

Distribution.—Southern California. Subintertidal, to 310 fms.

Genus **NOTOPYGOS** Grube

Notopygos ornata Grube

Notopygos ornata Grube, 1856, p. 53; Monro, 1933, pp. 10-11, fig. 5 (synonymy).

Lirione maculata Kinberg, 1857, p. 12.

Notopygos maculatus Chamberlin, 1919, p. 251.

Notopygos maculata Monro, 1928, pp. 78-79.

Collections.—161-34, 202-34, 247-34, 412-35, 446-35, 447-35, 473-35, 533-36, 549-36, 783-38. 17 specimens.

Distribution.—Gulf of California, Mexico, south to Gorgona Island, Colombia; Galapagos Islands. Shore, to 70 fms. In coral.

Genus **PHERECARDIA** Horst

Pherecardia striata (Kinberg)

Hermodice striata Kinberg, 1857, p. 13; Chamberlin, 1919a, p. 26; Augener, 1927, pp. 122-123.

Pherecardia striata Monro, 1924, pp. 72-73; 1928, p. 77; Gustafson, 1930, p. 308, fig. 11, pl. 1, fig. 7; Monro, 1933, p. 7; Okuda, 1937, pp. 265-266, figs. 4-5.

Collections.—114-33, 146-34, 247-34, 447-35, 454-35, 867-38. About 15 specimens.

Distribution.—Tropical eastern and western Pacific; Panama; Galapagos Islands. Shore, to 31 fms (Monro, 1924, p. 73).

Family **Euphrosynidae**

This small family is known to be present in the eastern Pacific through only one genus, *Euphrosyne* Lamarck. Ten species have heretofore been reported from the temperate and tropical Pacific. They are:

1. *Euphrosyne arctia* Johnson (1897, p. 159) from California, north to Alaska.
2. *Euphrosyne aurantiaca* Johnson (1897, p. 157) from California.
3. *Euphrosyne bicirrata* Moore (1905, p. 532) from the Gulf of Georgia, south to California.
4. *Euphrosyne calypta* Essenberg (1917, p. 63) from California.
5. *Euphrosyne dumosa* Moore (1911, p. 235) from Catalina Island, California.
6. *Euphrosyne heterobranchia* Johnson (1901, p. 402) from Washington.
7. *Euphrosyne hortensis* Moore (1905, p. 534) from Alaska, south to California.
8. *Euphrosyne kyllosetosa* Essenberg (1917, p. 68) from California.
9. *Euphrosyne limbata* Moore (1911, p. 237) from San Nicolas Island, California.
10. *Euphrosyne panamica* Chamberlin (1919, p. 33) from the Pacific side of Panama.

Nine (nos. 1-9) of these have been ascribed to California, one (no. 10) from Panama, and none from the other areas covered in this report. Among the California species, some may be found to be identical with others, when they will have become more completely known. Thus, *E. kyllosetosa* and *E. aurantiaca* bear remarkable similarities to each other (see also p. 210). Furthermore, *E. hortensis, E. dumosa,* and *E. aurantiaca* are not easily separable, except through characters that may prove to be variable.

Key to Species

1. Caruncle conspicuously trilobed, with a median and a pair of long, lateral lobes (pl. 32, fig. 25) . . . *E. panamica,* p. 209
1. Caruncle without conspicuous long, lateral lobes 2
2. Branchial filaments bilobed . . . . . . *E. bicirrata,* p. 210
2. Branchial filaments ramosely divided (pl. 32, fig. 24) . . . 3

3. Dorsal setae of one kind, none serrated or strictly bifid; branchiae 10 to 12 pairs on a parapodium, dichotomously divided 3 to 5 times 4
3. Dorsal setae include bifid serrated setae (pl. 32, fig. 28) and bifid spurred smooth setae; branchiae variable in number on a parapodium 5
4. Median parapodia with 6 main branchial trunks, each to 4-lobed; lateral dorsal cirri between second and third gill trunks, counting from the dorsum . . . . . *E. calypta* Essenberg
4. Median parapodia with 10 to 12 main branchial trunks, each 4 or 5 times dichotomously branched; lateral dorsal cirri between gill trunks 6 and 7 or 5 and 6, counting from the dorsum . . . . *E. limbata* Moore
5. With 5 pairs of branchiae, the tips of the filaments flat, expanded . . . . *E. arctia* Johnson
5. With more than 5 pairs of branchiae, the tips of the filaments not expanded 6
6. Smooth notopodial setae with a short to obscure spur . . . 7
6. Smooth notopodial setae with a lateral fang; median parapodia with 7 pairs of branchial trunks, the dorsal cirrus between the third and fourth trunks . . . . *E. aurantiaca,* p. 210
7. With 9 to 11 branchial trunks; dorsal cirri between dorsal trunks 3 and 4 or 4 and 5 . . . . . *E. dumosa* Moore
7. With 11 to 13 pairs of branchial trunks, dorsal cirri between trunks 4 and 5 to 7 and 8 . . . . *E. hortensis* Moore
7. With 10 pairs of branchial trunks, the dorsal cirri between trunks 4 and 5 . . . . *E. heterobranchia* Johnson

Euphrosyne panamica Chamberlin

Plate 32, Figs. 24-26

Euphrosyne panamica Chamberlin, 1919a, pp. 33-34, pl. 12, figs. 7, 8, pl. 13, figs. 1-7.

Collections.—412-35, 436-35, 446-35. 3 specimens.

Length 11 to 23 mm; number of setigerous segments 35 to 40. The caruncle (pl. 32, fig. 25) is trilobed, the lateral processes somewhat shorter than indicated by Chamberlin; the median antenna extends along the median lobe nearly to the middle of it.

The branchiae are richly branched and terminate distally in inflated lobes. A typical one from the sixteenth parapodium is shown in plate 32, fig. 24. *E. armadilloides* Ehlers (1901, p. 37) has similar foliose branchiae. In the latter, however, the long spine of the bifurcated seta is said to have a subterminal tooth (Ehlers, 1901, pl. 1, fig. 8). The ringed setae have broad, bifurcated ends and a slender stalk (pl. 32, fig. 26).

Distribution.—Panama, Pacific side; Gorgona Island, Colombia. Shore.

Euphrosyne aurantiaca Johnson

Plate 32, Figs. 27-29

Euphrosyne aurantiaca Johnson, 1897, pp. 157-158, pl. 5, figs. 1-4 (not Treadwell, 1914, p. 178; see below).

Euphrosyne kyllosetosa Essenberg, 1917, pp. 68-69, pl. 5, figs. 24-31.

Collections.—439-36, 874-38, 906-38. 4 specimens.

The caruncle consists of a larger ventral lobe upon which the dorsal lobe is imposed and to which it is completely fused. The branchiae are more or less regularly dichotomously branched. The ventral bifurcated setae (pl. 32, fig. 29) are similar to, but longer than, the dorsal setae (pl. 32, fig. 27). All of the simple bifurcated setae are finely punctate below the fork. Some of the longer ventral setae have a few elevations, in a single series, near the base of the longer spur (pl. 32, fig. 29). The ringed dorsal setae (pl. 32, fig. 28) are broader than the simple setae, but almost transparent, fewer, and less easily seen.

In a single specimen from Portuguese Bend, California (906-38), the branchiae are unusually conspicuous, but the dorsal setae are fewer, perhaps lost. The setae and branchiae are typical of the species.

The cotype of *E. kyllosetosa* Essenberg (1917, p. 68) in the collections of the University of California has been compared with paratypes of *E. aurantiaca* Johnson. No significant differences have been observed. Their descriptions, also, agree reasonably well. *E. aurantiaca* Treadwell (1914, p. 178) was made the type of *E. calypta* Essenberg (1917, p. 63).

Distribution.—California; Anacapa Island, off California; Piñas Bay, Panama. Shore, to 45 fms.

Euphrosyne bicirrata Moore

Plate 32, Figs. 21-23

Euphrosyne bicirrata Moore, 1905, pp. 532-534, pl. 34, figs. 8-12; 1908, p. 339; 1911, p. 234; Berkeley, 1923, p. 211.

Length 6 mm; width without, 1.4 mm, with setae, 2 mm; number of segments 23. The caruncle is a simple ridge with dorsal and ventral lobes; the dorsal lobe extends posteriorly to the anterior third of the fifth segment, the ventral lobe to the posterior third of the fourth segment. It is widest in the region of the eyes and tapers gradually posteriorly. The 2 eyes of a side are fused to form a single pair of elongate spots at the sides of the anterior end of the ventral lobe. Branchial filaments are bifid.

E. bicirrata resembles *E. notialis* Ehlers (1901, p. 38) from the Straits of Magellan in having bifid branchial filaments. In the latter, however, the distal end of the serrated setae is proportionately much longer than in *E. bicirrata* (pl. 32, figs. 22, 23). Also, in the latter the bifurcated dorsal setae have a noticeable thickening on the main fang (pl. 32, fig. 21).

Distribution.—Alaska, south to southern California, in 18 to 369 fms; Gulf of California, in 45 fms.

Family Hesionidae

Key to Genera

1. With 8 pairs of tentacular cirri at the anterior end 2
1. With 6 pairs of tentacular cirri at the anterior end . . . . PODARKE, p. 211
2. Prostomium with a pair of antennae inserted at the frontal margin; proboscis without jaw pieces . . HESIONE, p. 211
2. Prostomium with a pair of antennae at the frontal margin and a median antenna inserted on the posterior half; proboscis with jaw pieces . . . . LEOCRATES, p. 212

Genus **PODARKE** Ehlers

Podarke pugettensis Johnson

Podarke pugettensis Johnson, 1901, pp. 397-398, pl. 3, figs. 23-25; Moore, 1908, p. 341; 1909, p. 243; Gravier, 1909, pp. 622-624, pl. 16, figs. 2-7; 1910, pp. 97-98, pl. 5, figs. 2-7; Treadwell, 1914, p. 177; Berkeley, 1923, p. 211; Okuda, 1936, pp. 413-415, fig. 4.

Collection.—902-38. One specimen.

Distribution.—North and east Pacific, south to Peru (Gravier); Japan. Littoral.

Genus **HESIONE** Savigny

Body short, somewhat depressed, truncate at both ends. Consists of few, indistinctly articulated segments. Prostomium with 4 eyes disposed in a rectangle, and a pair of anterior antennae. Proboscis eversible, cylindrical, without chitinous jaws. First 4 segments more or less fused, provided with 8 pairs of tentacular cirri that project obliquely forward. Parapodial and anal cirri tentacular, the dorsal ones long, filamentous. Parapodia seemingly uniramous, the notopodium represented only by a long, dorsal cirrus, the neuropodium well developed and with acicula and composite falcigerous setae. Anal ring with 2 long, tentacular cirri.

Hesione intertexta Grube

Plate 33, Figs. 30-31

Hesione intertexta Grube, 1878, pp. 102-103, pl. 6, fig. 5; Monro, 1926, pp. 311-314; 1928, p. 79; 1931, pp. 9-10, fig. 4; 1933, p. 26.

Hesione panamena Chamberlin, 1919, pp. 188-190, pl. 22, figs. 9-10; Treadwell, 1937, p. 149.

Collections.—59-33, 134-34, 148-34, 167-34, 213-34, 289-34, 310-35, 336-35, 503-36, 576-36, 585-36, 627-37, 688-37, 719-37, 745-37, 811-38. Numerous specimens.

Total length 40-50 mm, the largest individual from Consag Rock, in the northern end of the Gulf of California. Most individuals retain the reticulated, fulvous pattern on the dorsum of the anterior segments, but in some there are almost none. There are 16 parapodial segments. Acicula are black, setae pale. The 8 pairs of tentacular cirri are long, directed anteriorly. Prostomial antennae are minute, not easily distinguished.

Parapodia have 2 elongated lobes, preacicular and postacicular, at their dorsodistal edge (pl. 33, fig. 30). Composite neuropodial setae have a guard which approaches the apical tooth (pl. 33, fig. 31). The significance of the relation of guard to apical or subapical tooth has been carefully studied by Monro (1926, p. 311). The specimens here examined were surprisingly uniform with respect to this character.

Distribution.—Philippine Islands; South Sea islands; China; Galapagos and Cocos islands; Panama; western Mexico; Gulf of California, north to Consag Rock. Subintertidal, to 25 fms.

Genus **LEOCRATES** Kinberg

Plate 33, Figs. 32-35

Leocrates chinensis Kinberg, 1866, p. 244; 1910, p. 57, pl. 23, fig. 7; Ehlers, 1901, pp. 83-84, pl. 11, figs. 10-15; Horst, 1924, pp. 193-194; Monro, 1926, p. 313; 1931, p. 12.

?*Leocrates claparedii* Fauvel, 1919, p. 371 (synonymy); 1923, pp. 237-238, fig. 88; 1930, p. 12; 1932, p. 61; 1933, pp. 44-45; Day, 1934, p. 33; Okuda, 1937, pp. 270-271, figs. 11, 12.

Collections.—305-34, 633-37. 2 specimens.

Lengths 22 and 15 mm. There are 18 body segments, all but the first (cirriferous) have acicular lobes; the second to the second last, or 16 segments, are setigerous.

Notopodial setae are first present from the fifth setigerous segment. They are slender, lanceolate, delicately serrated along one edge. The neuropodial setae are composite, falcigerous (pl. 33, figs. 34, 35); often 1 or 2 ventralmost retain the pointed, protecting sheath (pl. 33, fig. 34). They range from shorter, superiormost, to longer, inferiormost (pl. 33, fig. 35).

The prostomium is slightly broader than long, the 4 reddish-brown eyes are subequal. The paired anterior antennae are long, cirriform, longer than the prostomium. Between them the large facial tubercle is inserted. This is proportionately larger or smaller, depending on whether the proboscis is retracted (pl. 33, fig. 32) or everted (pl. 33, fig. 33). A similar effect is observable in the proportionate sizes of the palpi. The median prostomial antenna is inserted on the posterior half of the prostomium, in a shallow, median sulcus. The jaw piece is pale yellow.

Ehlers (1901, p. 83) identified specimens from Juan Fernandez (off southwestern South America) as *L. chinensis* Kinberg on comparison with Kinberg's type which came from near Hong Kong. In this connection it is noteworthy that Okuda (1937, p. 270) reported *L. claparedii* from Japan. The specimens from western Mexico agree reasonably well with Okuda's good account save that the posterior eyes are as large as the anterior ones, and the prostomium is proportionately less broad in ours. Also, the median prostomial antenna is inserted posterior to the eyes (pl. 33, fig. 33); in Okuda's illustration it is shown between anterior and posterior eyes, about as shown for *L. claparedii* by Fauvel (1923, fig. 88).

Distribution.—Tropical Pacific; Indo-Pacific; off western South America; western Mexico; Gulf of California; ?Mediterranean. Subintertidal, to 18 fms.

Family Stauronereidae

Genus STAURONEREIS Verrill

Includes *Staurocephalus* Grube, *Anisoceras* Oersted, *Dorvillea* Parfitt, and *Prionognathus* Keferstein.

Stauronereis cerasina (Ehlers)

Plate 34, Figs. 38-41

Staurocephalus cerasinus Ehlers, 1901, pp. 263-264.
Stauronereis cerasina Ehlers, 1901, pp. 147-149, pl. 19, figs. 11-17, pl. 20, figs. 1-3.

Collections.—498-36, 662-37, 683-37, 728-37. 8 specimens.

Length 15 to 20 mm. Dorsal cirrophores are long, provided with slender acicula, and the cirrostyles greatly surpass the neuropodia in length (pl. 34, figs. 38, 39). Supraacicular setae are slender, lanceolate, serrated along the cutting edge (pl. 34, fig. 41). Subacicular falcigerous setae have a well-developed subterminal tooth, and the shaft is pilose distally save for the smooth blunt tip (pl. 34, fig. 40). The prostomium has 4 dark, reddish-brown eyes, the anterior pair being much the larger.

Distribution.—Juan Fernandez, off southwestern South America; Gulf of California, Mexico. Sublittoral, to 15 fms.

Stauronereis gracilis Hartman

Stauronereis gracilis Hartman, 1938, pp. 100-101, figs. 36-38.

Collection.—905-38. 3 specimens.

Distribution.—California. Intertidal.

Family **Nereidae**

Separation of the Nereidae into genera has long been based, in part, on the disposition of the paragnaths on the proboscidial rings, as also the shape and structure of these parts (Kinberg, 1866, p. 170; Grube, 1873, p. 56; and others). Thus, presence or absence of conical paragnaths on one or both rings has separated such genera as *Nereis, Ceratonereis, Eunereis,* and *Leptonereis.* Admittedly, however, the number of paragnaths on both rings may vary from abundance to rarity between different species, and even differs within certain limits in the individuals in a species. This character, therefore, is to be observed with caution and, if possible, correlated with the nature of other parts.

The genera that are sometimes included in *Nereis* Linnaeus include *Neanthes* Kinberg, *Ceratonereis* Kinberg, *Eunereis* Malmgren, and *Nereis* s. str. If the species of these genera and those of *Leptonereis* Kinberg were to be arranged in a continuous series based on the number of conical paragnaths on the proboscis, the limitation of genera would disappear. If, on the other hand, these species were first grouped into those with, and those without, falcigerous notopodial setae, a more definite criterion for separation might be attained. This would, however, necessitate a redistribution of species within a genus, and a reexamination of many type specimens in which this character has not been made known.

Numerous species of Nereidae have been described from the tropical and subtropical eastern Pacific. Some of these have not been redescribed since first named, and in some instances identity is hardly possible. Such are the following: *Nereis castelnaui, N. rupta,* and *N. pacifica,* described by Quatrefages (1865, pp. 522-524) from Peru. The name of the last was later changed to *N. peruviana* Ehlers (1868, p. 460, footnote) without a redescription. *Nereis chlorodes, N. delicatula,* and *N. gayi* by Blanchard (1849, pp. 22-23), as also *Mastigonereis cuprea* and *Nereis maculata* Schmarda (1861, pp. 112, 102), were described from Chile. Kinberg (1866, p. 173) described *Heteronereis grubei* from Valparaiso and *Nereis tredecimdentata* from the Galapagos Islands (1866, p. 169). *Heteronereis pannosa* from Callao, Peru, and *Nereis rigida* from Puntarenas were named by Grube (1856, pp. 167-172). If the types of these species were to be reexamined, they might be found to be conspecific with subsequently described species.

Key to Genera

1. Peristomium produced so as to project forward, collarlike, under the prostomium; commensal with pagurids . . . . CHEILONEREIS, p. 219
1. Peristomium not so produced 2
2. Proboscis without paragnaths; notopodia without falcigerous setae . . . . LEPTONEREIS, p. 216
2. Proboscis with few to many paragnaths; notopodia with or without falcigerous setae 3
3. Paragnaths present only on maxillary ring; notopodia with or without falcigerous setae . . . CERATONEREIS, p. 217
3. Paragnaths present on both oral and maxillary rings; notopodia with or without falcigerous setae 4
4. Paragnaths on both rings are conical 5
4. Paragnaths are conical except those on area VI (or also on area V), which are transverse; notopodia without falcigerous setae . . . . PERINEREIS, p. 229
4. Paragnaths on the maxillary ring are pectinate 6

5. Posterior notopodia with homogomph falcigerous setae; notopodial preacicular lobe not elongate . . . NEREIS, p. 220

5. Posterior notopodia without falcigerous setae; some notopodial preacicular lobes elongate, especially in a posterior region . . . . NEANTHES, p. 219

6. Proboscidial areas I, II, and V with paragnaths; area VI with transverse plaques; homogomph falcigerous setae absent . . . . PSEUDONEREIS, p. 231

6. Proboscidial areas I, II, and V lack paragnaths, area VI with points; some notopodia with falcigerous setae 7

7. Posterior notopodia with simple, stout, falcigerous setae . . . . UNCINEREIS, p. 231

7. Posterior notopodia with composite, stout, falcigerous setae (pl. 38, fig. 83) . . . . PLATYNEREIS, p. 229

Genus **LEPTONEREIS** Kinberg*

Proboscis lacks chitinous paragnaths. Jaws pale, translucent, with oblique teeth on the cutting edge. Parapodia with heterogomph and homogomph spinigerous setae; neuropodia with heterogomph falcigerous setae. Notopodia without homogomph falcigerous setae. Epitokous forms with 2 or 3 body regions, an anterior and sometimes a posterior region with atokal setae, and a median region with natatory setae.

Kinberg (1866, pp. 178-179) erected 3 genera, *Leptonereis, Nicon,* and *Nicomedes.* Most of the species therein named have since been included under *Leptonereis. Nicon* and *Nicomedes,* in part at least, are epitokous stages of *Leptonereis* species. The following were described from the eastern Pacific: *Nicon loxechini* and *N. virgini* from the Straits of Magellan, *Leptonereis laevis* from Guayaquil, and *Nicon tahitanus* from Hawaii. Unfortunately, most of these are too incompletely known to permit identity.

The collections at hand include numerous specimens of pelagic epitokous stages. They differ greatly among themselves as to number of anterior, atokal segments, and comparative sizes. Until more is known about the sedentary stages from which these are derived, it has been deemed best to postpone the description of them until additional material is available. The one described below has been based on material which permits a more complete diagnosis.

* The types of *Leptonereis, Nicon* and *Nicomedes* have been reexamined, necessitating important changes in these genera. They are to appear in a subsequent revision of some Swedish types.

Leptonereis glauca Claparède, **moniloceras,** new subspecies

Plate 34, Figs. 42-46

Nereis (Leptonereis) glauca Claparède, 1870, pp. 454-455, pl. 7, fig. 3.

Collections.—900-38 (Holotype), 728-37. 4 specimens.

Length of epitokous female is 16 mm; number of setigerous segments 62, including 22 anterior segments with normal setae, 23 median segments with natatory setae, and 17 posterior segments with normal setae. Prostomial antennae and peristomial cirri are annulated distally (pl. 34, fig. 43). The latter consist of a basal ceratophore and about 6 articles, these of approximately equal lengths in the anterior ventralmost cirrus, but in the others the basal articles are greatly elongated. The proboscis lacks paragnaths. Jaws are pale yellow, translucent, with 4 or 5 short, oblique teeth.

Parapodia are long, directed laterally; the dorsal cirri extend distally to the ends of the parapodial lobes in anterior parapodia (pl. 34, fig. 45), but they are surpassed in epitokous parapodia by the dorsal lobe (pl. 34, fig. 46); posteriorly they are proportionately longer (pl. 34, fig. 42). The ventral cirri are shorter and do not reach to the tip of the ventral lobes.

Parapodia are provided with spinigerous setae in notopodia and neuropodia, and heterogomph falcigerous setae (pl. 34, fig. 44) in neuropodia. Acicula are pale yellow. The dorsum is ornamented with a pigmented pattern across the anterior half of the prostomium, and broken transverse lines across the middle of the segments (pl. 34, fig. 43). Parapodial lobes in middle and posterior regions have dark, glandular patches (pl. 34, figs. 46, 42), most conspicuous in the posterior half of the body.

Leptonereis glauca moniloceras differs from the type in that the peristomial cirri are notably longer, and annulated; natatory setae in the female are first present from the twenty-second segment instead of the sixteenth; the pigmentation of posterior parapodia is more extensive and pronounced.

Holotype.—AHF no. 23.

Distribution.—Off Catalina Island, California, in brachiopod colony, in 40 fms; San Esteban Island, Gulf of California. Shore.

Genus CERATONEREIS Kinberg

Proboscis with conical paragnaths on the oral ring, but without paragnaths on the maxillary ring. Notopodia provided with spinigerous setae, or also falcigerous setae (pl. 36, fig. 56). Neuropodia with spinigerous and heterogomph falcigerous setae.

Key to Species

Notopodia with falcigerous setae (pl. 36, fig. 56); palpi greatly elongate, cylindrical, the two widely separated at the base; dorsal cirri attenuate, extending far beyond the tips of the setae . . . . *C. tentaculata,* p. 218

Notopodia without falcigerous setae; palpi not elongate; dorsal cirri only moderately long (pl. 36, fig. 57) . . *C. costae,* p. 218

Ceratonereis tentaculata Kinberg

Plate 35, Fig. 47

Ceratonereis tentaculata Kinberg, 1866, p. 170; Augener, 1913, pp. 168-170 (synonymy); Monro, 1933, p. 45.

Ceratonereis singularis Treadwell, 1929, pp. 1-3, figs. 1-8.

??Nereis tentaculata Treadwell, 1914, p. 190.

Collections.—12-33, 114-33, 197-34, 210-34, 277-34, 498-36, 525-36, 549-36, 607-37, 633-37, 634-37, 638-37, 639-37, 662-37, 683-37, 688-37, D-104. Numerous specimens.

Falcigerous setae (pl. 35, fig. 47) are present, a few in a fascicle, from about the twentieth parapodium. The articulation is slightly heterogomph. Neuropodial falcigerous setae have a similar appendage, but the articulation is clearly heterogomph.

The description of *Ceratonereis singularis* Treadwell (1929, p. 1) from Carmen and San José islands, Lower California, agrees well with that for *C. tentaculata* Kinberg. *Nereis tentaculata* Kinberg was reported from Pacific Grove, California (Treadwell, 1914, p. 190). It may be questioned, however, whether the range of the tropical *C. tentaculata* actually extends so far north in the Pacific.

Distribution.—Tropical and subtropical eastern and western Pacific; Australia; West Indies. Shore, to 40 fms.

Ceratonereis costae (Grube)

Plate 35, Fig. 48

Nereis costae Grube, 1840, pp. 74-75.

Nereis (Ceratonereis) costae Fauvel, 1923, pp. 349-350, fig. 136 (synonymy).

Collections.—13-33, 209-34, 702-37. 4 specimens.

Two small epitokous individuals from La Libertad (13-33). A female has 17 anterior parapodial segments, the first 5 with modified dorsal cirri; there are 46 epitokal segments; total length is 14 mm. A male, with

14 anterior segments of which 7 have modified dorsal cirri, has about 50 epitokal segments and is nearly as long. Color is lacking except for the reddish-brown eyes and a dark transverse band across the dorsum of the second parapodial segment.

Jaws are translucent, dark amber in color, with 5 teeth on the cutting edge. Paragnaths are present as follows: area I with none; area II with a crescent of 2 or 3 rows of paragnaths; area III with a broad patch; area IV with a triangular patch; areas V to VIII with none.

The postepitokal parapodia have middle and ventral lobes about equally long, but the dorsal lobe is longer (pl. 35, fig. 48). Homogomph falcigerous setae are absent. The specimen from 702-37 is an anterior fragment of 17 setigerous segments and a regenerating posterior end. The anterior third of each segment is crossed by a dark band dorsally.

These specimens are referred to *C. costae* largely because the posterior parapodia have a preacicular notopodial lobe (pl. 35, fig. 48).

Distribution.—Mediterranean; Indo-Pacific; Madagascar; Philippines; Ecuador; Gulf of California. Intertidal, to 18 fms.

Genus NEANTHES Kinberg

Neanthes differs from *Nereis* mainly in that the preacicular notopodial lobe elongates, and notopodia have spinigerous setae only. Conical paragnaths are usually present on all areas.

It is of interest that no representatives of this genus are present in the collections of the Hancock Pacific Expeditions. Two species (see below) are in the collections of The University of Southern California. These have heretofore been reported from California (Hartman, 1938, p. 80). Both are fairly common in littoral zones. They are separable as follows:

Posterior notopodial lobe elongate, the dorsal cirrus inserted near its distal end; often estuarine . *N. succinea* (Frey and Leuckart)

Posterior notopodial lobe broadly foliaceous, the dorsal cirrus inserted near the middle of its dorsal convex edge; marine . . . . *N. brandti* (Malmgren)

Genus CHEILONEREIS Benham

Cheilonereis cyclurus (Harrington)

Nereis cyclurus Harrington, 1897, pp. 219-220, pl. 16, figs. 1-3, pl. 17, figs. 1-7, pl. 18, figs. 1-5; Johnson, 1901, p. 400, pl. 4, fig. 46, pl. 5, figs. 48-52; Moore, 1908, pp. 343-344; 1911, p. 246; Ramsay, 1914, pp. 237-240, fig. 1 (synonymy); Treadwell, 1914, p. 190; Berkeley, 1924, p. 292.

Collection.—889-38. One specimen.

No data are available as to its association. Previous records report it commensal with pagurids.

Distribution.—Northeast Pacific, south to southern California; Japan. Subintertidal, to 37 fms.

Genus NEREIS Linnaeus

Differs from *Neanthes* Kinberg in that the notopodial preacicular lobes do not elongate; posterior notopodia are provided with falcigerous setae.

Key to Species

1. Area V of proboscis with numerous paragnaths . . . . *N. pseudoneanthes,* p. 221
1. Area V of proboscis with few or no paragnaths 2
2. Areas VII and VIII of proboscis with few (5 or fewer) paragnaths, disposed in a single row 3
2. Areas VII and VIII with more numerous paragnaths . . 4
3. Parapodial lobes with extensive dark areas, the posterior dorsal lobe exceeds the middle lobe in size (pl. 33, fig. 37); pelagic stages with 23 to 27 anterior atokal segments *N. riisei,* p. 221
3. Parapodial lobes without dark areas, the posterior dorsal lobe not surpassing the middle lobe; pelagic stages with 32 to 38 anterior, atokal segments . . . . *N. paucignatha,* p. 222
4. Posterior parapodia with falcigerous setae (pl. 37, fig. 65) resembling those in Platynereis . . . *N. pseudonereis,* p. 223
4. Posterior parapodia without such falcigerous setae . . . 5
5. Posterior dorsal parapodial lobes not longer than middle lobes (pl. 35, fig. 53) 6
5. Posterior dorsal parapodial lobes extend distally beyond the middle lobes (pl. 37, fig. 69) 8
6. Area V of proboscis with a single large paragnath that exceeds all others in size; prostomium and anterior segments crossed by broken color bands . . . . *N. latescens,* p. 224
6. Area V of proboscis with no such large paragnath; pigmentation pattern otherwise, if present 7
7. Posterior dorsal lobes dark, trapezoidal, broader than middle lobes (pl. 33, fig. 36) . . . . . . *N. neonigripes,* p. 225

7. Posterior dorsal lobes pale, triangular, smaller than middle lobes (pl. 35, fig. 52) . . . . *N. pelagica,* p. 225
8. Area III of proboscis lacks paragnaths . *N. flavipes,* p. 226
8. Area III of proboscis provided with paragnaths 9
9. Posterior dorsal lobes elongate, rectangular (pl. 35, fig. 57); area VIII with larger paragnaths and an oval area of smaller paragnaths on the maxillary side . . . *N. mediator,* p. 227
9. Posterior dorsal lobes with dorsal edge convex; area VIII of proboscis otherwise 10
10. Dorsal lobe ventral to the dorsal cirrus is produced in posterior parapodia (pl. 37, fig. 70) . . . . . *N. veleronis,* p. 228
10. Dorsal lobe ventral to the dorsal cirrus is not produced in posterior parapodia . . . . *N. callaona,* p. 227

Nereis pseudoneanthes Hartman

Nereis pseudoneanthes Hartman, 1936, pp. 470-471, fig. 47.

Collections.—260-34, 288-34. 13 specimens.

Distribution.—Southern California; Gulf of California; Tangola-Tangola, Mexico. Intertidal.

Nereis riisei Grube

Plate 33, Fig. 37

Nereis riisei Grube, 1856, pp. 162-163; Monro, 1933, pp. 43-44 (synonymy); Hartman, 1938, p. 7 (synonymy).

Nereis ambiguus Treadwell, 1937, pp. 149-151, pl. 2, figs. 19-24.

Collections.—11-33, 12-33, 13-33, 99-33, 120-33, 132-34, 148-34, 445-35, 495-36, 498-36, 633-37, 643-37, 788-38. Numerous individuals.

All have deeply pigmented parapodial lobes. The dorsal lobe of posterior parapodia is elongate triangular, inflated (pl. 33, fig. 37). Setae are pale, acicula dark. Homogomph falcigerous setae have a delicately toothed appendage.

The peristomium is about one and one-half times as long as the first parapodial segment. It and the anterior border of the prostomium are dark. There are also paired patches of color on the atokous segments, proximal to the parapodia. The peristomial cirri are slender, and appear irregularly reticulated, the longest extending posteriorly to about the fifth setigerous segment, the shortest about to the distal end of the palpodes.

Epitokous individuals from Ecuador (11-33 and 13-33) include some females that are less than half as large as some of the males. In the former there are 17 anterior setigerous segments, of which 5 have enlarged dorsal cirri. In the male there are 15 (16 in one) anterior setigerous segments, of which 7 have enlarged dorsal cirri.

A specimen from 148-34 has the following proboscidial formula: area I with a single, larger cone; area II with about 12 cones in 2 elongate rows; area III with 10 to 12 in a broad patch; area IV with a crescent of about 12 cones; area V with none; area VI with 4 or 5 tall cones; areas VII and VIII with a single row of few (4 or 5) widely spaced cones. Paragnaths of the maxillary ring are much the larger, and much more numerous. Those of the oral ring are few, small. Jaws have about 8 well-developed oblique teeth on the cutting edge.

Nereis ambiguus Treadwell (1937, p. 149) from Clarion Island has the dark parapodial lobes characteristic of *N. riisei,* and homogomph falcigerous setae as in this species. Its description agrees reasonably well with that for *N. riisei.*

Nereis paucignatha, new species

Plate 36, Figs. 58-62

Collection.—21-33. 2 male epitokous individuals.

Length 37 mm; number of segments 108, including 38 anterior parapodia and 70 provided with natatory appendages. The prostomium is broadly rectangular, the 4 eyes large though well separated, each with a minute pale lens (pl. 36, fig. 59). Prostomial antennae extend distally beyond the palpi but are somewhat wrinkled. The peristomial cirri are long, cirriform, and wrinkled terminally as in the prostomial antennae.

The proboscidial formula is as follows: area I with none; area II with 3 to 5 cones in a row; area III with 1 to 4 cones in a transverse row; area IV with about 9 cones in 2 rows; area V with none; area VI with only 2 cones; area VII with 6 cones in 2 rows, widely spaced, those on the maxillary side the largest; area VIII with none. Jaws have about 7 slightly oblique teeth on the cutting edge, and a distal curved fang.

Dorsal cirri of the first 7 parapodia are thickened, elongated. Parapodia anterior to the natatory region have slender lobes, extending distally not quite so far as the dorsal cirri. The dorsal and ventral cirri are similar to each other except that the dorsal are somewhat the longer (pl. 36, fig. 60). Notopodial setae include homogomph falcigerous setae, the appendage long, serrated along one edge (pl. 36, fig. 58). Neuropodial setae include heterogomph and homogomph spinigerous, and heterogomph falcigerous, the appendage slender, finely serrulated (pl. 36, fig. 62). Natatory parapodia are present from about the thirty-ninth parapodium. The dorsal cirrus is crenulate, with 10 or fewer lobes (pl. 36, fig. 61).

Nereis trifasciata Grube (1878, p. 74), like *N. paucignatha,* has few paragnaths. Augener (1922, p. 177) enhanced the original description and attributed homogomph falcigerous setae to it. In it, however, the epitokous individual has few anterior segments, the male with only 14, the female with 17; in *N. paucignatha* there are about 38 anterior segments.

Nicon eugeniae Kinberg (see Ehlers, 1897, p. 67) has numerous, 26 to 34, anterior segments in epitokous stages. According to Ehlers, however, the prostomium is longer than wide, the peristomial cirri are notably shorter, and there are no homogomph falcigerous setae. *Nereis goajirana* Augener (1933, p. 253) from the West Indies lacks homogomph falcigerous setae, as does also *Nereis kerguelensis* McIntosh (1885, p. 225) from the Kerguelen Islands.

Holotype.—AHF no. 26.

Distribution.—Salango Island, Ecuador. Pelagic.

Nereis pseudonereis, new species

Plate 36, Figs. 63-64; Plate 37, Figs. 65-66

Collections.—326-35 (Holotype), 364-35, 374-35, 384-35. 8 specimens.

Body long, slender; length of 68 setigerous segments (complete) is 20 mm, its width about 1 mm. Parapodia proportionately long, their length over half the width of the body where best developed. Dorsum pigmented with a pattern of broken transverse stripes, a similar pigment at the sides of the prostomium and on the proximal sides of the palpi. Prostomium with a broad rectangular basal portion with 4 dark subequal eyes, and a distal slender portion less than half as wide as the basal portion (pl. 36, fig. 64). Prostomial antennae inserted proximal to one another, their distal ends surpassed by the palpi. Palpi broad, flat, divergent distally, terminate in an elongate article. Peristomial cirri slender, the longest extends posteriorly to the sixth or seventh setigerous segment, when directed posteriorly.

Parapodia are pale except for the free ends of the dorsal, middle, and ventral lobes which are dark (pl. 36, fig. 63). They are conspicuous throughout, the lobes moderately long in the anterior half or about the first 30 segments, the lobes proportionately longer more posteriorly, with a gradual diminution of the parapodial bases. The dorsal cirri, however, continue to surpass the dorsal lobes throughout (pl. 36, fig. 63).

The paragnaths of the proboscis are disposed as follows: area I with 2 cones in tandem; area II with 12 to 15 well-separated cones in 2 or 3 irregular rows, the cones slightly smaller than those of area I; area III with about 100 well-separated small, sharp-pointed cones; area IV with a crescent of 20 to 30 sharp-pointed, small cones. Area V with none; area VI with 4 tall pointed cones; areas VII and VIII with 2 rows of larger pointed cones ventrally and about 3 rows laterally. The paragnaths of these two areas exceed the others in size. Jaws are dark amber, translucent, with about 6 obliquely truncate teeth.

There are spinigerous setae in notopodia and neuropodia, homogomph falcigerous setae (pl. 37, fig. 65) in notopodia from about the twenty-eighth segment. These are unique in that the appendage is much like that present in species of the genus *Platynereis,* the terminal end rounded, with a small boss. Neuropodia are provided also with falcigerous heterogomph setae (pl. 37, fig. 66). Anal cirri are long, slender, about as long as the last 9 segments.

Nereis pseudonereis has affinities with *N. falsa* Quatrefages (see Fauvel, 1923, p. 337), in which similar notopodial falcigerous setae are present. In the latter, however, the posterior parapodial lobes are not like those in *N. pseudonereis* (pl. 37, fig. 72), and the transverse dorsal striped pattern is absent.

Holotype.—AHF no. 27.

Distribution.—Galapagos Islands; Peru. In 3 to 15 fms.

Nereis latescens Chamberlin

Plate 35, Figs. 53-56

Nereis latescens Chamberlin, 1919, pp. 10-11.

Collections.—885-38, 904-38. Numerous specimens from southern California.

Length to 40 mm; number of segments about 80. Paragnaths of the maxillary ring are typically smaller than those of the oral ring. Area I has 1 or 2 tiny teeth in tandem; area II has a triangular patch of 8 to 12 small teeth; area III has a broad band of small paragnaths that reach laterally to area IV but are finer than those of the latter; area IV has a crescent-shaped area of 3 irregular rows; area V has a single, exceptionally large tooth; area VI has 4 larger cones in a diamond arrangement;

area VII has 3 to 5 rows of larger paragnaths, more or less continuous with area VIII but diminishing to only a single row at the sides.

The prostomium is dark brown or rust colored, and a similar pigment forms broken bands across the segments dorsally. Parapodia have diverging middle and dorsal lobes (pl. 35, figs. 53, 56), and a postneuroacicular lobe which is somewhat flaring, but shorter than the acicular lobe itself. Notopodial (pl. 35, fig. 55) and neuropodial (pl. 35, fig. 54) falcigerous setae have appendages about equally long. The former have a few serrations or are quite smooth. The neuropodial falcigerous appendages are delicately spinose along the cutting edge.

Distribution.—California. Intertidal, to 14 fms. Marine and estuarine.

Nereis neonigripes Hartman

Plate 33, Fig. 36

Nereis neonigripes Hartman, 1936, pp. 471-472, fig. 48.

Collection.—901-38. One individual.

Length of 94 segments (not quite complete) is 50 mm. The prostomial lobe is longer than wide; the palpi extend distally slightly beyond the prostomial antennae. The posterior parapodial lobes are dark over their free portions; these lobes are flat, compressed (pl. 33, fig. 36).

Paragnaths are weakly developed, area I without cones; area II with about 8 to 10 cones in 2 sparse rows; area III with about 6 in a transverse row; area IV with 7 or 8 cones in 2 rows; area V with none; area VI with 3 or 4 cones in a transverse row; areas VII and VIII with about 8 larger cones in a row on the maxillary side and 1 or 2 irregular rows of smaller cones on the oral side. Homogomph falcigerous notopodial setae are first present from about the twenty-seventh segment.

Distribution.—Northeast Pacific, south to southern California. Intertidal.

? **Nereis pelagica** Linnaeus

Plate 35, Fig. 52

Nereis pelagica Ehlers, 1868, pp. 511-517, pl. 20, figs. 11-20; Chamberlin, 1919, p. 213; Berkeley, 1924, p. 291; Monro, 1928, pp. 80-81.

Collections.—283-34, 675-37, 874-38, 897-38, 900-38, D-104. 29 specimens.

Length to 30 mm; number of segments about 65; pale except for dark eyes and acicula. The proboscidial formula is approximately as follows: area I with 2 or 3 cones in tandem; area II with an elongate patch of 12 to 15 cones; area III with a broad patch of 10 to 12 smaller cones; area IV with 18 to 24 tall cones disposed in a triangular patch, some of which are heaviest on the maxillary ring, but along the inner side of IV the cones are tiny; area V with none; area VI with 4 or 5 cones in a diamond or 2 irregular rows; areas VII and VIII with a row of larger cones on the maxillary side and 2 or 3 rows of tiny cones on the oral side. In one collection (900-38) some of the paragnaths are inserted on chitinous plaques, much as shown by Fauvel (1914, pl. 14, fig. 6) for individuals of *N. zonata* Malmgren.

Parapodia are typical except that in posterior parapodia the dorsal lobe is notably reduced (pl. 35, fig. 52). Homogomph falcigerous notopodial setae are present from about the twentieth segment. The appendage is slightly curved but lacks teeth. Heterogomph falcigerous neuropodial setae have a short, curved appendage, the basal part about as long as the hooked end, with obscure spinelets along the cutting edge.

In some specimens the peristomial ring is constricted, collarlike, much narrower than the first podal segment, but about twice as long as the latter.

These specimens are referred to *N. pelagica* Linnaeus with some doubt because of the character of the posterior dorsal lobe (pl. 36, fig. 61).

Distribution.—Widely reported from littoral areas in all seas.

Nereis flavipes Ehlers

Plate 35, Figs. 49-51

Nereis flavipes Ehlers, 1868, pp. 549-552, pl. 21, figs. 26-30.

Collection.—728-37. One individual.

A single, complete individual, 40 mm long, has 71 setigerous segments. It agrees reasonably well with the description by Ehlers (1868, p. 549) for the type from the Adriatic Sea. Posterior notopodial lobes are enlarged; the lobe ventral to the attachment of the dorsal cirrus is produced as a triangular elongation (pl. 35, fig. 51). Homogomph falcigerous notopodial setae are present from the nineteenth segment. They have a smooth, falcate appendage (pl. 35, fig. 49). Neuropodial falcigerous setae have a short appendage, with delicate spinelets (pl. 35, fig. 50).

The proboscidial formula is as follows: area I with 2 unequal cones in tandem; area II with a double row of small cones; area III with none; area IV with about 15 cones in a crescentic patch; area V with none; area VI with 6 or 7 taller cones in 2 rows; areas VII and VIII with very many small cones, including an irregular row of larger cones on the maxillary side and about 3 or 4 rows of smaller cones on the oral side.

Distribution.—Mediterranean; San Esteban Island, Gulf of California. Shore.

Nereis mediator Chamberlin

Plate 35, Fig. 57

Nereis mediator Chamberlin, 1918, p. 174; 1919, p. 11.

Collections.—902-38, 904-38, 906-38, 913-39. 6 individuals.

Length to 60 mm; number of segments about 80. Prostomium slightly longer than wide, its antennae not reaching distally as far as the palpi. Peristomium about twice as long as the second segment, smooth dorsally and ventrally, usually forming a tumid lower lip, which, when the proboscis is retracted, is often produced forward beneath the palpi.

Paragnaths are pale to dark brown. Area I has 2 or 3 teeth in tandem; area II has about 16 small cones in a crescent; area III has 3 or 4 transverse rows of tiny paragnaths forming an oval patch; area IV has a curved patch of paragnaths larger than those of area III; area V has 3 or 4 tiny cones or sometimes none; area VI has 4 large, tall cones disposed in a diamond arrangement; area VII has a few small cones in a patch on the maxillary side and several rows of mostly larger paragnaths; area VIII has larger paragnaths, in a broad band, continuous with those of area VII.

Posterior parapodia have elongate, rectangular lobes, the dorsal and ventral sides approximately parallel (pl. 35, fig. 57). Homogomph falcigerous setae are present in fascicles of 1 to 3 in posterior parapodia, usually unaccompanied by other setae.

Distribution.—Northeast Pacific, south to southern California. Intertidal.

Nereis callaona (Grube)

Nereilepas callaona Grube, 1856, pp. 165-166.

Nereis callaona Ehlers, 1901, pp. 108-109, pl. 13, figs. 13-20 (synonymy).

Nereis heterocirrata Treadwell, 1931, pp. 1-2, fig. 1; Hartman, 1938, p. 14.

Nereis eucapitis Hartman, 1936, pp. 468-469, fig. 46.

Collection.—127-33. 5 specimens.

Fauvel (in litt.) has suggested the synonymy given above. I have been able to compare descriptions and collections only from southern California and the Gulf of California. Grube's original specimens came from Peru. A comparison with South American collections would be desirable.

Distribution.—Eastern and western Pacific. Littoral.

Nereis veleronis, new species

Plate 37, Figs. 67-73

Collections.—373-35, 384-35 (Holotype), 385-35, 395-35. 12 specimens.

Length of 38 anterior segments is 21 mm; another nearly complete, with 65 segments, is 26 mm long (393-35). The prostomium is broadly rectangular, the 4 dark eyes subequal, well separated from one another. Prostomial antennae are nearly half as long as the prostomium, and separated at their bases (pl. 37, fig. 67).

Peristomial cirri are short, the longest extending distally to the third parapodial segment. The peristomial segment is about twice as long as the first parapodial segment (pl. 37, fig. 67).

Paragnaths are tall, conical, though small. Area I has 2 cones in tandem, which exceed in size the others on the maxillary ring; area II has about 15 to 20 in 2 or 3 irregular rows; area III has 30 to 50 smaller points in a broad transverse patch, approximately in 3 rows, those on the maxillary side the smallest; area IV has about 20 to 25 in a triangular patch; area V has none; area VI has 5 to 9 smaller, subequal, in 2 rows; areas VII and VIII have a continuous band of numerous cones, forming 1 or 2 rows at the sides, but 4 to 6 rows ventrally.

Parapodia in anterior segments (pl. 37, fig. 68) resemble those of *Nereis zonata* Malmgren. In the more posterior parapodia, the dorsal lobes are conspicuously larger, the dorsal lobe elongate, the dorsal cirrus carried distally (pl. 37, figs. 70, 69). In posteriormost parapodia the middle and ventral lobes are far surpassed by the dorsal lobe (pl. 37, fig. 69). Homogomph falcigerous notopodial setae are present from about the thirtieth segment; their appendages are short, smooth (pl. 37, fig. 73). Heterogomph falcigerous neuropodial setae have an appendage that is finely serrated (pl. 37, fig. 72).

Collection 384-35 includes a male epitokous specimen 16 mm long. It consists of 14 anterior segments in which the first 7 segments have modified dorsal cirri and 39 posterior, epitokous segments. A typical parapodium is shown in plate 37, figure 71.

Nereis veleronis differs from *N. zonata* Malmgren (1868, p. 164) in that the posterior dorsal lobes are notably different, the dorsal edge strongly convex, the lateral edge drawn out in a triangular lobe.

Holotype.—AHF no. 28.

Distribution.—Peru. In 5-16 fms.

Genus **PERINEREIS** Kinberg

Perinereis monterea (Chamberlin)

Nereis (Neanthes) monterea Chamberlin, 1918, pp. 174-175.
Nereis monterea Berkeley, 1935, pp. 769-770.
Perinereis monterea Hartman, 1936, p. 32.
Nereis spinifera Treadwell, 1929, pp. 5-6, figs. 15-20.

Collections.—Numerous specimens, probably collected from southern California, but lacking more complete data, in the collections of The University of Southern California.

Length to 65 mm; width to 4.5 mm; number of segments 100 to 130. Color in life pale with reddish-brown pattern, a quadrate patch on the middle dorsum of each segment, darkest and most extensive on the anterior segments and becoming paler posteriorly.

Paragnaths are dark brown. Area I has a single, stout conical cone; area II has about 6 cones in 3 transverse rows; area III has numerous points in 4 transverse series; area IV has numerous cones in an elongated patch; area V has a single, stout tooth; area VI has one transverse piece; areas VII and VIII form a continuous band of several rows of larger paragnaths.

Nereis spinifera Treadwell (1929, p. 5) from Puget Sound is probably the same. Its description agrees reasonably well with that for *P. monterea* (Chamberlin).

Genus **PLATYNEREIS** Kinberg

Platynereis polyscalma Chamberlin

Plate 38, Figs. 76-83

Platynereis polyscalma Chamberlin, 1919, pp. 219-226, pl. 30, figs. 5-8, pl. 31, figs. 1-10, pl. 32, figs. 1, 2; Horst, 1924, pp. 186-187; Monro, 1931, p. 18; Fauvel, 1931, pp. 23-25, pl. 3, figs. 1-6; Fauvel, 1932, pp. 114-116; Hartman, 1938, p. 15.
Platynereis integer Treadwell, 1920, pp. 595-597, figs. 1-4.

Collections.—8-33, 11-33, 13-33, 495-36, 503-36, 622-37, 639-37. Numerous specimens.

The atokous stage has heretofore been unknown. It is, therefore, of interest to find it in the collections. The following description is based on individuals from stations 495-36, 503-36, 639-37.

Length to 50 mm; number of segments 70 to 100. Pale (preserved) except for black eyes. These have white opaque areas (pl. 38, fig. 76) as typical of the epitokous stage. Parapodia, particularly in the posterior region, have opaque areas on the lobes and dorsal and ventral bases. Setae are pale yellow, acicula black.

The prostomium is broad, depressed, about as wide as long, the 4 eyes large, wide apart, lenticulated (pl. 38, fig. 76). The prostomial antennae exceed the palpi in length. The latter are directed ventrally. Peristomial cirri are long, slender, smooth, the longest extending distally to about the eleventh parapodium.

The proboscis lacks paragnaths on areas I, II, and V; area III has 7 or 8, more or less separated, small patches of pectinae; area IV has a crescentic area of pectinae in 3 or 4 rows; area VI has a short row of pectinae, and sometimes also a much shorter row on the maxillary side; areas VII and VIII have a single transverse series of 5 patches, the 3 ventralmost the longer, the 2 lateral areas short. All paragnaths save those on area IV are weakly developed. Jaws are thin, pale, amber colored except for brown tips; they have 5 teeth on the cutting edge.

Parapodia are well developed throughout, the free lobes increasing in length from anterior to posterior regions. The acicular lobes are distally acute (pl. 38, figs. 77-80). Dorsal, middle, and ventral lobes are elongate, the dorsal lobe extending distally beyond the others. Dorsal cirri are longest in anterior segments; they extend distally far beyond the setal tips. More posteriorly they are shorter, but in atokous individuals they extend beyond the setae.

Setae include those typical of the genus. Homogomph falcigerous notopodial setae (pl. 38, figs. 81-83) are present from about the fourteenth segment. The appendage is terminally smooth except for a minute boss. Throughout, they are accompanied by spinigerous setae, but the latter decrease in number posteriorly. Neuropodia are provided with spinigerous and falcigerous setae. The appendage of the latter is short, recurved (pl. 38, fig. 82), the lateral spinelets fine, hairlike.

Included in the dredged collections from Cape San Lucas (495-36) are several approaching epitoke (nereilepas stage). A male consists of about 90 segments, is 20 mm long, and has the first 7 parapodia modified. After the thirteenth segment, the epitokal lappets are gradually developed, but there is no abrupt transformation of the parapodia. A typical parapodium in this area is shown in plate 38, figure 79. Similarly, a female from the same collection consists of 85 segments, is 23 mm long, resembles the male, but the dorsal cirri are smooth (pl. 38, fig. 77).

Numerous pelagic epitokous individuals from Ecuador have been identified with this species, as redescribed by Monro and Fauvel (see synonymy above). In the female, there are 22 atokous parapodia; segments 23 and 24 are transitional, the first 5 having modified dorsal cirri. The posteriormost parapodia have the characteristic ribbed setae as described by Chamberlin; the prostomium is greatly elongated. It was at first thought that the atokous specimens from the Gulf of California belonged to another species because of the differences in the parapodia. Since, however, the proboscidial armature (see above) agrees well with that described by Fauvel (1932, p. 115) and the homogomph falcigerous setae (pl. 38, fig. 83) are much like those in epitokous individuals (pl. 38, fig. 81) in which ribbed setae are present, it is assumed that all belong to a single, widely represented species.

Distribution.—Tropical Pacific; Indo-Pacific. Pelagic, to 15 fms.

Genus **PSEUDONEREIS** Kinberg

Pseudonereis gallapagensis Kinberg

Pseudonereis gallapagensis Kinberg, 1866, p. 174; Gravier, 1909, pp. 629-633, pl. 16, figs. 15-20; 1910, pp. 102-104, pl. 5, fig. 11, pl. 6, figs. 15, 17-20; Kinberg, 1910, p. 52, pl. 20, fig. 3; Fauvel, 1932, p. 111.

Collections.—11-33, 16-33, 19-33, 154-34, 260-34, 380-34, 837-38. 12 individuals.

The paragnaths are disposed as follows: area I has 1 to 3 cones in tandem; area II has 3 rows of pectinae in close, trim series; area III has 4 rows of pectinae in close series, the row on the maxillary side the shortest; area IV has 5 rows of pectinae arranged in a V-shaped mass; area V has a single stout cone; area VI has a single broad transverse plaque; areas VII and VIII have a single row of paragnaths, those on VIII alternating cones and elongate pieces. Epitokous individuals have 14 anterior parapodia, the fifteenth and sixteenth being transitional.

Distribution.— Eastern Pacific, from western Mexico south to the Straits of Magellan; Indo-Pacific. Intertidal.

Genus **UNCINEREIS** Chamberlin

Uncinereis agassizi (Ehlers)

Nereis agassizi Ehlers, 1868, pp. 542-546, pl. 23, fig. 1.
Platynereis dumerilii var. *agassizi* Monro, 1933, pp. 44-45 (synonymy).
Uncinereis agassizi Hartman, 1936, p. 32 (synonymy).

Collections.—12-33, 66-33, 148-34, 169-34, 177-34, 182-34, 193-34, 234-34, 283-34, 364-35, 391-35, 395-35, 495-36, 530-36, 532-36, 549-36, 563-36, ?567-37, 610-37, 683-37, 706-37, 843-38, 845-38, 881-38, 882-38, 888-38, 898-38, 900-38, D-93, D-104. Numerous specimens.

Simple, uncinigerous setae are generally present from the tenth to twelfth segment.

Distribution.—Eastern Pacific from British Columbia south to Peru; Australia (Augener); Japan. Intertidal, to 900 fms.

Family Nephthyidae

The Nephthyidae are represented in the collections by 12 species, or subspecies, 3 of which are thought to be new, and most of the others are known only through one or a few records. Only 2 are typically intertidal. It is to be expected, however, that this number will be considerably enhanced once our knowledge of sandy beaches is increased. All of the others were taken from dredgings in shallow waters, regions that have been little explored. These areas may be expected to yield rich returns when intensively studied.

Genus NEPHTHYS Cuvier

Key to Species

1. Proboscis without papillae; recurved cirri involute; dorsal and ventral cirri long, conspicuous, surpassing the other parapodial lobes in length (pl. 39, fig. 84) . . . . *N. inermis,* p. 234

1. Proboscis provided distally with well-developed papillae; recurved cirri involute or curved outward; dorsal and ventral cirri not surpassing the other lobes in length 2

2. Recurved cirri involute (pl. 40, fig. 94); lyre setae (pl. 40, fig. 95) present or absent 3

2. Recurved cirri directed outward (pl. 39, fig. 87); lyre setae absent 5

3. Postsetal lobes serrated, divided in 4 lobes in posterior parapodia (pl. 40, fig. 94); lyre setae absent . *N. lobophora,* p. 234

3. Postsetal lobes not serrated; lyre setae present or absent . . 4

4. Postsetal lobes expanded, foliaceous (pl. 39, fig. 90); notopodial acicular lobe prolonged in a slender process; dorsal edge of neuropodia with slender lobe . *N. macroura peruana,* p. 236

4. Postsetal lobes short, inconspicuous in posterior parapodia; notopodial acicular lobe not so prolonged; dorsal edge of neuropodia with a slender, digitate lobe . . *N. dibranchis,* p. 237

5. Dorsal surface overlain, at sides, by closely imbricated, scalelike expansions of the dorsal edge of the notopodia; notopodial and neuropodial postsetal lobes greatly elongated, foliaceous (pl. 41, fig. 98) . . . . *N. squamosa,* p. 237
5. Dorsal surface without imbricated lappets; parapodial lobes otherwise 6
6. Recurved cirri present from tenth or eleventh setigerous segment, absent from posterior fifth of body; proboscis proximally covered with minute, conical, chitinous prickles . . . . *N. punctata,* p. 239
6. Recurved cirri present from third to fifth setigerous segment, continued through all or most of body length 7
7. Prostomium with a pair of black eye spots on its posterior half (pl. 41, fig. 100); recurved cirri present from third setigerous segment . . . . *N. magellanica,* p. 238
7. Prostomium without black eye spots; recurved cirri present from third setigerous segment or beyond 8
8. Neuropodial postsetal lobes greatly elongated, expanded (pl. 39, fig. 87) in median and posterior parapodia, considerably surpassing the corresponding notopodial lobe *N. assimilis,* p. 239
8. Neuropodial lobes otherwise 9
9. Acicular lobes conical; the aciculum projects from the distalmost part of the lobe (pl. 42, figs. 106, 107) . . . . *N. panamensis,* p. 239
9. Acicular lobes, at least in notopodia and usually also in neuropodia, are bilobed; the tip of the aciculum projects from the lobe at its deepest part (pl. 42, fig. 110) 10
10. Proboscis with a median dorsal papilla; postacicular setae stiff, the spinose area extending nearly across the width where best developed; pigmented pattern of prostomium and first few segments extensive 11
10. Proboscis without a median dorsal papilla; postacicular setae soft, silky, flowing; pigmented pattern of prostomium limited . . . . *N. californiensis,* p. 240
11. Recurved cirri first present from fourth segment; posterior neuroacicular lobes bilobed; recurved cirri slender, taper distally . . . . *N. caecoides,* p. 240
11. Recurved cirri first present from third segment; posterior neuroacicular lobes conical (pl. 42, fig. 112); recurved cirri thick, blunt (pl. 42, figs. 110, 112) . . . . *N. caecoides ferruginea,* p. 241

Nephthys inermis Ehlers

Plate 39, Figs. 84-86; Plate 40, Fig. 95

Nephthys (Aglaophamus) inermis Ehlers, 1887, pp. 125-128, pl. 38, figs. 1-6.

Nephthys inermis Fauvel, 1923, pp. 375-376, fig. 147; 1933, pp. 47-50, fig. 3.

Collections.—633-37, 863-38. 3 specimens.

The longest (863-38) is 73 mm long for 85 segments; a posterior piece is lacking. Two smaller individuals (633-37) measure about 30 mm for 81 segments. The prostomium has 4 dark spots disposed in a rectangle near the posterior border. The proboscis is unarmed.

Recurved cirri are involute, first present from the fourth setigerous segment, though at first minute. By the tenth segment they are much larger and nearly fill the interramal space. At the base, on the outer side, there is an elongate papilla, directed laterally (pl. 39, fig. 85). Dorsal and ventral cirri are long, conspicuous throughout (pl. 39, figs. 84-86). Acicular lobes are pointed, conical (pl. 39, fig. 85); the acicula are pale amber in color and project from the lobes. Notopodial postsetal lobes are transversely elongate, their greatest width attained in the postmedian region (pl. 39, figs. 84, 86). Lyre setae (pl. 40, fig. 95) are as heavy as, or slightly heavier than, the postacicular setae.

Distribution.—Off southern Florida; Mediterranean Sea; Gulf of Suez; Gulf of California; Bahia Honda, Panama. Subintertidal, to 53 fms. This marks the first record from the eastern Pacific.

Nephthys lobophora, new species

Plate 40, Figs. 91-94

Collections.—826-38, 832-38 (Holotype). 2 specimens.

Two incomplete individuals; the larger (holotype) consists of 92 setigerous segments and is 115 mm long. The smaller is in 2 pieces, 59 and 20 segments, with lengths 55 and 18 mm, respectively, but incomplete posteriorly. The larger has the proboscis partly protruded. General color is iridescent gray. The prostomium is only slightly darker, the setae yellowish, acicula amber colored.

The prostomium is hexagonal, the nuchal organs conspicuous, elongate on the postectal margin. No pigmented pattern or eyes are visible on the preserved material. The proboscis has 22 rows of papillae on its distal part, but no median papilla. On its proximal part there are numerous, low, soft conical papillae, adnate at their bases, but the part immediately bounding the mouth is smooth.

Recurved cirri are involute, present from the third setigerous segment to the end of the pieces. Where best developed, they circumscribe almost 2 complete whorls (pl. 40, fig. 93).

Parapodia are conspicuously lobed throughout. They have large, foliaceous lobes, posterior to the longer setae, on the sides proximal to the interramal space. Also, there are shorter, broad lamellae on the dorsal face of the notopodium and ventral to the foliaceous neuropodial lobe. In anterior segments (about the first 20) these lobes are entire. More posteriorly they are serrated (pl. 40, figs. 91, 94). The neuropodial postsetal lamellae are simple, entire in the first 25 to 30 parapodia (pl. 40, fig. 93); then for about 10 to 12 segments they are distally serrated, consisting of 2 or 3 lobes, the ventralmost broadest but shortest. From about the fortieth to forty-fifth segment the postsetal lamellae consist of 4 lobes, and this arrangement continues to the end.

The notopodial postsetal lobes are similarly divided; the first serrations occur at about the twenty-second segment and are increasingly deeper and more regular until 4 lobes are present (pl. 40, fig. 94) from about the fortieth segment. Ventral cirri are clavate and terminate in a slender point.

Setae are of 2 kinds: preacicular barred, and heavier postacicular spinose setae. These have a pilose base and a slightly serrated distal portion (pl. 40, fig. 92). The tip is smooth, pointed.

Nephthys lobophora was at first thought to be the same as *N. polyphara* Schmarda (1861, p. 89) from Chile. Both have conspicuous parapodial lobes, including serrated postsetal lamellae, and the postacicular setae are pilose basally, with only weak serrations distally. In *N. polyphara* the recurved cirri are probably shown in an unnatural position, dorsal to the notopodium instead of in the interramal space. Discounting this seeming difference, there are others which indicate that the two are distinct from each other. *N. polyphara* has 12 rows of papillae on the proboscis, *N. lobophora* has 22 rows. In *N. polyphara* the parapodial "obere Ast trägt eine lange fadenförmige, stark eingerollte, cirrenartige Kieme [recurved cirrus turned unnaturally upward?]. Unter ihr steht ein kleines rundliches Blatt" [the dorsalmost postsetal lamella?]. In *N. lobophora* the smaller, rounded lobe is dorsal to the recurved cirrus and to the foliose lobe (pl. 41, fig. 102). In *N. polyphara* the postsetal lamella has "drei zungenförmige Lappen." In *N. lobophora* there are 4 lobes (pl. 40, fig.

94). The color notations by Schmarda were made, presumably, on the living individual, hence cannot be used for comparison. In so far as I am aware, *Nephthys polyphara* has not been reexamined or recorded since first described.

Holotype.—AHF no. 30.

Distribution.—Peru. In 10-30 fms.

Nephthys macroura Schmarda, **peruana,** new subspecies

Plate 39, Figs. 89-90; Plate 40, Figs. 96-97

Nephthys macroura Schmarda, 1861, p. 91, figs. B, K, b.
Nephthys macrura Gravier, 1911, pp. 98-99; Fauvel, 1916, pp. 436-438, pl. 8, figs. 1-3.

Collections.—823-38 (Holotype), 833-38. 2 specimens.

Two anterior fragments consist of 39 and 25 segments and are 21 and 12 mm long, respectively. They are pale except for a dusky elongate, triangular patch on the prostomium covering most of its dorsum, and pale yellow setae. The prostomial lobe is trapezoidal, widest anteriorly.

Recurved cirri are involute, the first present from the third setigerous segment, small, about as large as its dorsal cirrus, which is proximal at its base. At the fourth segment they are much larger, and by the tenth segment come to occupy most of the interramal space.

The postsetal lamellae are conspicuous, as in the type species, from about the sixth segment, but reach their maximal development posterior to the widest part of the body. The acicular lobes of both notopodia and neuropodia are elongate beyond the point of emergence of the acicula. In the notopodium the lobe is ventral to the aciculum; in the neuropodium it is dorsal (pl. 39, fig. 89). These lobes are present in at least the first 39 segments, but after the thirty-fifth they diminish in size (pl. 39, fig. 90).

Acicula are pale. Setae are yellow, numerous, long, silky, flowing. They include preacicular barred (pl. 40, fig. 97) and finer, though longer, postacicular spinose setae. In the latter the spiny area is sparse and narrow (pl. 40, fig. 96). No lyre setae have been observed.

N. macroura peruana differs from the type species most conspicuously in that the acicular lobe is produced distally in a slender, digitate process that extends far beyond the tip of the aciculum (pl. 39, fig. 89).

Holotype.—AHF no. 31.

Distribution.—Peru. In 10-40 fms.

Nephthys dibranchis Grube

Nephthys dibranchis Grube, 1878, p. 536; McIntosh, 1885, pp. 161-162, pl. 26, figs. 8, 9, pl. 27, fig. 5; Augener, 1923, pp. 15-16; Fauvel, 1932, pp. 117-118; Monro, 1933, pp. 56-57, fig. 24; Hartman, 1938, p. 146.

Nephthys mirasetis Hoagland, 1920, p. 610, pl. 48, figs. 5-8.

Collections.—185-34, 187-34, 213-34, 250-34, 421-36, 436-36, 492-36, 513-36, 667-37, 668-37, 770-38. Numerous specimens.

The prostomium has 2, more or less clearly distinguishable, minute, black eye spots on its posterior half. The proboscis has 22 rows of papillae and is finely punctate proximally.

Recurved cirri are involute, present from the fourth or fifth setigerous segment. The lyre setae are much finer than either the barred preacicular or the serrulated postacicular setae.

Distribution.—Eastern and western southern Pacific; Galapagos Islands; Panama (Pacific); western Mexico; Gulf of California. Intertidal, to 60 fms.

Nephthys squamosa Ehlers

Plate 41, Figs. 98-99

Nephthys squamosa Ehlers, 1887, pp. 128-131, pl. 37, figs. 7-10; Augener, 1918, pp. 159-160, pl. 3, fig. 67; Monro, 1933, pp. 52-53.

Collections.—546-36, 632-37, 669-37, 735-37, 856-38, 900-38. 10 specimens.

The proboscis has 22 rows of terminal papillae; it is smooth proximally. Recurved cirri, present from the fourth setigerous segment, are long, curving outward, though perhaps small or absent from at least some posteriormost segments. The prostomium is subtrapezoidal, broadly rounded anteriorly and somewhat longer than wide, hence differing from that described by Ehlers (1887, pl. 37, fig. 7).

The dorsal lamellae are broad, foliaceous, lying flat over the dorsum, recalling the elytra of a polynoid. Both dorsal and ventral postsetal lamellae are elongate, foliaceous. The dorsal cirrus, also, is longer than typical of this species. Neuropodia have a slender, digitate lobe at their dorsal edge (pl. 41, fig. 98) not shown by Ehlers (1887, pl. 37, fig. 8), but believed to be referred to in the text (1887, p. 130), "auf seiner [untere Ast] vorderen Fläche steht am oberen Rande eine kleine schmale und dünne Lippe, welche nicht weiter als die Spitze hinausragt."

Postacicular setae are lanceolate, with cutting edge minutely serrated. Barred setae are slenderer than the lanceolate setae. Lyre setae are absent.

Augener (1918, p. 159) added to the original description, based on collections from west Africa and a reexamination of the types. This study reveals the presence of postlamellar lobes that are notably shorter than those in specimens from the Pacific (pl. 41, figs. 98, 99). Also, the bars of the preacicular setae are proportionately broader. These differences, however, do not seem sufficiently basic to warrant the erection of another name.

Monro (1933, p. 140) questionably referred some fragmentary specimens to this species. These agree with the individuals herein noted in having a "long, leaf-shaped, pointed, ventral posterior lamella." Whether or not the dorsal lamella is also long is not made known.

Distribution.—Off Florida; west Africa; Gorgona Island, Ecuador; Colombia; Gulf of California; Catalina Island, California. Subintertidal, to 118 fms.

Nephthys magellanica Augener

Plate 41, Figs. 100-103

Nephthys magellanica Augener, 1912, pp. 208-211, figs. 27, 28.
Nephthys magellanica Hartman, 1938, pp. 146-147, fig. 62 (synonymy).

Collections.—259-34, 279-34, 285-34, 438-35, 456-35, 530-35, 533-36, 549-36, 577-36, 620-37, 628-37, 662-37, 675-37, 677-37, 692-37, 696-37, 702-37, 705-37, 706-37, 725-37, 732-37, 734-37, 747-37, 833-38, ?843-38, 845-38, 870-38, Acc. 600. Numerous specimens.

The prostomium is broad, spatulate, with a pair of deeply embedded, black eye spots. Some individuals have a dark blotch near the middle (pl. 42, fig. 109). The nuchal organs, conspicuous when everted, lie proximal to the first notopodial lobe (pl. 41, fig. 100). The proboscis has a median dorsal papilla and 22 rows distally. It is smooth proximally.

Recurved cirri are digitiform, present from the third setigerous segment. Setae are long, silky, flowing, including three kinds. The preacicular setae are barred (pl. 41, fig. 101). Postacicular setae are of two kinds. They include numerous long, serrulated setae, with transverse rows of spines limited more or less to the broadest part (pl. 41, figs. 103, 104), and paler, lanceolate, finely denticulated setae (pl. 41, fig. 102) present posterior to the twenty-fifth segment. There is, in addition, a smaller, shorter, postacicular seta, intergrading with these two, in which the exposed bases are finely pilose.

Specimens from Independencia Bay, Peru (833-38), differ somewhat from the others in that the postsetal lamellae are longer and distally more acute.

Distribution.—Straits of Magellan, north to southern California; Gulf of California. Subintertidal, to 75 fms.

Nephthys punctata Hartman

Nephthys punctata Hartman, 1938, pp. 155-156, fig. 67.

Collection.—?Mission Bay, California. One specimen.

Distribution.—Alaska; California.

Nephthys assimilis Oersted

Plate 39, Figs. 87-88

Nephthys assimilis Oersted, 1843, p. 33, figs. 93, 100.

Nephthys assimilis Moore, 1908, p. 342; Treadwell, 1914, p. 193; Berkeley, 1924, p. 290.

Collections.—495-36, 770-38. 3 specimens.

Long, slender; length of 53 anterior segments is 32 mm. The prostomium is rectangular, longer than broad, thin, spatulate. The first segment is prolonged, its parapodia directed anteriorly. A recurved cirrus is present from the fourth setigerous segment, the first already fairly large, exceeding in size its respective dorsal cirrus.

The anterior neuropodial lobes have a bluntly digitate, superior lobe (pl. 39, fig. 88), which decreases in size after the fifteenth segment and is absent from about the twenty-fifth segment. The notopodial acicular lobe is bifid, the 2 lobes so formed each smoothly rounded, thus differing from the condition in *N. hombergii* Savigny, where the 2 lobes diverge from one another. The postsetal lamellae of the neuropodia are greatly elongate, thin, foliaceous (pl. 39, fig. 87). Setae include long, spinose in the postacicular fascicles, and barred setae in the preacicular fascicle. Lyre setae are absent.

Distribution.—Northeast Atlantic; northeast Pacific. Subintertidal, to 15 fms.

Nephthys panamensis Monro

Plate 41, Fig. 105; Plate 42, Figs. 106-109

Nephthys panamensis Monro, 1928, pp. 81-82, figs. 3-4.

Collections.—451-35, 499-36. 2 specimens.

Two anterior fragments, 55 and 37 segments, measure 29 and 16 mm, respectively. Both are brownish yellow, with a pattern of broad, transverse dark bands dorsally, a similar pigment distributed on the prostomium (pl. 41, fig. 105). On the ventral side there is a dark longitudinal stripe in the neural area, darkest in the anterior, inflated part. The proboscis (dissected) has 22 rows of papillae distally. Proximally it is smooth.

Recurved cirri are directed outward. They are cirriform, present from the third setigerous segment to the end of the pieces, and do not fill the interramal space. Where best developed, at about the twenty-fifth segment, they extend distally to the neuropodium, but by the fiftieth segment (pl. 42, fig. 106) they are much smaller.

Parapodia are well developed, the rami of the first few segments approximately as far apart as those of the fifty-fifth segment, but those of the latter are longer. The postsetal lobes are conspicuous, broad, foliaceous, extending distally nearly as far as the shorter postacicular setae. They are slightly concave so as to partly envelop the fan-shaped postsetal fascicles. The preacicular lobes are broadly oval, but comparatively short. They conceal most of the acicular lobes except for their free ends where the acicula emerge.

Setae are burnt amber in color. The preacicular fascicle contains 15 to 20 slender, barred setae which are curved at their distal ends, the barred area limited to the distal half of the free part of the seta. The postacicular fascicle includes numerous, longer, serrated setae (pl. 42, fig. 109), coarser than the barred setae, and also fewer, almost smooth, though similar setae in the dorsalmost and ventralmost parts of the notopodial and neuropodial fascicles. No lyre setae have been observed.

Nephthys panamensis has heretofore been known only through a single, incomplete, macerated individual (Monro, 1928, p. 81). The individuals described above are believed to be the same because of the similarity in the parapodial lobes of the median segments, the presence of a dark neural stripe, and the dark markings on the prostomium.

Distribution.—Panama; Gulf of California. Intertidal, to 50 fms.

Nephthys californiensis Hartman

Nephthys californiensis Hartman, 1938, pp. 150-151, fig. 64.

Collections.—284-34, 871-38, 906-38, Acc. 587, Acc. 590. 12 specimens.

Distribution.—California; Gulf of California. Intertidal, to 30 fms.

Nephthys caecoides Hartman

Nephthys caecoides Hartman, 1938, pp. 148-149, fig. 63.

Collections.—616-37, 876-38, 885-38, 886-38, 887-38, 888-38, 889-38, 891-38, 892-38, 893-38, 894-38, 896-38, 897-38, 903-38, 905-38, 908-38, 909-38, 913-39. Numerous specimens.

Distribution.—California; Gulf of California. Intertidal, to 90 fms.

Nephthys caecoides Hartman, **ferruginea,** new subspecies

Plate 42, Figs. 110-114; Plate 43, Fig. 115

Nephthys caecoides Hartman, 1938, pp. 148-149, fig. 63.

Collections.—379-35, 492-36, 820-38, 823-38, 834-38 (Holotype), 876-38. 24 specimens.

No individuals are complete. Length of 46 anterior segments is 30 mm; the greatest width, at segments 10 to 13, is 3 mm. The anterior end, through about the first 15 segments, is distended, barrellike, deeply pigmented with a rust-colored pattern consisting of transverse bars across the middle of the segments and longitudinal stripes at the sides (pl. 43, fig. 115). The proboscis has 22 rows of papillae and a median dorsal papilla. It is smooth proximally.

Recurved cirri are directed laterally. They are first present from the third setigerous segment and continue posteriorly to the ends of the pieces. They are broad, flattened, but not foliaceous, and terminate in blunt tips (pl. 42, figs. 110-112). The dorsal cirri are slender and notably longer than is typical for *N. caecoides* Hartman (1938, p. 147).

The acicular lobes are bilobed in anterior segments (pl. 42, figs. 110, 111). Neuroacicular lobes in posterior segments are conical (pl. 42, fig. 112). Setae resemble those in *N. caecoides.* The barred setae are slenderer (pl. 42, fig. 114) than the spinose setae, their thickness less than half that of the latter. The spinose setae (pl. 42, fig. 113) have extensive serrulations, extending nearly across the width on the outer side, where best developed. Lyre setae are absent.

N. caecoides ferruginea differs from the type species in that the recurved cirri are first present from the third segment instead of the fourth; the posterior neuroacicular lobes are conical; the anterior region, through about the first 15 segments, is distended; the dorsal pigmented pattern is more extensive.

Holotype.—AHF no. 29.

Distribution.—Peru, north to Anacapa Island, southern California. In 10 to 45 fms.

Family **Glyceridae**

Key to Genera

Parapodium with a single aciculum and only composite setae, with one presetal and one postsetal lobe; branchiae absent; support of jaw (aileron) a simple, rodlike structure . . . . HEMIPODUS, p. 242

Parapodium with 2 acicula, simple and composite setae, with one or 2 presetal and postsetal lobes; branchiae absent or present; aileron generally broadest at the base and terminating distally in one or 2 unequal, slender bars . . . GLYCERA, p. 244

Genus **HEMIPODUS** Quatrefages

This genus was erected for *Hemipodus roseus* Quatrefages (1865, pp. 194-196) from Chile. Earlier, *Glycera simplex* Grube (1856, pp. 177-178) had been described from Chile and Peru. This species belongs to the same genus. Schmarda (1861, pp. 93-94) briefly described *Glycera diodon, G. macrorhiza, G. micrognatha,* and *G. monodon,* all from Chile. Ehlers (1901, p. 155) considered all of the above-named to belong to one species, for which he retained the name, *H. simplex* (Grube). Arwidsson (1899, pp. 28-30), however, considered *H. roseus* Quatrefages and *H. patagonicus* Kinberg (1866, p. 245) distinct from each other. Ehlers based his conclusions on a study of the postsetal parapodial lobes. He indicated intergrading variations in these structures, from a simple, rounded to a bilobed condition. A comparative structure of other parts might have led to different conclusions. A reexamination of either the types or collections from the type localities might prove interesting.

Later, *Hemipodus borealis* Johnson (1901, p. 411) was described from the northeast Pacific, and *H. californiensis* Hartman (1938, p. 93) from central California. These species are separable as indicated in the key below. *H. yenourensis* Izuka (1912, p. 250) is known only from Japan.

Several other species, described in the genus *Hemipodus,* have been transferred to other genera or their affinities are not clearly understood. *H. magellanica* McIntosh (1885, p. 349) was later made the type of the genus *Glycerella* Arwidsson (1899, p. 25). *Hemipodus septentrionalis* Roule (1896, p. 452) was shown to be a *Glycera* (Arwidsson, 1899, p. 28). *Hemipodus mexicanus* Chamberlin (1919, p. 349) from the Gulf of California should perhaps be referred to the genus *Glycera,* since it has both simple and composite setae; also, the parapodium has 2 long, presetal ligulae, as characteristic of the genus *Glycera. Hemipodus canadensis* Treadwell (1937, p. 348) from Nova Scotia, Canada, is shown with simple setae (1937, fig. 2) in addition to composite setae, a character which eliminates it from the genus *Hemipodus.* It is not made known whether the aileron of the proboscidial armature is a bar, such as characterizes *Hemipodus,* or a flaring chitinous piece, as known for *Glycera.* The parapodia of the latter, however, have 2 acicula, and the composite setae are not so clearly, if at all, heterogomph.

Key to Species

1. Parapodia relatively long and well developed; postsetal lobes elongate, much longer than broad; postsetal lobe truncate or at least broadly rounded 2
1. Parapodia poorly developed, short, broad; postsetal lobe much shorter; color in life light green . . . *H. californiensis*
2. Postsetal lobe rounded; proboscis closely covered with elongate papillae; color in life red . . . . *H. borealis,* p. 244
2. Postsetal lobe truncate; proboscis sparsely covered with low papillae . . . . *H. simplex,* p. 243

Hemipodus simplex (Grube)

Plate 43, Figs. 116-119

Glycera simplex Grube, 1856, pp. 177-178.

Hemipodus simplex Ehlers, 1901, pp. 155-156, pl. 18, figs. 11-15; Augener, 1923, p. 69; 1924, p. 439; 1927, p. 351.

Collections.—366-35, 375-35, 846-38. 8 specimens.

Length to 90 mm; number of segments over 150; pale (preserved) and somewhat flaccid. Color in life not noted. Parapodial lobes are characteristically long, particularly in anterior segments (pl. 43, fig. 116). The presetal lamella is elongate, triangular throughout (pl. 43, figs. 116-118). Dorsal cirri are inserted low, near the dorsal base of the parapodia. Ventral cirri increase in relative length posteriorly, but do not surpass the truncate postsetal lamella.

These individuals resemble, in general appearance, color, and size, those of *H. californiensis* from southern California. Some of the latter, however, retain a greenish tint; also the everted proboscis of *H. simplex* is clavate, while that of *H. californiensis* is elongate, cylindrical. In *H. simplex* the parapodial ramus is long, the lobes slender; in *H. californiensis* the ramus is short, the lobes blunt, triangular.

The papillae of the proboscis are unique in the 3 species indicated in the key above. In *H. simplex* the papillae are sparse; each is short, triangular (pl. 43, fig. 119), cusplike, the point directed forward toward the distal end of the proboscis. In *H. californiensis* the papillae are elongate, oval (pl. 43, fig. 120), the narrowest end distally, but both ends smoothly rounded; they are circular in cross section. In *H. borealis* the papillae are bluntly conical, the base truncate (pl. 43, fig. 121), circular in cross section.

In the individuals of these species that have been examined, the jaws and accessory pieces do not differ sufficiently among themselves to render them useful in comparison. The aileron is a slender bar, somewhat broader where it is attached to the jaw, and the latter is a strongly falcate, clawlike structure.

Distribution.—Chile; Peru; New Zealand (Augener). Intertidal, to 8 fms.

Hemipodus borealis Johnson

Plate 43, Fig. 121

Hemipodia borealis Johnson, 1901, pp. 411-412, pl. 10, fig. 104; Moore, 1909, pp. 259-260; Treadwell, 1914, p. 198; Berkeley, 1927, p. 411.

Collections.—910-39, Mission Bay. 3 specimens.

The parapodia have an elongate, triangular presetal lobe, and a shorter, bluntly rounded, postsetal lobe, somewhat as in *H. simplex,* but less truncate. The proboscis is clavate when everted. The papillae of the proboscis are closely crowded, elongate, conical (pl. 43, fig. 121), approximately circular in cross section. They differ, therefore, from those described for *H. roseus* Quatrefages, in which they are small, foliaceous (Arwidsson, 1899, p. 29).

Distribution.—Northeast Pacific, from British Columbia south to San Diego, California. Intertidal.

Genus **GLYCERA** Savigny

Key to Species

1. Branchiae present, retractile; parapodia with 2 presetal and 2 postsetal lobes 2
1. Branchiae present, not retractile; parapodial lobes as above 4
1. Branchiae absent; parapodia with 2 presetal and 1 or 2 postsetal lobes 5
2. Branchial lobe simple, digitate; neuropodial postsetal lobe shorter than notopodial postsetal lobe . . . *G. rouxii,* p. 245
2. Branchial lobe much branched; the 2 postsetal lobes of approximately the same length 3
3. Parapodia much deeper than long; postsetal lobes deep but notably shorter than the presetal lobe . . *G. longissima,* p. 245
3. Parapodia as long as, or longer than, deep; postsetal lobes resemble presetal lobes . . . . . . *G. americana,* p. 246

4. Branchiae are blisterlike, on the dorsal surface of the parapodia; parapodial bases elongate, exceeding in length the parapodial lobes . . . . *G. robusta,* p. 246

4. Branchiae are digitate, or lobular, inserted terminally; parapodial bases are moderately long to short 5

5. Branchial lobes present on dorsal and ventral sides of parapodia . . . . *G. dibranchiata,* p. 246

5. Branchial lobes present only on dorsal side of parapodia . . . . *G. convoluta,* p. 247

6. Parapodia with one postsetal lobe 7

6. Parapodia with 2 subequal postsetal lobes . *G. tesselata,* p. 247

7. Presetal lobes pointed, unequal; aileron with 2 teeth . . . . *G. papillosa,* p. 248

7. Presetal lobes broadly rounded, subequal; aileron with one tooth (plate 37, fig. 75) . . . . ?*G. oxycephala,* p. 248

Glycera rouxii Audouin and Edwards

Glycera rouxii Fauvel, 1923, p. 389, fig. 153 (synonymy); Okuda, 1938, pp. 124-125, fig. 1.

Collection.—889-38. One specimen.

Distribution.—Farallon Islands, California, in 37 fms; Japan; north Atlantic; Mediterranean.

Glycera longissima Arwidsson

Glycera longissima Arwidsson, 1899, pp. 23-24, figs. 15-19; Moore, 1911, pp. 304-305.

Glycera chilensis Arwidsson, 1899, pp. 24-25, figs. 20-21, 56.

Collection.—903-38. One specimen.

This clearly defined, robust species is known through few collections, each based on only a single individual. Arwidsson's two types were 250 and over 450 mm long; Moore's specimen measured 305 mm long, and the fragmentary specimen in the collection, though perhaps less than the anterior half, measures 130 mm long.

Distribution.—Patagonia; Chile; off San Nicolas Island; Anaheim Slough, southern California. Shore, to 32 fms.

Glycera americana Leidy

Glycera americana Leidy, 1855, pp. 147-148, pl. 11, figs. 49, 50; Ehlers, 1868, pp. 668-670, pl. 23, figs. 43-46; 1897, p. 81; 1901, pp. 152-153; Monro, 1933, p. 57 (synonymy).

Glycera rugosa Johnson, 1901, pp. 409-411, pl. 10, figs. 102-103; Hartman, 1938, p. 10 (synonymy).

Collections.—248-34, 280-34, 379-35, 380-35, 381-35, 492-36, 499-36, 632-37, 688-37, 740-37, 826-38, 833-38, 835-38, 843-38, 876-38, 886-38, 887-38, 889-38, 890-38, 891-38, 892-38, 897-38, 903-38, 905-38, 910-39, D-53, D-88, D-103. Numerous specimens.

Distribution.—Probably widely present through the eastern Pacific, from western Canada south to the Straits of Magellan, including the tropical Pacific. On the eastern coast of the Americas, it has been reported only from the New England states, south to South Carolina. New Zealand (Augener, 1927, p. 351). Intertidal, to 54 fms.

Glycera robusta Ehlers

Glycera robusta Ehlers, 1868, pp. 656-658, pl. 24, figs. 31, 32; Moore, 1903, p. 464; Izuka, 1912, pp. 248-249, pl. 23, fig. 10; Chamberlin, 1918, p. 177; 1919, p. 260; Berkeley, 1935, p. 770.

Collection.—Mission Bay, California. One specimen.

Distribution.—California; Japan. Intertidal, to 65 fms.

Glycera dibranchiata Ehlers

Glycera dibranchiata Ehlers, 1868, pp. 670-702, pl. 24, figs. 3-8, 10-28; Chamberlin, 1919, p. 350; Treadwell, 1928, p. 473.

Rhynchobolus dibranchiatus Webster, 1879, p. 245.

Euglycera dibranchiata Webster and Benedict, 1887, p. 723.

Collection.—Mission Bay, California. One specimen.

A single, complete individual, 150 mm long, agrees remarkably well with the original description by Ehlers (1868, p. 670). Its occurrence on the Pacific coast is of interest because it has not been reported heretofore outside of the eastern coast of North America. The single specimen was collected by R. L. Morrison from southern California, presumably Mission Bay. More complete data are lacking.

Distribution.—New England coast, south to Cape Hatteras; southern California. Intertidal, to 633 fms.

Glycera convoluta Keferstein

Glycera convoluta Ehlers, 1868, pp. 663-665, pl. 24, figs. 29, 30; Fauvel, 1923, pp. 383-385, fig. 150; Monro, 1930, p. 117.

Glycera alba Rathke *macrobranchia* Moore, 1911, pp. 301-302.

Glycera alba Treadwell, 1914, p. 198.

Glycera exigua Chamberlin, 1919, pp. 13-14.

Glycera macrobranchia Hartman, 1936, p. 32; 1938, p. 9.

Collections.—770-38, 903-38, Mission Bay. 11 specimens.

The prostomium consists of 14 annuli or more. Branchial lobes are first present from the twentieth parapodium (Mission Bay) to the twenty-fifth segment (903-38). Ehlers (1868, p. 664) noted them from the sixteenth parapodium in specimens from Naples, and Monro (1930, p. 117) reported them from the twelfth segment in collections off southwest Africa. Branchiae are continued posteriorly nearly to the end, but are absent from a few of the posteriormost segments.

These specimens differ from *G. alba* most notably in having longer branchial lobes; the accessory jaw piece is longer, the base more divergent. The proboscidial papillae are of two kinds, a much more numerous chitinous papilla, and a few, scattered tiny, rounded papillae.

Moore (1911, p. 301) separated *G. macrobranchia* from typical *G. alba* Müller because the branchiae of the former are notably larger. This is the case in *G. convoluta* Keferstein. The proboscidial papillae described by Moore seem to agree with those for *G. convoluta.*

Distribution.—North and south Atlantic; Mediterranean; southern California. Littoral.

Glycera tesselata Grube

Glycera tesselata Grube, 1863, pp. 41-42, pl. 4, fig. 4; Ehlers, 1868, pp. 654-656, pl. 24, figs. 2, 9, 33; McIntosh, 1885, p. 343, pl. 42, fig. 5; Moore, 1903, p. 464; 1908, p. 348; 1911, pp. 300-301; Fauvel, 1923, p. 387, fig. 152; Berkeley, 1927, p. 411; Fauvel, 1932, pp. 124-125.

Glycera abranchiata Treadwell, 1902, pp. 200-201, fig. 49 (fide Augener, 1922, p. 205).

Collections.—132-34, 283-34, 285-34, 463-35, 530-36, 533-36, 549-36, 559-36, 561-36, 696-37, 704-37, 732-37, 733-37, 745-37, 863-38, 900-38, 914-38. Numerous specimens.

Distribution.—Eastern Pacific, from British Columbia south to Panama; Japan; Indo-Pacific; Atlantic; Mediterranean.

Glycera papillosa Grube

Glycera papillosa Grube, 1856, pp. 176-177; Ehlers, 1901, p. 154; Kinberg, 1910, p. 58, pl. 21, fig. 3; Augener, 1922, pp. 203-205, fig. 9.

Collection.—376-35. One specimen.

Length of a nearly complete individual is 20 mm for about 85 segments. The characters agree well with the redescription by Augener (1922, pp. 203-206) except that the proboscidial papillae do not have a subterminal constriction. The dorsal cirri are inserted high above the parapodial bases.

Distribution.—Chile; Peru. In depths to 20 fms.

? Glycera oxycephala Ehlers

Plate 37, Figs. 74, 75; Plate 43, Figs. 122-124; Plate 44, Fig. 125

Glycera oxycephala Ehlers, 1887, pp. 121-123, pl. 41, figs. 7-11.

Collections.—786-38, 887-38, 889-38, 914-39. 10 specimens.

Length of 115 segments is about 70 mm. Segments are biannulate, the parapodial ring the longer; anterior segments have a faintly marked third ring. The prostomium is a long smooth cone, or faint annulations are visible at the sides. The terminal antennae include 2 shorter and 2 longer, the latter about twice as long as the former (pl. 43, fig. 124).

The proboscis (everted) is more or less closely covered with elongate papillae of one kind (pl. 43, fig. 122). The terminal jaws are stout, black, strongly falcate (pl. 37, fig. 74). The accessory piece differs from that in *G. capitata* in that the basal piece is longer than broad, and the secondary tooth is absent (pl. 37, fig. 75).

Parapodia have 2 presetal and 1 postsetal lobe. The presetal lobes in the anterior region are long, bluntly rounded distally, the dorsal extending distally as far as the ventral (pl. 43, fig. 123). More posteriorly the dorsal lobe is progressively smaller, but even in posterior parapodia (eighty-fifth) the 2 lobes still surpass the postsetal lobe (pl. 44, fig. 125). Dorsal cirri are inserted low, near the dorsal base of the parapodia.

Ehlers (1887, p. 121) described *G. oxycephala* from collections made by the Blake Expeditions. The locality was given as doubtful. Ehlers was able to attribute only 2 prostomial antennae to it, saying, however, that the other 2 might have become lost. In the specimens herein reported, the 4 antennae are of unequal sizes (pl. 43, fig. 124), but clearly visible.

These specimens differ from Ehlers' description in that (1) the prostomium has 4 antennae instead of 2, (2) the aileron differs from that in

G. capitata, with which Ehlers compared that of *G. oxycephala.* The parapodial lobes, however, are strikingly similar to those shown by Ehlers. For these reasons, the specimens are questionably referred to *G. oxycephala.*

Distribution.—Indefatigable Island, Galapagos, in 392 fms; off California, in 36-40 fms.

Family **Goniadidae**

Key to Genera

Proboscis without V-shaped pieces at sides, near base . . . . GLYCINDE, p. 249
Proboscis with a series of V-shaped pieces at the sides, near base . . . . GONIADA, p. 251

Genus **GLYCINDE** F. Müller

Glycinde multidens F. Müller

Plate 44, Figs. 126-131

Glycinde multidens F. Müller, 1858, p. 214, pl. 6, figs. 4-6; Grube, 1870, pp. 67-68; Augener, 1918, pp. 399-402, pl. 3, fig. 75, pl. 6, fig. 196, fig. 50.

?*Glycinde armigera* Moore, 1911, pp. 307-311, pl. 21, figs. 160-171; Berkeley, 1927, p. 411.

?*Glycinde pacifica* Monro, 1928, pp. 83-85, figs. 5-8; 1936, fig. 144.

Collections.—116-33, 173-34, 477-35, 890-38, 893-38, 909-39, Mission Bay. 7 specimens.

A 9 mm fragment (116-33) consists of 45 segments. Its proboscis, partly everted, is dorsally covered with many rows of teeth, resembling the radula of a mollusk. These include, on each side, 4 in a row dorsally, the innermost curved inward, the outer less curved, with a distal articulating appendage (pl. 44, figs. 126, 127), 2 rows of tiny papillar cones laterally (pl. 44, fig. 129), and smaller hooks ventrally, resembling those in the outer dorsal rows, but much smaller. Prostomial annulations are obscure; there are 4 black eye spots, a pair on the basal ring, another pair subdistally.

Dorsal setae are simple, acicular, with a tapering, pointed hood (pl. 44, fig. 131). Ventral setae are composite, the articulation heterogomph (pl. 44, fig. 130). Notopodia are first present from the thirtieth segment. The dorsum is traversed by broad, brown segmental bands.

A specimen from Mission Bay, California, is 43 mm long for 112 segments; a posterior end is lacking. The color is pale reddish brown, with a broad, darker band crossing each segment dorsally and ventrally. The parapodial lobes are similarly pigmented, the segmental grooves pale. Notopodia are present from the thirtieth segment.

Collections from 890-38 and 893-38 include each, a single individual, with 25 mm for 120 segments, or less. In the former the prostomium has 9 annulations, as described for *G. pacifica* Monro (1928, p. 83). Each has notopodia from the thirtieth segment. Collection 913-39 includes an individual 31 mm long with 77 anterior segments. The prostomium is obscurely 8 or 9 ringed, on which 2 pairs of eyes are distinguishable. Notopodia are present from the thirtieth segment. Collection 909-39 has a single pale specimen, 28 mm long for 97 segments, a short posterior piece lacking. The prostomium is somewhat macerated, but has annulations on its proximal half. Prostomial eyes are clearly visible. Notopodia are present from the thirtieth segment. Collection 173-34 has an individual 13 mm long for 98 segments. The prostomium has 9 annulations and 2 pairs of eyes. Notopodia are present from the thirtieth segment. A tabulation of some of these characteristics follows.

Station number	*Number of segments*	*Length*	*Prostomial annulation*	*Eyes*	*Notopodial occurrence*	*Pigmentation*
116-33	45+	9 mm	none	present	from 30th	pale brown
173-34	98+	13 mm	9 annuli	present	from 30th	pale brown
890-38	120+	25 mm	9 annuli	present	from 30th	pale brown
893-38			none	present	from 30th	pale brown
909-39	97+	28 mm	9 annuli	present	from 30th	pale brown
913-39	77+	31 mm	8 or 9 (obscure)	present	from 30th	
915-39	144+	66 mm	9 annuli	obscure	from 30th	dark brown
Mission Bay	122+	43 mm	obscure	obscure	from 30th	opaque brown

Glycinde armigera Moore (1911, p. 307) is nearly related, if not identical with *G. multidens*. The conspicuous obcordate condition of the presetal lobes, described by Moore, is more or less obviously present in individuals in the collections mentioned above. In other respects, it agrees reasonably with *G. multidens*. Monro (1936, p. 144) has indicated the possibility of the identity of *G. pacifica* with *G. multidens*. In the former, however, the notopodia are first present from parapodia 20 to 25. *Glycinde picta* Berkeley (1927, p. 412) from western Canada is a nearly related form. In it, however, the notopodia are first present from segments 26 to 28.

Distribution.—Brazil; Panama; eastern Pacific, from Monterey Bay, California, south to Costa Rica; Galapagos Islands. In depths to 90 fms. Moore reported *G. armigera* from California, in depths of 36 to 271 fms.

Genus GONIADA Audouin and Edwards

Key to Species

1. Notopodia provided with blunt, acicularlike setae; notopodial setae first present after the sixtieth segment; the distal, free end of the proboscis has a series of 17 dorsal and 13 ventral smaller chitinous pieces . . . . *G. acicula,* p. 252
1. Notopodia provided with setae terminating in a slender point; notopodial setae first present anterior to the sixtieth segment; the distal end of the proboscis with fewer small plates . . . 2
2. Notopodia first present after the fiftieth segment; chevrons with 9 V-shaped pieces on a side; the distal end of the proboscis with 3 ventral and 4 greatly reduced dorsal teeth, in addition to the larger lateral plates . . . . . *G. maculata,* p. 251
2. Notopodia first present from the thirty-eighth segment; chevrons with about 16 pieces on a side; the distal end of the proboscis with 3 ventral and 9 dorsal pieces, in addition to the lateral plates . . . . *G. uncinigera,* p. 252

Goniada maculata Oersted

Goniada maculata Oersted, 1843, pp. 33-34, figs. 16, 23, 91, 95, 97, 98; Ehlers, 1868, pp. 704-718, pl. 24, figs. 36-48; Arwidsson, 1899, pp. 36-38, figs. 25-28, 60, 61; Fauvel, 1923, pp. 392-393, fig. 154.

Collections.—887-38, 889-38. 4 specimens.

Length to 57 mm, a posterior piece lacking. Notopodial lobes are first present from the fifty-first segment, but from the fifty-sixth segment the notopodia are abruptly larger and setae are present. The prostomial antennae are distinctly biarticulated, the distal article tiny, papillar, less than one fourth as long as the basal article.

The proboscis terminates in 18 soft papillae. The larger, lateral teeth (macrognaths) are black, with 5 claws, decreasing in size from dorsal to ventral ends. The smaller plates (micrognaths) number 3 ventrally; these do not nearly fill the space between the macrognaths. There are 4 greatly reduced dorsal micrognaths widely separated from one another. The lateral chevron has 9 V-shaped pieces on a side.

G. maculata heretofore has not been reported from the Pacific. *G. brunnea* Treadwell is recorded by Moore (1911, p. 306) from Monterey Bay, from about the same depth as *G. maculata.* Both species have few to no micrognaths in the dorsal arc. In *G. maculata,* however, the ventral micrognaths number only 3, in *G. brunnea* they are said to be 9.

Distribution.—Atlantic; off central California, in 36-37 fms.

Goniada uncinigera Ehlers

Goniada uncinigera Ehlers, 1901, pp. 159-161, pl. 21, figs. 1-8.

Collections.—903-38. 5 specimens.

Length to 20 mm; number of segments over 100. One of the specimens has the proboscis partly everted. It is covered with large, spinose papillae in which the main spine is directed posteriorly (Ehlers, 1901, pl. 21, fig. 7). The V-shaped pieces include 16 on a side (13, according to Ehlers), those most proximal being the smallest. The micrognaths include 3 pieces ventrally and 9 dorsally. The prostomium has 7 annuli, the distal ring slenderest but longest.

Notopodia are first present from the thirty-eighth segment (Ehlers reported it from the thirty-ninth). Notopodial setae taper distally to fine points.

In so far as I am aware, this is the first record of *G. uncinigera* since it was first described, from southern Chile.

Distribution.—Southern Chile, in 5-6 fms; Anaheim Slough, southern California, intertidal.

Goniada acicula, new species

Plate 44, Figs. 132-141

Collections.—8-33, 499-36, 549-36 (Holotype). 3 specimens.

Length of 148 segments is 75 mm (posteriorly incomplete). Body with 3 regions: (1) an anterior part of about 63 segments with uniramous, smaller parapodia, (2) a median region of about 28 segments, the parapodia biramous but not noticeably larger than those in the anterior region, and (3) a posterior region from about segment 93, in which the parapodia are abruptly larger, the rami well separated and both well developed.

The prostomium region consists of 10 annuli and a distal cone provided with 4 terminal, biarticulated antennae. These have a cylindrical basal portion, that is about four times as long as wide, and a distal, slender, papillar style.

The proboscis (protruded) is long, cylindrical, widest distally. It has a series of chevrons on either side, near the base, consisting of 10 to 12 pieces in a set (pl. 44, figs. 138, 139). There are 17 soft, terminal papillae. Macrognaths are black, with 5 claws, decreasing in size from dorsal to ventral ends, the dorsalmost about 6 times as long as the ventralmost. Micrognaths include 17 in the dorsal arc and 13 in the ventral. They form a continuous series, but vary somewhat in size. Some of the larger are accompanied, on their outer side, by an accessory smaller piece similar to the larger, and functioning, perhaps, to replace the older when lost. Each of the micrognaths has 2 terminal points and 2 embedded teeth. Proboscidial papillae are of one kind, distally truncate (pl. 44, fig. 135), but in lateral view are seen to be directed away from the terminal jaw pieces (pl. 44, fig. 134).

Parapodia in the anterior region have well-developed lobes and cirri, the ventral cirrus exceeding the other lobes in size (pl. 44, fig. 132). From about the sixty-fourth parapodium, the notopodium is present as a slender, digitate lobe, and within it are embedded 2 dark, acicular setae. The dorsal and ventral rami are not separated; hence this region is apt to remain unobserved. Parapodia of the median region have notopodia consisting of an upwardly directed, postacicular and a preacicular lobe (pl. 44, fig. 137). The ventral cirrus continues large, long, surpassing the other parapodial lobes. Parapodia of the posterior region have the rami well separated. The postacicular neuropodial lobe is broadly rounded, somewhat obcordate (pl. 44, figs. 133, 136), surpassed by the slender, bifurcated presetal lobe (pl. 44, fig. 136). Neuropodial setae are numerous, disposed in fan-shaped fascicles, the articulation heterogomph (pl. 44, fig. 141). Notopodia consist of 2 subequal lobes, provided with a few (3 to 5) stout, acicular setae with blunt, slightly bent tip (pl. 44, fig. 140). Their surface is smooth, not granular or serrated. They are about as thick as the supporting acicula. Setae and acicula are pale amber in color, the composite setae nearly colorless.

Goniada acicula has the stout acicular notopodial setae characteristic of some other species. From *G. grahami* Benham (1932, p. 561) from New Zealand, it differs in that the notopodial acicula are amber colored, not black; the stout notopodial setae are distally curved, not straight. From *G. teres* Treadwell (1931, p. 19) from Jamaica, it differs in that the proboscis is provided terminally with paragnaths and the parapodial change is considerably beyond the fifty-seventh segment.

G. acicula approaches *G. tripartita* Monro (1931, p. 19) from the Great Barrier Reefs in having a median region with smaller, biramous parapodia, but differs from the latter in that its parapodial lobes are differently shaped; the proboscis has 10 to 12 pieces in the chevron instead of 8 pieces; the large, stout jaw pieces at the distal end of the proboscis have 5 teeth instead of 3. *G. japonica* Izuka (1912, p. 232) from Japan has ventral cirri that are proportionately much smaller; also, the acicular notopodial setae are straight, not curved, the transitional region from anterior to posterior, including only 2 segments.

Holotype.—AHF no. 25.

Distribution.—Gulf of California; La Libertad, Ecuador. In depths to 40 fms. The single specimen from Ecuador was taken at night with an electric light. It appears to be a sexually mature male, but its setae are like those of the dredged specimens.

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(Only those citations referred to in the text which have not been given in the first part are listed. See also pp. 94-99.)

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PLATE 31

Figures 1-4, *Eurythoë complanata:* Fig. 1, anterior end in dorsal view of a smaller specimen, consisting of about 70 segments (498-36), for comparison with that shown in fig. 5, x 31; Fig. 2, serrated notopodial seta from a posterior (about 60th) parapodium, x 645; Fig. 3, elongated neuropodial seta from the same parapodium, x 645; Fig. 4, a shorter neuropodial seta from the same parapodium, x 645.

Figures 5-9, *Pareurythoë californica:* Fig. 5, anterior end in dorsal view from a specimen that consists of about 75 segments (902-38) for comparison with that shown in fig. 1, x 31; Fig. 6, a long neuropodial seta from a posterior (about 63rd) parapodium, x 645; Fig. 7, a hastate, neuropodial seta from the same parapodium, x 645; Fig. 8, a shorter neuropodial seta from the same parapodium, x 645; Fig. 9, a serrated notopodial seta from the same parapodium, x 645.

Figures 10-13, *Chloeia pinnata:* Fig: 10, prostomium and caruncle in dorsal view (915-39), x 18; Fig. 11, anal cirri, in dorsal view, the stippling indicates pigment, x 31; Fig. 12, notopodial seta, x 127; Fig. 13, tip of the same seta, enlarged, x 285.

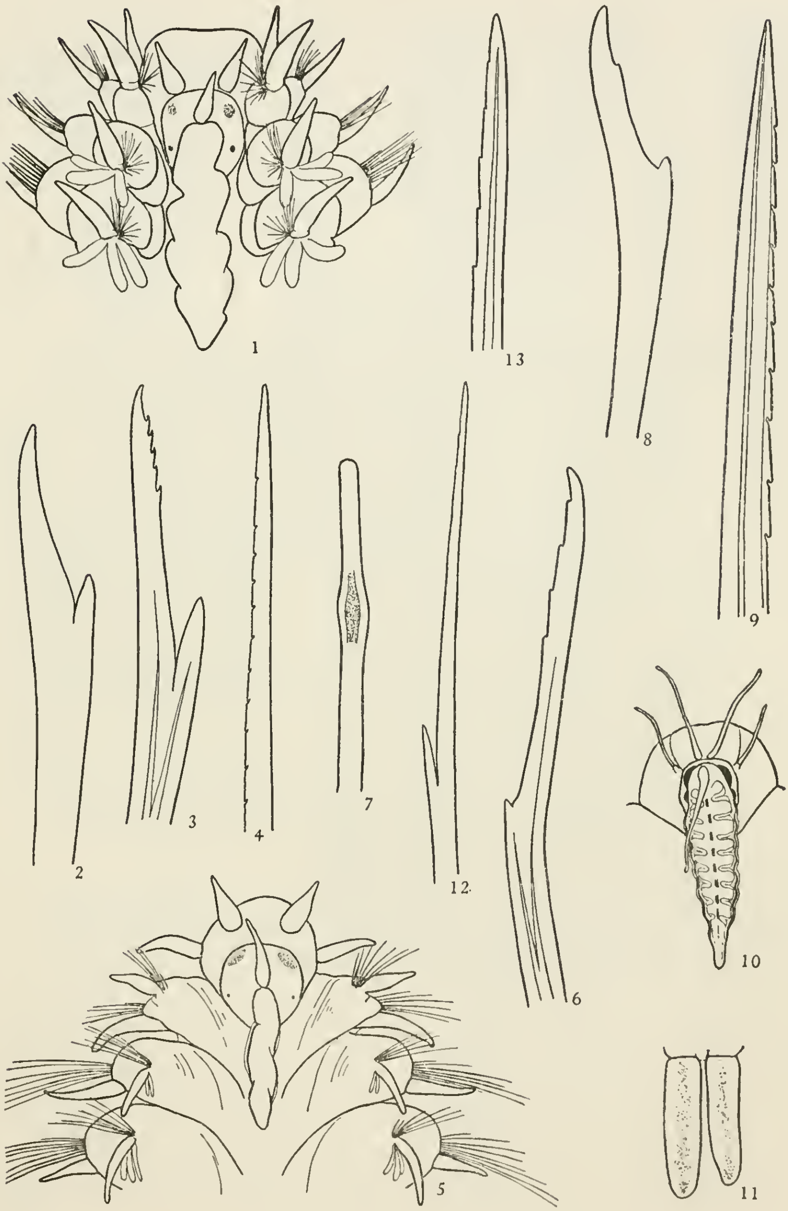
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PLATE 32

Figures 14-20, *Chloeia entypa:* Fig. 14, anterior end in dorsal view (213-34), x 24; Fig. 15, a dorsal serrated notopodial seta without tip, from the 8th last segment, x 65; Fig. 16, a portion of the same from the serrated region, x 285; Fig. 17, distal end of a neuropodial seta from the same segment, of which about 100 or more are present, all resembling one another, x 285; Fig. 18, one of smooth notopodial setae from the 4th parapodium, x 65; Fig. 19, a serrated notopodial seta from 10th parapodium of a young individual (876-38), x 127; Fig. 20, tip of a notopodial seta from a median parapodium, x 285.

Figures 21-23, *Euphrosyne bicirrata:* Fig. 21, smooth notopodial seta from a median parapodium (559-36), x 285; Fig. 22, serrated notopodial seta from same parapodium, in lateral view, x 285; Fig. 23, same, in frontal view, x 285.

Figures 24-26, *Euphrosyne panamica:* Fig. 24, branchial tuft from the 16th parapodium (446-35), x 65; Fig. 25, prostomium and caruncle in dorsal view, x 27; Fig. 26, a serrated notopodial seta from the 16th parapodium, x 285.

Figures 27-29, *Euphrosyne aurantiaca:* Fig. 27, a bifurcated notopodial seta, x 285; Fig. 28, a serrated notopodial seta, x 285; Fig. 29, a long, neuropodial seta (439-35), x 580.


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PLATE 33

Figures 30-31, *Hesione intertexta:* Fig. 30, 10th parapodium from left side, with acicular lobes at dorsal edge of neuropodium (310-35), x 31; Fig. 31, distal end of neuropodial seta from 10th parapodium, x 285.

Figures 32-35, *Leocrates chinensis:* Fig. 32, prostomium from specimen with proboscis retracted, the median antenna broken off, frontal process and palpi extended forward (633-37), x 18; Fig. 33, anterior end of a specimen with proboscis partly everted, the frontal process and palpi directed ventrally (305-34), x 18; Fig. 34, distal end of ventralmost seta from the 10th parapodium, the protecting hood still attached, x 285; Fig. 35, distal end of superiormost neuropodial seta from the same parapodium, x 285.

Figure 36, *Nereis neonigripes* (901-38): seventh last parapodium, setae omitted, the dorsal cirrus turned unnaturally to the right, x 65.

Figure 37, *Nereis riisei* (633-37): parapodium from about the 60th segment, setae indicated, x 65.

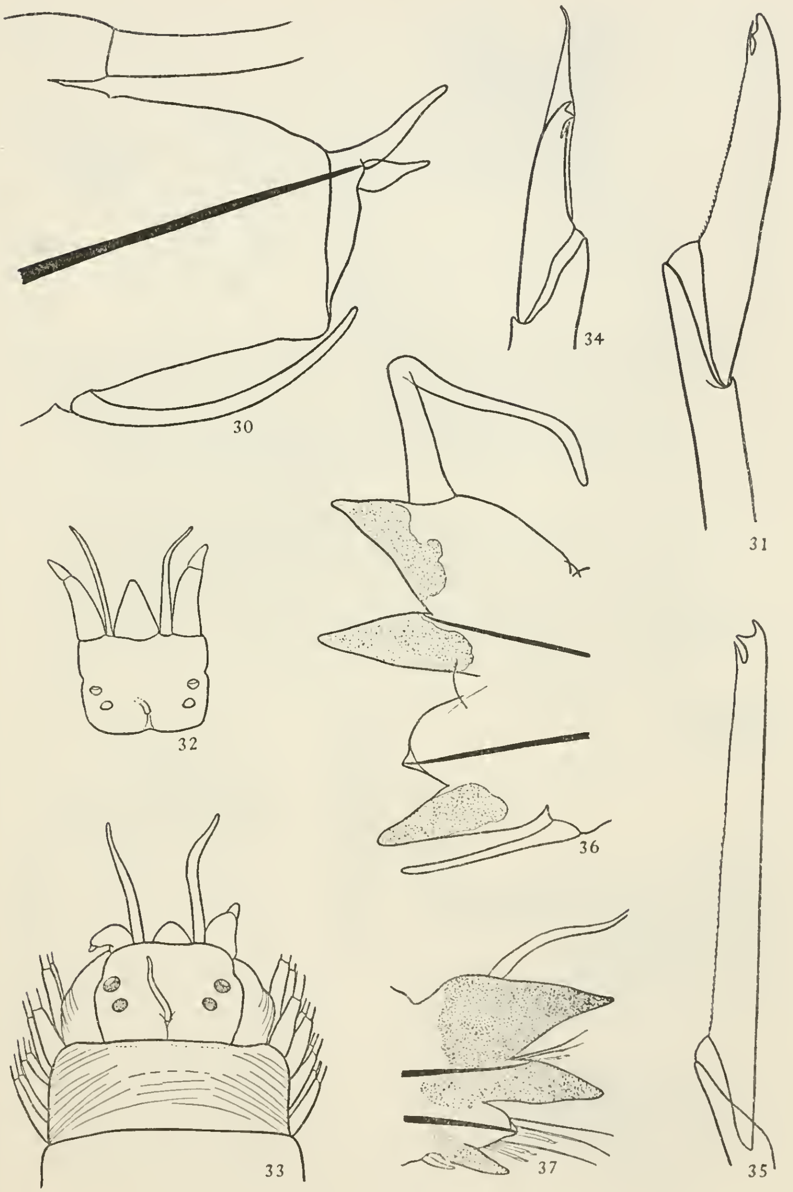
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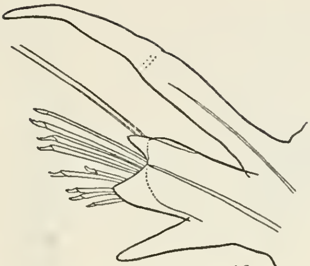
PLATE 34

Figures 38-41, *Stauronereis cerasina:* Fig. 38, 67th parapodium, or about the 5th last, setae indicated, x 65; Fig. 39, 20th parapodium, setae indicated, x 65; Fig. 40, a subacicular composite neuropodial seta from the 20th parapodium, x 645; Fig. 41, a supra-acicular, simple neuropodial seta from the same parapodium, x 645.

Figures 42-46, *Leptonereis glauca moniloceras:* Fig. 42, 57th parapodium, or 10th last, from the postepitokal region, x 65; Fig. 43, anterior end in dorsal view (728-38), x 31; Fig. 44, neuropodial seta from a posterior parapodium (814-38), x 645; Fig. 45, 16th parapodium from a female epitokal individual, x 65; Fig. 46, epitokal parapodium from the 40th segment, the atokal setae still present, x 65.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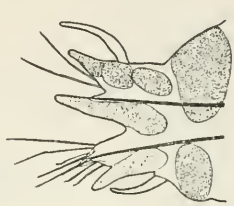
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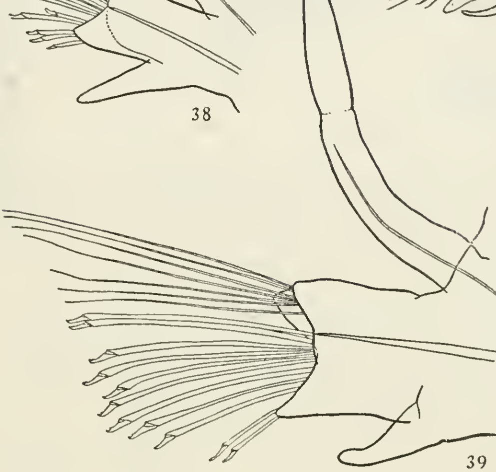
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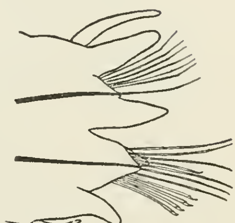
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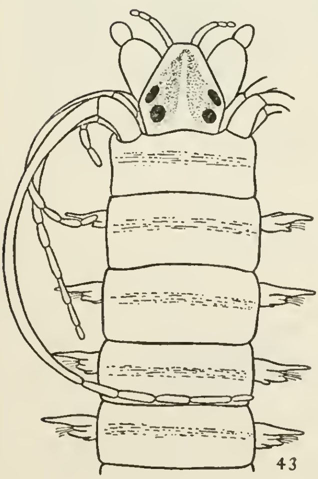
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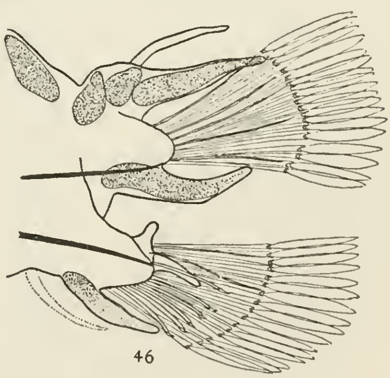
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PLATE 35

Figure 47, *Ceratonereis tentaculata* (639-37): falcigerous notopodial seta, with slightly heterogomph articulation, x 285.

Figure 48, *Ceratonereis costae* (13-33): postepitokal parapodium, setae omitted, x 65.

Figures 49-51, *Nereis flavipes:* Fig. 49, homogomph notopodial seta from a posterior parapodium, x 645; Fig. 50, heterogomph falcigerous neuropodial seta from the same parapodium, x 645; Fig. 51, a posterior parapodium, setae indicated, x 65.

Figure 52, *Nereis pelagica* (900-38): a posterior parapodium, setae indicated, x 65.

Figures 53-56, *Nereis latescens:* Fig. 53, 70th parapodium, or 10th last, x 65; Fig. 54, a heterogomph falcigerous neuropodial seta from the 70th parapodium, x 645; Fig. 55, a homogomph falcigerous notopodial seta from the same parapodium, x 645; Fig. 56, 31st parapodium, setae omitted, x 65.

Figure 57, *Nereis mediator:* a posterior parapodium, setae indicated, x 65.


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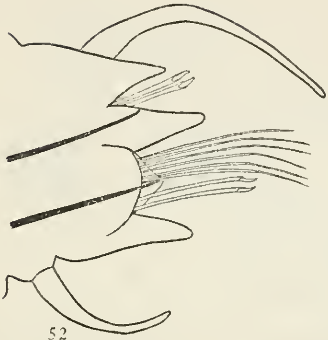
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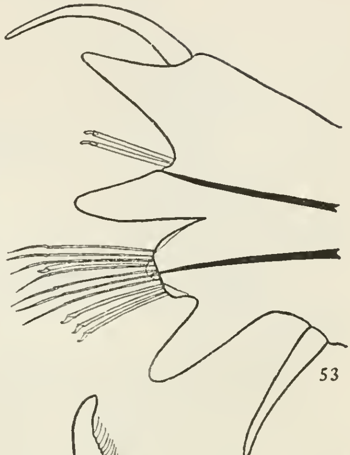
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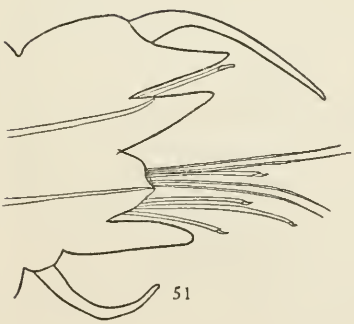
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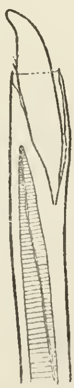
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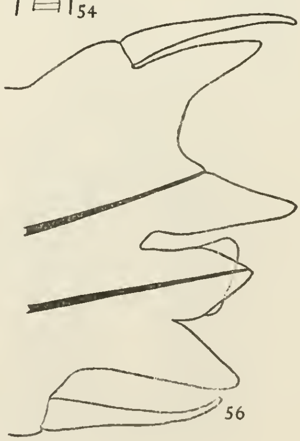
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PLATE 36

Figures 58-62, *Nereis paucignatha:* Fig. 58, a falcigerous notopodial seta from the 31st parapodium, x 645; Fig. 59, anterior end in dorsal view of a male epitokous individual, the peristomial cirri from the left side omitted (21-33), x 24; Fig. 60, 31st parapodium from same individual, setae indicated, x 65; Fig. 61, a median epitokal parapodium from the same individual, setae omitted, x 65; Fig. 62, a falcigerous neuropodial seta from the same parapodium, x 645.

Figures 63-64, *Nereis pseudonereis:* Fig. 63, 56th parapodium, setae indicated, x 31; Fig. 64, anterior end in dorsal view, stippling indicates pigment, x 12.

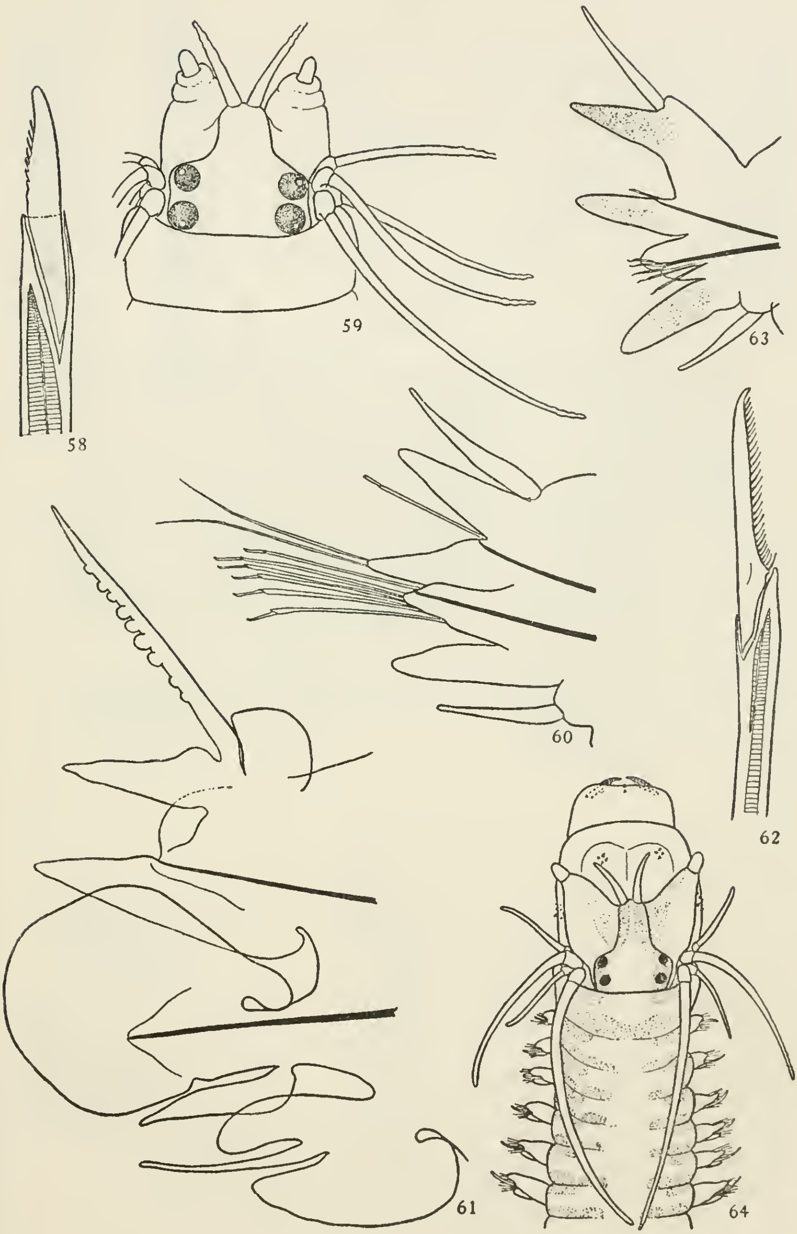
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PLATE 37

Figures 65-66, *Nereis pseudonereis:* Fig. 65, falcigerous notopodial seta from the 56th parapodium, x 645; Fig. 66, falcigerous neuropodial seta from the same parapodium, x 645.

Figures 67-73, *Nereis veleronis:* Fig. 67, anterior end in dorsal view, proboscis everted, x 12; Fig. 68, 25th parapodium, setae indicated, x 31; Fig. 69, 10th last parapodium, setae omitted, x 31; Fig. 70, 38th parapodium, setae indicated, x 65; Fig. 71, a median epitokous parapodium (384-35), x 31; Fig. 72, a falcigerous neuropodial seta from the 25th parapodium, x 645; Fig. 73, a falcigerous notopodial seta from the same parapodium, x 645.

Figures 74-75, ?*Glycera oxycephala:* Fig. 74, jaw piece (889-38), x 65; Fig. 75, accessory jaw piece or aileron, depressed under cover slip, x 65.

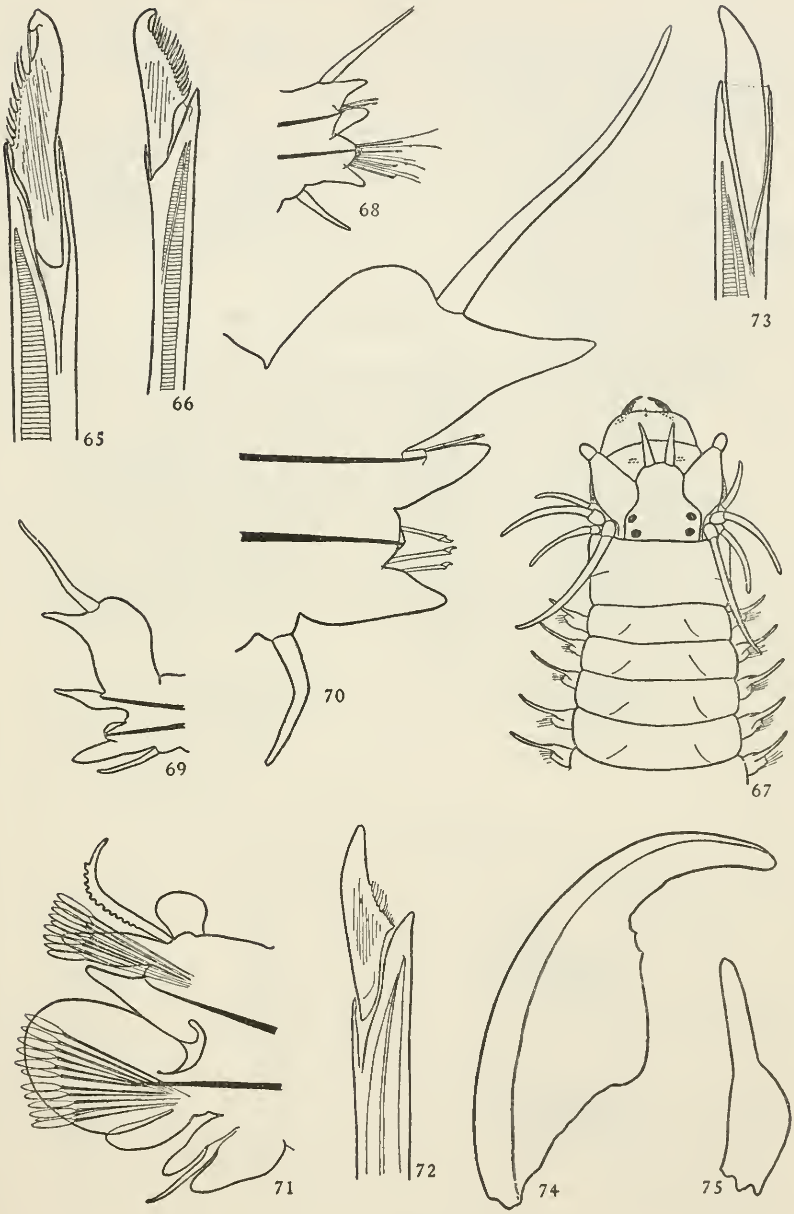
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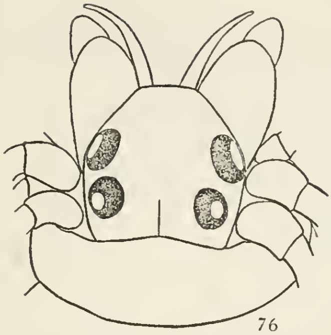
PLATE 38

Figures 76-83, *Platynereis polyscalma:* Fig. 76, anterior end in dorsal view of an atokous individual (495-36), x 31; Fig. 77, a 45th parapodium in anterior view, setae indicated, x 65; Fig. 78, a 60th parapodium, in anterior view, x 65; Fig. 79, median parapodium from a nereilepas stage of male, with normal setae, x 65; Fig. 80, 15th parapodium from right side, from same individual as shown in fig. 85, x 65; Fig. 81, falcigerous notopodial seta from an epitokous male (11-33), x 645; Fig. 82, falcigerous neuropodial seta from 45th parapodium of an atokous individual, x 645; Fig. 83, falcigerous notopodial seta from same parapodium, x 645.



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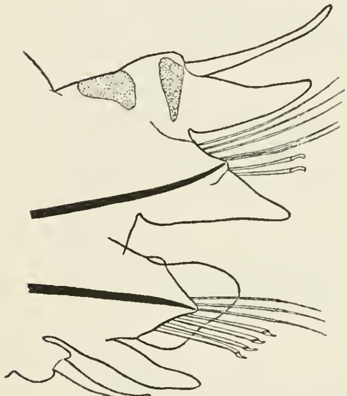

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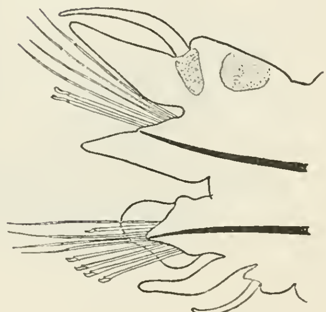

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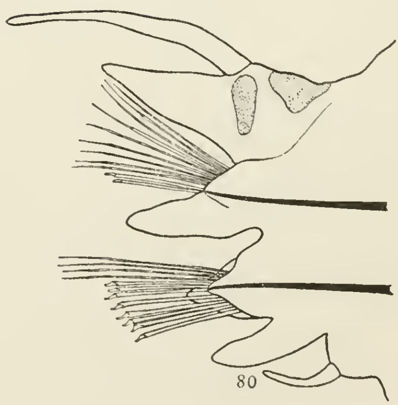

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PLATE 39

Figures 84-86, *Nephthys inermis:* Fig. 84, 50th parapodium, setae omitted (633-37), x 31; Fig. 85, 20th parapodium from same individual, x 31; Fig. 86, a posterior parapodium from same individual, x 31.

Figures 87-88, *Nephthys assimilis:* Fig. 87, a posterior parapodium in anterior view, setae omitted (495-36), x 31; Fig. 88, 10th parapodium in anterior view, showing digitate lobe at dorsal edge of neuropodium, x 65.

Figures 89-90, *Nephthys macroura peruana:* Fig. 89, 10th parapodium in anterior view, with attenuated acicular lobes, which are increasingly smaller after the 23rd parapodium, x 31; Fig. 90, 38th parapodium in posterior view, x 31.

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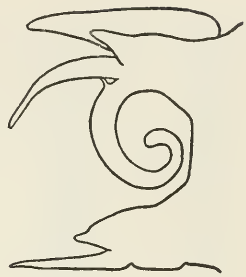

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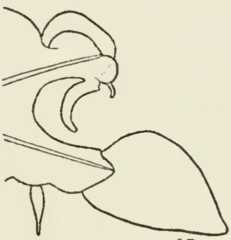

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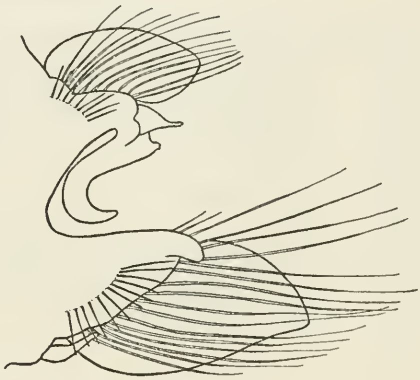

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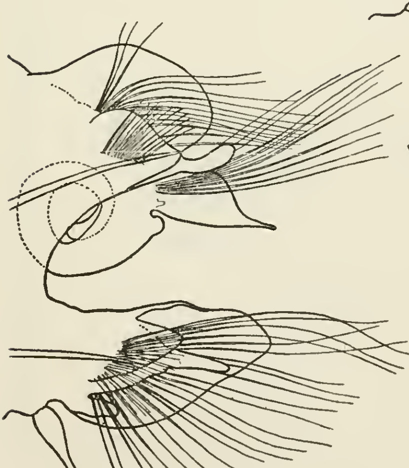

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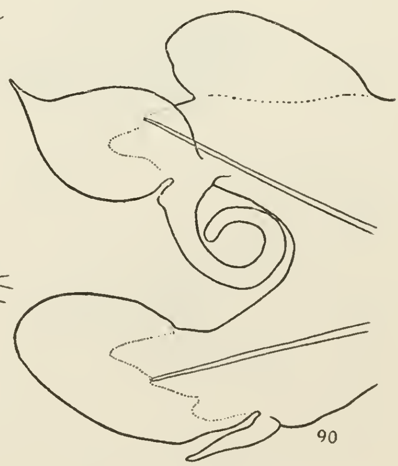

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PLATE 40

Figures 91-94, *Nephthys lobophora:* Fig. 91, 45th parapodium in posterior view (832-38), x 18; Fig. 92, basal part of a postlamellar, long seta, x 285; Fig. 93, 12th parapodium in anterior view, setae indicated, x 18; Fig. 94, a posterior parapodium in posterior view, setae indicated, x 18.

Figure 95, *Nephthys inermis:* lyre seta from a posterior parapodium, x 285.

Figure 96-97, *Nephthys macroura peruana:* Fig. 96, part of a spinose seta, x 285; Fig. 97, part of a barred seta from the same parapodium, x 285.

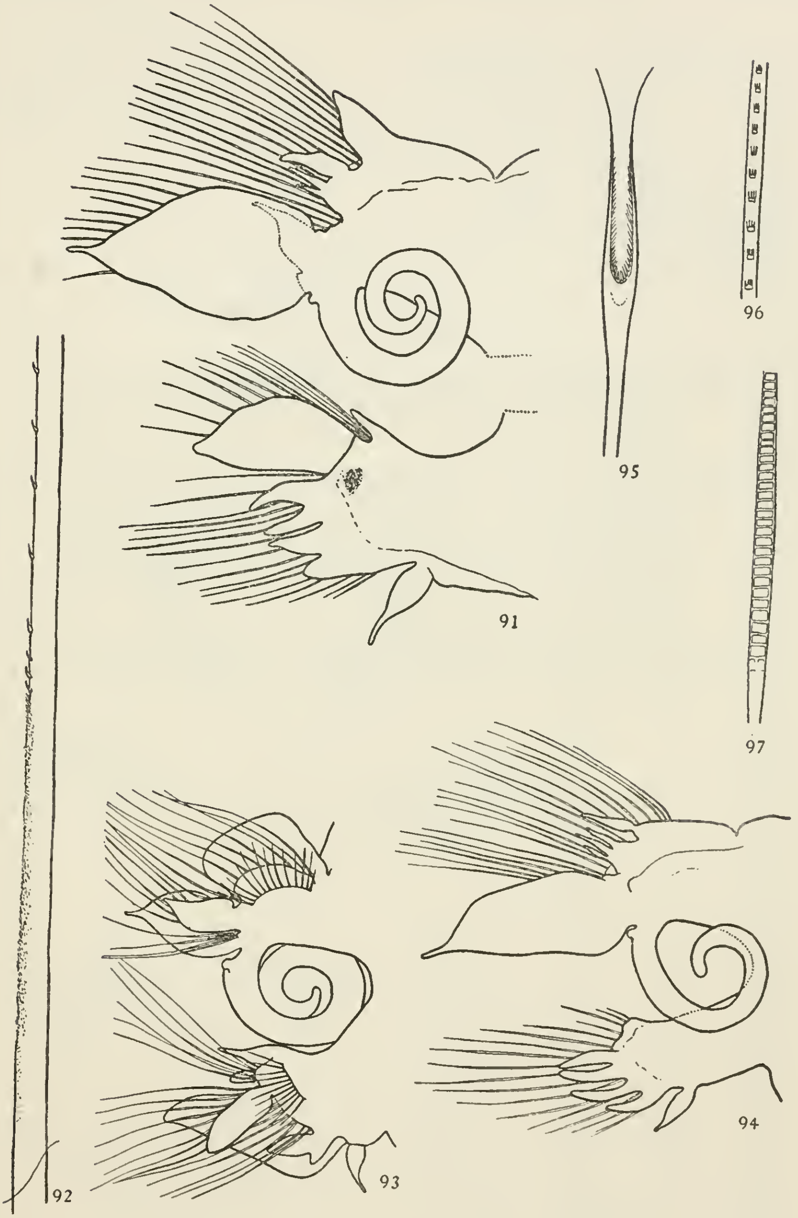
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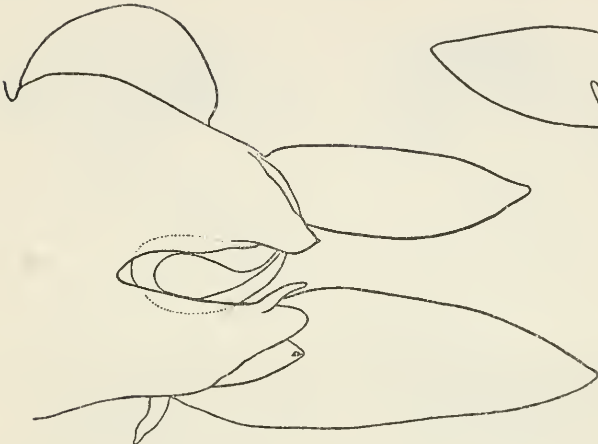
PLATE 41

Figures 98-99, *Nephthys squamosa:* Fig. 98, 25th parapodium in anterior view (735-37), x 31; Fig. 99, notopodium from the same, in posterior view, x 31.

Figures 100-104, *Nephthys magellanica:* Fig. 100, anterior end in dorsal view (628-37), x 31; Fig. 101, portion of barred seta from the 45th parapodium, x 285; Fig. 102, a shorter, postlamellar seta from the 25th parapodium, x 285; Fig. 103, distal part of a long postlamellar seta from the 45th parapodium, x 285; Fig. 104, basal part of same seta, x 285.

Figure 105, *Nephthys panamensis:* anterior end in dorsal view, pigmented pattern indicated by stippling (499-36), x 31.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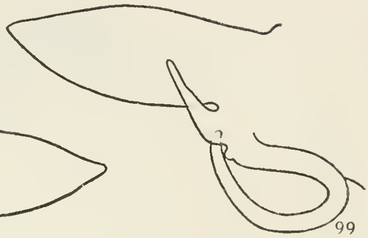
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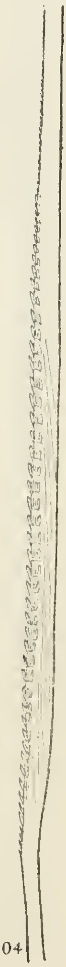
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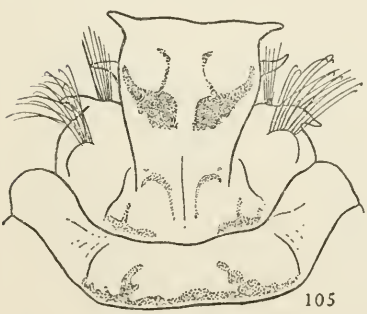
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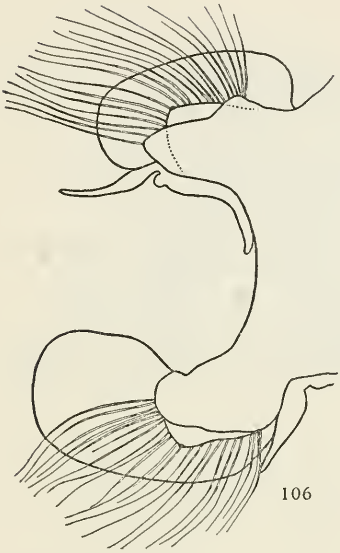
PLATE 42

Figures 106-109, *Nephthys panamensis:* Fig. 106, 50th parapodium in anterior view, postacicular setae indicated, x 31; Fig. 107, 25th parapodium in anterior view, x 31; Fig. 108, 10th parapodium in anterior view, x 31; Fig. 109, part of a postacicular serrated seta from the same parapodium, x 285.

Figures 110-114, *Nephthys caecoides ferruginea:* Fig. 110, 20th parapodium in anterior view, setae omitted, x 31; Fig. 111, 10th notopodium in anterior view, x 31; Fig. 112, about 50th parapodium in anterior view, setae omitted, x 31; Fig. 113, part of a spinose seta from postacicular fascicle, x 127; Fig. 114, part of a barred seta from the same parapodium, x 127.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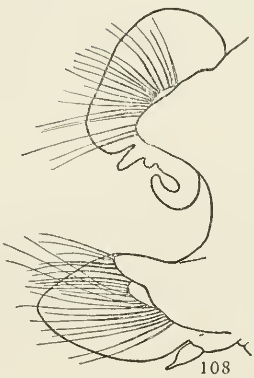
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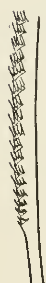
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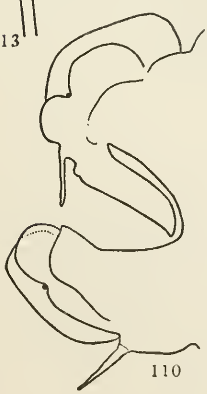
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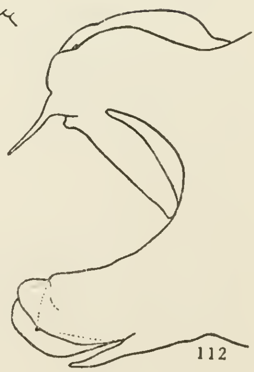
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PLATE 43

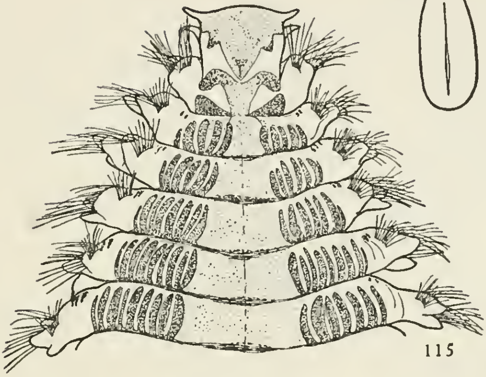
Figure 115, *Nephthys caecoides ferruginea:* anterior end in dorsal view, pigmented pattern indicated by stippling (379-35), x 18.

Figures 116-119, *Hemipodus simplex:* Fig. 116, 10th parapodium (366-35), x 65; Fig. 117, 60th parapodium from the same individual, x 65; Fig. 118, 13th last parapodium from the same individual, x 65; Fig. 119, 3 papillae from the proboscis, the cusps directed toward the terminal jaws, x 285.

Figure 120, *Hemipodus californiensis:* 2 papillae from the proboscis, x 285.

Figure 121, *Hemipodus borealis:* 2 papillae from the proboscis, x 285.

Figures 122-124, ?*Glycera oxycephala:* Fig. 122, 2 papillae from the proboscis, x 285; Fig. 123, 10th parapodium in anterior view, setae indicated, x 65; Fig. 124, distal end of prostomium from left side, with 2 longer and 2 shorter terminal antennae, x 65.



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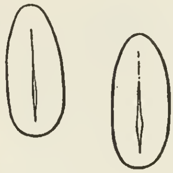

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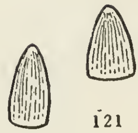

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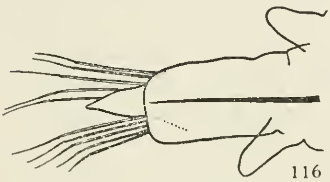

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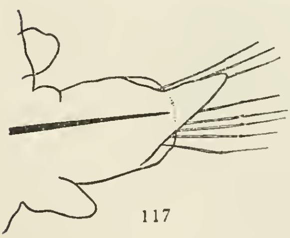

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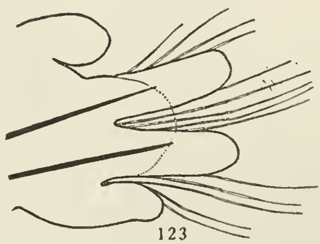

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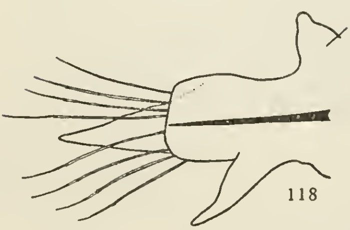

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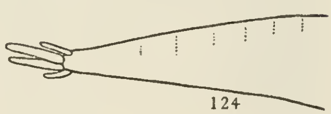

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PLATE 44

Figure 125, *?Glycera oxycephala:* 85th parapodium in anterior view, setae omitted, x 65.

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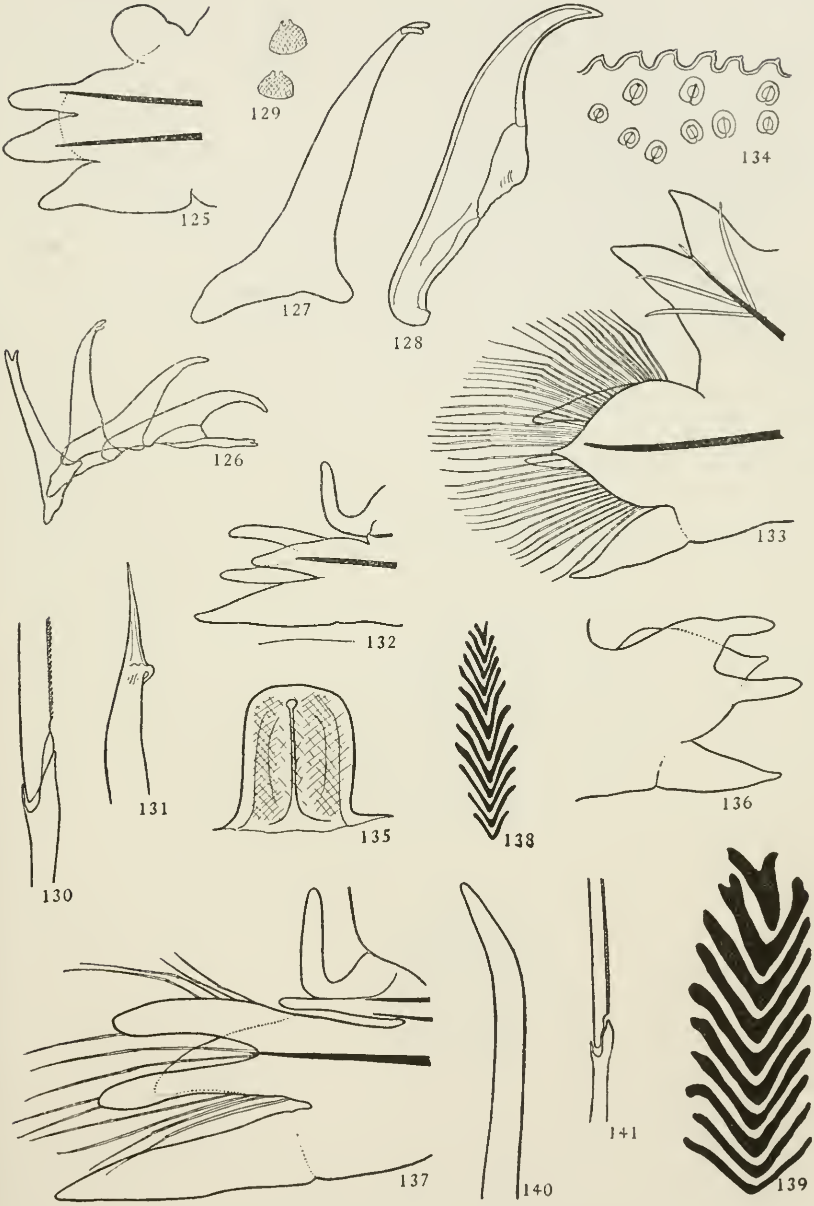
Figures 132-141, *Goniada acicula:* Fig. 132, parapodium from the middle anterior region, setae omitted, x 31; Fig. 133, parapodium from the middle posterior region, in posterior view, setae indicated, x 31; Fig. 134, papillae from proboscis taken from near the middorsal line near the distal third, the points directed toward the head (proboscis everted), x 65; Fig. 135, one of the proboscidial papillae in frontal view, x 285; Fig. 136, a neuropodium from the middle posterior region in anterior view, setae omitted, x 31; Fig. 137, a parapodium from the middle region, or about the 83rd parapodium, in anterior view, x 31; Fig. 138, chitinous plates (chevron) from the right side of a proboscis (499-36), x 65; Fig. 139, same, from another specimen (549-36), x 65; Fig. 140, distal end of a notopodial seta from a posterior parapodium, x 285; Fig. 141, articulation of a composite seta from the same parapodium, x 285.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ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 7 NUMBER 4

SOME CONTRIBUTIONS TO THE BIOLOGY AND LIFE HISTORY OF SPIONIDAE FROM CALIFORNIA

With keys to species and genera and descriptions of two new forms

(PLATES 45-48)

by

OLGA HARTMAN
ALLAN HANCOCK FOUNDATION

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REPORTS ON THE COLLECTIONS OBTAINED BY ALLAN HANCOCK PACIFIC EXPEDITIONS OF VELERO III OFF THE COAST OF MEXICO, CENTRAL AMERICA, SOUTH AMERICA, AND GALAPAGOS ISLANDS IN 1932, IN 1933, IN 1934, IN 1935, IN 1936, IN 1937, IN 1938, IN 1939, AND IN 1940.

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With keys to species and genera and descriptions of two new forms

(Plates 45-48)

By Olga Hartman
ALLAN HANCOCK FOUNDATION

The present report concerns itself with members of the family Spionidae (polychaetous annelids) from California. The collections originate from different sources. Most were made by the author over a period of years; when they are from other sources, recognition is made. Most of the larval stages reported on were taken from the pier of the Scripps Institution of Oceanography at La Jolla during the spring of 1938; some collections were made in southern California during the author's tenure at the Allan Hancock Foundation of The University of Southern California. The types of new species are deposited in the Allan Hancock Foundation.

The author is deeply indebted for valuable aids from the Scripps Institution of Oceanography at La Jolla during the spring of 1938, and to Dr. Martin W. Johnson, in whose laboratory plankton samples were examined; to Professor S. F. Light of the University of California, with whom the collections in San Mateo County were made during 1933-1936; and for many opportunities made available at the Allan Hancock Foundation of The University of Southern California.

Members of the family Spionidae are largely inhabitants of the intertidal zones, particularly abounding in sandy or muddy sand beaches, in crevices, and in rocky situations. Most are free living; a few are known to be destructive *(Polydora ciliata)*; rarely they are commensal *(Polydora commensalis)*. Though largely intertidal, some species have been recorded from over 400 fathoms. They are to be classed with the smaller chaetopods, since their length ranges usually from a few to about 50 mm; rarely they may attain twice that length or even more. Because of their small size, they are frequently overlooked in casual collecting. Records from California include Fewkes (1889, pp. 37-38) with one species *(Spio californica)*, Treadwell (1914, pp. 199-203) with one (or two?) species *(Spio acuta* and *Polydora californica?)*, Chamberlin (1919, p. 17) with one species *(Morants duplex)*, Moore (1923, pp. 179-186) with four species *(Prionospio alata, Spionides foliata, S. sacculata,* and *Spiophanes* *fimbriata)*, and Hartman (1936b, 1940) with six species *(Boccardia brachycephala, B. truncata, Polydora amarincola, Pygospio californica, Rhynchospio arenincola,* and *Streblospio lutincola)*. The present report brings the total to 23 species, with one other regarded as indeterminable and another a possible synonym.

The following lists 11 genera and 23 species recorded from California. Ten of these, preceded by an asterisk, are newly reported; 2, *Polydora citrona* and *Spiophanes missionensis,* are believed to be new to science.

Boccardia proboscidea Hartman, p. 299
*?*Boccardia redeki* (Horst), p. 304
Boccardia truncata Hartman (1936b)
**Boccardia uncata* Berkeley, p. 304
Laonice cirrata (Sars), p. 293
Morants duplex Chamberlin (1919)
Nerinides acuta (Treadwell), p. 294
**Polydora armata* Langerhans, p. 306
Polydora brachycephala Hartman (1936b)
**Polydora ciliata* (Johnston), p. 308
Polydora citrona, new species, p. 311
**Polydora commensalis* Andrews, p. 308
**Polydora giardi* Mesnil, p. 309
Polydora ligni Webster, p. 309
**Polydora socialis* (Schmarda), p. 310
Polydora tricuspa Hartman (1940)
Prionospio alata Moore, p. 298
Pygospio californica Hartman (1936b)
Rhynchospio arenincola Hartman (1936b)
**Spio filicornis* (O. F. Müller), p. 293
Spiophanes fimbriata Moore (1923)
**Spiophanes missionensis,* new species, p. 296
Streblospio lutincola Hartman (1936b)

Two other names in the literature merit consideration. *Spio californica* Fewkes (1889, pp. 37-38) is a *Polydora* or *Boccardia,* species indeterminable (Hartman, 1936a, 1940), which renders the next name a homonym. *Polydora californica* Treadwell (1914, pp. 203-204) from unknown locality, though named for California, is perhaps what has since been designated *Boccardia proboscidea.*

Chart of the Genera of SPIONIDAE Known from California, with Some Diagnostic Features

	Frontal horns	*First appearance of branchiae*	*Kind of branchiae*	*Number of branchiae*	*Presence of hooks*	*Kind of hooks*	*Nature of pygidium*	*Other unique features*
Spio	absent	first setiger	simple	present throughout	neuropodia	bidentate	with cirri	
Laonice	absent	second setiger	simple	present anteriorly	neuropodia	bidentate	with cirri	with parapodial pouches
Prionospio	absent	second setiger	pennate	3-11 pairs	neuro- and notopodia	multidentate	with cirri	
Spiophanes	partly produced	none	none	none	neuropodia	bi- or tridentate	disklike	
Nerinides	absent	second setiger	simple	many	neuropodia	usually bidentate	disklike	
Pygospio	absent	about nineteenth setiger	simple	through a median region	neuropodia	bidentate	4 short cirri	
Rhynchospio	present	second setiger	simple	many	neuropodia	tridentate	8 short cirri	
Polydora	absent	after fifth setiger	simple	few to many	neuropodia	bidentate	disklike (rarely cirri)	fifth setiger with modified spines
Boccardia	absent	before fifth setiger	simple	many	neuropodia	bidentate	disklike	fifth setiger with modified spines
Morants	present	first setiger	simple	?	neuropodia	bidentate	with 2 cirri	sixteenth setiger with modified spines
Streblospio	absent	first setiger	simple	one pair	neuropodia	tridentate	simple	with dorsal membrane on second segment

Key to the 11 Genera of SPIONIDAE from California

1. With a modified segment 2
1. Without a modified segment 5
2. Sixteenth segment modified; branchiae present from the first setiger; pygidium with 2 cirri . . . . *Morants* (*M. duplex* Chamberlin)
2. Fifth segment modified; branchiae present after the first setiger; pygidium usually disklike (rarely with cirri) 3
3. Branchiae present anterior and posterior to the modified segment . . . . *Boccardia,* p. 299
3. Branchiae present only posterior to the modified segment . . . . *Polydora,* p. 305
4. Without branchiae; prostomium with laterally directed processes at its anterior margin; anus with cirri . . *Spiophanes,* p. 296
4. With branchiae; prostomium with or without such processes; anus with or without cirri 5
5. With only one pair of branchiae, these simple, inserted just posterior to the paired palpi; second segment with a raised dorsal membrane; pygidium simple, without disk or cirri . . . . *Streblospio* (*S. lutincola* Hartman)
5. With more than one pair of branchiae; without such raised dorsal membrane on second segment; pygidium disklike or surrounded by cirri 6
6. Prostomium with articulating lateral horns at its frontal margin; branchiae present from second setiger and on most segments thereafter; uncini distally tridentate . . . . *Rhynchospio* (*R. arenincola* Hartman)
6. Prostomium without articulating horns; branchiae present from second setiger or later; uncini bidentate to multidentate . . 7
7. Branchiae pennate, limited to a few anterior segments; uncini distally multidentate . . . . *Prionospio (P. alata),* p. 298
7. Branchiae simple, cirriform or straplike, present on several to many segments; uncini usually bidentate (sometimes tridentate) 8
8. Successive neuropodia in a long posterior region connected by interramal pouches . . . . *Laonice,* p. 293
8. Without such neuropodial pouches 9

9. Branchiae present from first setiger, continued throughout length; pygidium with cirri . . . . *Spio,* p. 293
9. Branchiae present after the first setiger; pygidium disklike or with cirri 10
10. Pygidium disklike; branchiae present from second setiger through a long region . . . . *Nerinides,* p. 294
10. Pygidium with cirri; branchiae present from about the nineteenth setiger, continued through the median region; pygidium with 4 short cirri . . *Pygospio* (*P. californica* Hartman)

Genus SPIO Fabricius
Spio filicornis (O. F. Müller)

McIntosh, 1910, pp. 172-176, pl. 98, fig. 11, pl. 97, fig. 9, pl. 105, fig. 13; Berkeley, 1936, pp. 475-476; Okuda, 1937, pp. 224-225, figs. 5*a-e*.

Several specimens have been collected from low tidal pools at Marine View, San Mateo County. This species inhabits sandy beaches, where overgrown with some vegetation, at low-water line. Its distribution is cosmopolitan.

Genus LAONICE Malmgren
Laonice cirrata (Sars)

Berkeley, 1936; Hartman, 1936a.
Aricidea alata Treadwell, 1902, p. 202, figs. 58-60.
Spionides japonicus Moore, 1907, pp. 204-206, pl. 16, figs. 31-34.
Spionides foliata Moore, 1923, pp. 182-183.
? *Spionides sacculata* Moore, 1923, pp. 184-185.

This has been obtained in shallow dredgings from off La Jolla, off Half Moon Bay (collected by Dr. T. H. Bullock), and off southern California (collected by the *Velero III,* Allan Hancock Foundation). In the specimens from La Jolla the first hooks are present (1) in the last branchial segment, (2) in the last 3 branchial segments, and (3) in the first postbranchial segment, indicating a certain amount of variation in this respect. In other specimens the variation falls within the limits mentioned above. In all examined, the dorsal transverse fold reaches only a short distance from the dorsal face of the notopodium to the trunk region.

Two species of *Laonice* (as *Spionides*) have been described from California—*S. foliata* and *S. sacculata* by Moore (1923). These were separated as follows:

	S. foliata	S. sacculata
Presence of interpodal membrane	from twenty-ninth to thirty-seventh, posteriorly	from twenty-ninth to thirty-second, posteriorly
Presence of branchiae	to segments 43-49	to segments 50-60
Dorsal transverse fold	unites notopodia to body above and to neuropodia below	much less conspicuous than in *S. foliata*
Presence of hooks	immediately posterior to the branchial region	from about the fifty-fifth segment

Because of individual variations noted above, it appears doubtful that these two (*S. foliata* and *S. sacculata*) are to be considered distinct; as shown above, the presence of hooks varies within the specified limits. The observed difference in the transverse folds may be at least partly due to differences in age of specimens and methods of fixation. *Spionides japonicus* has been referred to *Laonice cirrata* (Söderström, 1920, p. 220); *S. foliata* by Hartman (1936a, p. 32). The type of *Arcidea alata* has been examined at the United States National Museum and found to be not a member of the family Paraonidae, but rather a spionid, with palpi broken off near their bases. In all other respects the type specimen agrees perfectly with *Laonice cirrata* (Sars).

L. cirrata is cosmopolitan in distribution.

Genus NERINIDES Mesnil

Nerinides acuta (Treadwell)

Plate 45, Figs. 1-8; Plate 47, Fig. 29

Spio acuta Treadwell, 1914, pp. 199-201, pl. 11, figs. 14-20. Hartman, 1936a, p. 32.

Extensive beds of this species have been found in intertidal sandy beaches in southern California, especially along the strand where accumulated debris and kelps are swept in, such as the coves at La Jolla, Laguna Beach, etc. It sometimes forms compact beds, or may be present where *Thoracophelia mucronata* (Treadwell) is dominant. Its vertical burrows in the sand are recognizable at the surface as minute apertures; these may be closely packed when abundant. In life the animal is light green, the pigment contained largely in the walls of the alimentary tract and palpi.

The prostomium is greatly prolonged anteriorly, pointed, widest where it meets the peristomium at the anterior margin. There is a transverse groove just anterior to the eyes (pl. 45, fig. 1). A high nuchal ridge is continued posteriorly a short distance to the third setiger. The palpal bases are at the sides of the ocular ridge. The peristomium is a long, achaetous ring at the sides of the prostomium. The first setigerous segment has only neurosetae; the second is the first branchial segment. Hooded hooks are distally tridentate (pl. 45, figs. 4, 5).

During the early part of May, 1938, eggs and spermatozoa were removed by breaking open the body wall of seemingly mature individuals of *Nerinides acuta*. The egg is elongate ellipsoid, measures approximately 0.21 by 0.129 millimeters, and is greatly depressed when seen from the side. It is covered by a thick membrane, its surface highly sculptured with larger and smaller depressions (pl. 45, figs. 7, 8). It is semitranslucent; a clear vesicle may be distinguished near its center, and smaller clear spots at the narrowed ends. The spermatozoa are highly motile, minute, oval bodies with long tail (pl. 45, fig. 6).

Attempts to inseminate eggs artificially in May resulted in a shrinking away of the cytoplasm from the egg membrane. Normal development was not obtained. Numerous planktonic young individuals of what is believed to be this species were collected during May. Also, early sedentary stages were found in great numbers in sandy beaches at Spindrift, near La Jolla, on May 4, 1938. A comparison of various stages from the plankton and from sandy beaches suggested a probable picture of its development. The youngest sedentary stages observed had 23 segments and measured 1.6 mm long in life. General appearance was much like that of the adult, with greatly prolonged prostomium. The palpi, however, were short, extending posteriorly only to about the fourth or fifth setiger. Branchiae were present from the second segment. The gastric area between segments 8 and 15 was dark. Hooded hooks were present from the thirteenth setiger. The pygidium was nearly hemispherical, provided with a ciliated telotroch.

A similar, earlier stage was taken in plankton late in May, and kept in culture for about a week. The same greenish color with a deep black streak marking the alimentary tract was visible through the body wall, just as in early sedentary stages; palpi were short. The prostomium and anterior end were prolonged, pointed, with 4 dark eyespots (pl. 45, figs. 2, 3). The pygidium was collarlike, with dorsal groove and well-developed telotroch.

A 15-segmented larva, perhaps of this species, was taken in tow on April 28. The prostomium and anterior parts had the proportions shown in pl. 47, fig. 29. From the fourth setiger the alimentary tract was darkly pigmented. Neurotrochs were present on setigers 3, 6, 9, and 10. The pygidium was hemispherical, without cirri, but with well-developed telotroch. The prototroch was still strong, but the anterior end had long smooth capillaries directed anteriorly and laterally. Tridentate hooded hooks, such as characterize adults, were present in neuropodia from the twelfth segment; segments 1 to 11 had smooth capillary setae only. The general appearance of this larva was reminiscent of another larva seen in the plankton on several occasions; in the latter, however, the anterior bristles were markedly spinous; it is believed to have been that of a Disomidae—a small family nearly related to the Spionidae.

The latest stage observed in the plankton was a 32-segmented larva, taken on April 25. In general appearance and color pattern it was much like the smaller larvae observed. The first setiger had a ventral fascicle of capillary setae; from segment 17 neuropodia had 2 tridentate hooks between superior and inferior capillary setae.

Genus **SPIOPHANES** Grube

This genus is characterized in lacking branchiae; the frontal margin of the prostomium is usually produced in a pair of laterally directed processes that are continuous with the prostomium or articulate with it. Notopodia have only long pointed setae; neuropodia, after a number of anterior segments, have hooded hooks that are distally bi- or tridentate. Only 5 species have been ascribed to it—*S. bombyx* Claparède, cosmopolitan in distribution; *S. cirrata* Sars, from cold waters of the Northern Hemisphere; *S. fimbriata* Moore, dredged off California; *S. kroyeri* Grube, reported from many seas; and *S. malayensis* Caullery, from Amboina. *S. missionensis,* described below, is believed to be new to science.

Spiophanes missionensis, new species

Plate 46, Figs. 17-21

The general form is minute, slender, total length about 10 to 15 mm, number of segments about 110. The prostomium is longer than broad, with a depressed, laterally produced frontal margin (pl. 46, fig. 17) but not strictly with lateral horns. There are 4 minute eyespots, disposed in trapezoidal arrangement, the anterior pair wider apart and less distinctly visible, the posterior pair dorsal in position. The prostomial ridge extends back to the region between the palpal bases.

The first segment has well-developed noto- and neuropodia, with long, tapering cirri; the notosetae are entirely smooth, slender, directed forward; the neurosetae include similar, though shorter, capillary setae and a single stout, recurved, pale spine (pl. 46, fig. 21). The second segment resembles the first save that its cirri are a little smaller than others near them but have thick, glandular areas. Neuropodia shift from a lateral to a ventrolateral position between setigers 14 to 16. The first 14 segments have only long, pointed, capillary setae in both rami. These setae are continued throughout in notopodia. From the fifteenth neuropodium, uncini are present, at first few in number, accompanied by capillary setae, but increasing in number posteriorly. They are distally tridentate (pl. 46, fig. 18).

The first 16 segments are notably more depressed than those following. From the seventeenth segment a transverse dorsal membrane is present and continued through the rest of the body length. Where best developed it consists of 18 to 20 short, transverse bands of long cilia, the whole forming a trim, straight row across the dorsum, between paired notopodia. Interramal pouches have not been observed, even in individuals with large eggs.

The egg (possibly near maturity) is oblong, approximately 0.12 x 0.096 mm, white; its surface appears punctate on account of numerous depressions under the surface membrane (pl. 46, fig. 19). This egg is reminiscent of that of *Poecilochaetus serpens*, a member of the Disomidae, described by Allen (1904, pp. 79-151).

The pygidium is a long ring, with dorsal anal opening, a pair of slender cirri inserted dorsolaterally, and a thick, somewhat depressed, unpaired median papilla ventrally (pl. 46, fig. 20).

S. missionensis inhabits well-constructed, sand-covered tubes open at both ends, disposed vertically in sandy beaches. It has been collected only at moderately high-tide line, in Mission Bay, near the place where it enters the ocean, on the north side; here it is common just east and south of a metal culvert that empties into the bay.

S. missionensis differs from other species of *Spiophanes* in the following complex of characters: (1) the prostomium is anteriorly produced but lacks true horns; (2) it lacks a median antenna on the prostomium; (3) there are no interramal parapodial pouches; (4) the pygidium has long, paired cirri and a thick, ventral papilla. *S. fimbriata* Moore (1923, p.

179), dredged from central and southern California (in 38 to 357 fms), differs from the new species in the following: (1) it has a slender, erect antenna near the truncated apex of the prostomium; (2) the dorsal transverse membranes are ruffled; (3) there are lateral interparapodial pouches after the fifteenth segment. The nature of the pygidium could not be determined because of fragmentary specimens.

Holotype.—AHF no. 32.

Distribution.—Mission Bay, California, intertidal.

Genus **PRIONOSPIO** Malmgren

Prionospio alata Moore

Moore, 1923, pp. 185-186.

A single specimen, agreeing with the original description, has been dredged off La Jolla, in about 45 fms, during a cruise of the *E. W. Scripps* of the Scripps Institution of Oceanography, April 19, 1938. Moore's single type specimen was dredged off Point Pinos Light in 56-57 fms.

Discussion on the Genera **Boccardia** Carazzi and **Polydora** Bosc

These 2 genera have long been separated on the basis of a single character—presence or absence of branchiae anterior to the modified segment. The artificiality of this separation may be argued, especially since the presence of branchiae on segments posterior to the modified one has only specific significance. It is of interest that among the species of these genera, some of each have 2 kinds of heavy spines in the modified segment. Thus, among species of *Boccardia, proboscidea* has 2 kinds whereas *uncata, redeki,* and *truncata* have but a single kind. Among species of *Polydora, tricuspa* and *citrona* have 2 kinds; most of the others have but a single kind. Furthermore, among the species of these genera, *B. uncata, P. hamata,* and *P. hoplura* possess heavy hooks, greatly resembling one another, in some posterior segments. These characters would seem to have phylogenetic significance. It is thus not convincing that the species comprising these genera are clearly separable as are those of most other genera. However, their separation is here maintained for convenience.

The modified segment is herein designated the fifth (setigerous) segment, although it is recognized that the peristomium (achaetous) is actually a segment. Some authors have therefore called the modified one the sixth.

Genus **BOCCARDIA** Carazzi

Branchiae are present anterior to the modified fifth setiger; modified hooks in the fifth are of one or 2 kinds; heavy spines in posterior segments are present or absent.

Key to Species of Boccardia from California

1. Major heavy spines in fifth (modified) segment of 2 kinds; branchiae present on setigers 2, 3, 4, 6 and to near end . . . . *B. proboscidea,* p. 299
1. Major heavy spines in fifth segment of only one kind; branchiae disposed otherwise 2
2. A posterior region (preanal) with modified heavy spines . . . . *B. uncata,* p. 304
2. Posterior region without modified heavy spines 3
3. Branchiae present on setigers 2, 3, 6 and to about the posterior fifth of the body . . . . *B. truncata* Hartman
3. Branchiae present on setigers 2, 3, 7 and through a long median region . . . . ? *B. redeki,* p. 304

Chart of the Species of Boccardia from California, with Some Diagnostic Features

	proboscidea	truncata	uncata	?redeki
presence of branchiae	on 2, 3, 4, 6, to near end	on 2, 3, 6, through a long region	on 2, 3, 6, to about posterior fourth	on 2, 3, 7, through a long region
heavy spines in posterior segments	absent	absent	present	(not known)
number of kinds of heavy spines in fifth setiger	2: simple falcate and bushy topped	1: simple falcate with subdistal concavity	1: simple falcate	1: simple falcate

Boccardia proboscidea Hartman[1]

Plate 46, Figs. 22-28; Plate 47, Figs. 30-37

Hartman, 1940, J. Wash. Acad. Sci., vol. 30, pp. 382-387, figs. 1*a-j*.
?*Polydora californica* Treadwell, 1914, pp. 203-204 (not Fewkes, 1889).
B. natrix Hartman, 1936a, p. 32 (not Söderström, 1920).

[1] Berkeley (in litt.) has called attention to the similarity of *B. proboscidea* to *B. columbiana* Berkeley (1927, p. 12) but the major spines in the fifth setiger are different (*cf.* Berkeley, pl. 1, fig. 6).

This is the commonest intertidal spionid in California, inhabiting particularly soft, reef-building shales, narrow interstices in harder rocks, and fine crevices among other suitable hard objects. If in shales, it occurs usually in vertical or oblique burrows made by the inhabitant; if in crevices, these are usually in oblique positions, the adjacent hard surface slightly grooved by the back-and-forth movement of the worm. A thin, mucoid, debris-covered tube covers it. The abundance of this species is often so great as to form a conspicuous part of the intertidal fauna. It may be found in low-lying, flat reefs, especially if these be of soft limestone or shale. When conditions are favorable, as they are in the vicinity of reefs at Moss Beach, San Mateo County, at Point Fermin, at Point Conception and other places, the burrows may be numerous, closely spaced, only a few millimeters from one another. Also, in high tidal pools, where temperature/salinity ratios may fluctuate greatly, this species successfully maintains itself.

B. proboscidea is not known to occur outside California. Its bathymetric range extends from the high intertidal pools to moderately low-water line; it has never been recovered from dredged collections. It is tolerant to salinities ranging from strictly marine to brackish, such as are found in the eastern end of San Francisco Bay, in the vicinity of Berkeley; its presence in high tidal pools indicates that it tolerates high salt content. Its ecologic niche is soft stones or narrow rocky crevices; it has never been found associated with sandy beaches or a strictly soft substratum.

B. proboscidea belongs to a small group in which the heavy spines of the modified fifth segment are of 2 kinds—(1) stout, smooth, falcate, and (2) bristle topped, in which the bristled area is limited to a region beyond the thickest part (pl. 46, fig. 24). The prostomium is prolonged anteriorly so as to extend beyond the peristomium; it is smooth, entire at its frontal margin (pl. 46, fig. 22). A caruncle extends posteriorly between the palpal bases to the posterior margin of the third setiger. A considerable sooty pigmentation is usually to be seen in the grooves between prostomium and peristomium. On the ventral side, the anterior portion of the prostomium has a median groove (pl. 46, fig. 23). In adult males, parapodial glands are present from the seventh to ninth segment; spermatozoa from the fourteenth; nephridia are greatly enlarged in this region. Hooded hooks are first present from the seventh setiger.

The interesting development of this species was first called to the author's attention several years ago by Professor S. F. Light, while at Moss Beach, near San Francisco. During the spring and summer months, adults with developing stages are obtainable. They are tolerant to conditions in the laboratory and may be kept alive for weeks in small dishes. The translucency of the cocoon permits observation of activities within. Eggs are deposited in soft, capsulelike cocoons (pl. 47, fig. 33). They are spherical in shape, opaque, yellow, measuring 0.12 to 0.15 mm in diameter and number 20 to 80 in a cocoon. Size of eggs and cocoons varies directly with that of the adult depositing them. Fifteen to 20 or more cocoons are deposited within the loosely constructed tube of an adult, approximately in linear series; each cocoon is attached to the tube (pl. 46, fig. 28) by a double stalk.

Söderström (1920, pp. 185-191) has given the most plausible explanation of the manner of egg deposition and cocoon building as it is known to occur among some members of the Spionidae. His observations and conclusions were based on *Pygospio elegans* Claparède and 2 species of *Polydora.* Since these views are in striking contrast to others that have been forwarded by Whitlegge, Mesnil and Caullery, and others (see Söderström, 1920, p. 185), they are briefly summarized. Söderström maintains that the rim of the nephridial pores secretes the material making up the capsular membranes, and that the eggs (which sometimes measure considerably more than the diameter of the nephridial aperture at the time of egg laying) literally flow through the nephridial tube and only take their definitive form in the capsule. At the time of egg laying, the body of the adult is pressed close against the wall of the tube. A secretion emerges from a pair of nephridial pores of a particular segment and is applied to the wall of the tube until a pair of short stalks results. This substance is sticky when shed but does not adhere to the eggs. When the eggs are extruded, they cause the walls of the elastic membrane to extend, such that its inner walls merge, resulting in a single vesicular sack (pl. 46, fig. 27). Thus, eggs emerging from both nephridial pores at the same time come to occupy the same capsule. The free distal end of a cocoon terminates the process and may show a small papillar elevation on either side, or it may be evenly rounded (as in *B. proboscidea*). The end of the process is diagrammatically shown in pl. 46, fig. 27.

The fertilized egg gives rise to a smooth, spherical, opaque blastula. If development is allowed to proceed normally (in the absence of cannibalism), a weakly ciliated, nearly spherical, modified trochophore develops. The cephalic region is identifiable by a pair of clear spots at the anterior end (pl. 47, fig. 30). In many cocoons development of all zygotes seemingly proceeds at such tempo that all embryos are in about the same stage of development. In others such is not the case; a few more precocious individuals soon attack the more retarded ones, so that the cellular contents are withdrawn (see below).

The earliest embryos in which structures are visible have a slightly lobed appearance (pl. 47, figs. 30, 31). The oral area of the anterior region is well ciliated. There are weak indications of segmentation and shallow transverse grooves on the ventral side, set apart by rows of short cilia. No long trochal cilia are observable, such as characterize typical planktonic polytrochs. The region of the alimentary tract is filled with yellow granular yolk particles. Not long thereafter prototroch and telotroch are present, and the cephalic region is better defined (pl. 47, fig. 32). This short, rotund form gives rise to a triangular-shaped, 3-segmented larva (pl. 47, fig. 37). The prostomium is clearly marked with 2 pairs of dark eyespots dorsolaterally and a pair of clear pouches opening anteriorly. On the ventral side the oral aperture is well ciliated, the lower lip bounded by large columnar cells. Before setae have emerged, elongate cells in the setigerous sacs may be seen with slender, rodlike spines. Setae that finally emerge are entirely slender, capillary, provisional, without limbate region such as those in the adult. These setae from the first 3 segments elongate rapidly and extend posteriorly so as to surpass the anal end. The alimentary tract is complete when the full length of the setae has been attained. If a cocoon be broken open in which such larvae are encased, they squirm rapidly out of the case and swim about, alternately holding the setae along the sides of the body or thrusting them laterally (pl. 47, fig. 37).

Several such cocoons were isolated in separate culture dishes, on March 2, to determine the fate of the larvae if left undisturbed, and whether they could effect their own release from the capsule. After 6 days they were still moving about in the cocoon, though considerably impeded by the proximity of others in the case. Many setae had been pulled out and were packed in the stalk end of the capsule. After 8 days the larvae were dead. Rate of survival of other cocoons differed somewhat, but in no case did they bring about their own release from the cocoon. It seems that an external stimulus must be applied, such as might be produced by the brooding individual in passing back and forth through the tube.

Other similar cocoons were broken open, permitting the young to escape. These were kept in culture for several weeks. They were capable of foraging for themselves and kept alive with no difficulty. When supplied with a matrix in which adults had been present, the young settled and built tubes. During the spring months of 1938 similar larvae were frequently encountered in the plankton, especially over areas where adults were known to occur.

In a young (4-segmented) larva there is slight trace of dark pigment, at the anterior end of the prostomium and anal ring. There are as yet no dorsal melanophores such as in later stages. Eyes are irregular in shape and number, forming a transverse band of 4 to 8 spots along the dorsal side of the prototroch. Capillary setae are long, limited to the first 3 segments, those of the first longest, extending distally beyond the body. The prostomium is strongly ciliated. The ventral lobes at the anterior margin of the mouth have numerous short cilia, continued in the pharynx. The peristomium is recognizable as a pair of pouches at the sides of the outer pair of eyes. A pair of thick ridges posterior to the lateral eyes are the palpal rudiments.

In capsules where cannibalism occurs, the larger individuals gradually and effectively not only ingest blastulae but attack younger larvae and devour them. In some tubes examined, it was found that all cocoons were of this kind. Whether this fact was due to an inherent trait or to physical conditions has not been ascertained. The more robust larvae continue to develop at the expense of other capsular contents, adding segments posteriorly, far beyond the 3-segmented stage, to the 12- or 15-segmented one. They remain relatively quiescent, perhaps because of their greatly extended condition. Like their relatives in the plankton, they have dorsal melanophores in a similar pattern and deeply pigmented eyespots (pl. 46, fig. 26). It is not unlikely that when escape is finally accomplished, they settle without entering the plankton.

Three to 15-segmented planktonic larvae of this species are common elements in plankton in spring. They are recognizable by a complex of characters distinguishing them from other spionid larvae. The prostomium is broad, truncate in front, with eyespots approximately in crescentic arrangement. Each segment has a medially placed, black spot on the dorsal side. These are broad, dendritically branched on the first 6 segments, diminishing in size thereafter (pl. 47, fig. 34). They are capable of expansion and contraction. During larval life the long capillary setae are replaced by thicker limbate setae in the first 4 setigerous segments, and from the postmodified (fifth) segment to the anal end. The modified fifth has typically 2 pairs of stout spines on either side, resembling those in the adult but much smaller (pl. 47, fig. 36). Palpi are short, thick, heavily ciliated, folded over as seen in lateral view. When this stage has been reached, settling occurs if a suitable substratum is provided. The latest planktonic larvae observed had 15 segments.

Boccardia uncata Berkeley

Plate 48, Fig. 46

Berkeley, 1927, p. 418, pl. 1, figs. 9-13; Okuda, 1937, pp. 238-240, figs. 16, 17.

This occurs abundantly in masses of oysters in Mission Bay, on the south side of the bridge over which the San Diego electric railway tracks pass. It is recognizable in having branchiae on the second and third setigerous segments, and from the sixth posteriorly; a long, closely crowded posterior portion lacks branchiae, but has heavy modified hooks (pl. 48, fig. 46).

Originally described from British Columbia, it has since been reported by Okuda (1937) from Japan. This is the first record from southern waters.

?Boccardia redeki (Horst)

Plate 48, Figs. 44, 45

Polydora redeki Horst, 1920, p. 111, 2 figs.

Polydora (Boccardia) redeki Okuda, 1937, pp. 240-241, fig. 18*a-d*.

A single incomplete specimen was taken with numbers of *Polydora socialis* from Mugu Lagoon, and another fragment from Mission Bay, southern California. Branchiae are present on setigers 2, 3, 7 to the end of the piece. The prostomium has 4 large eyespots, disposed in trapezoidal arrangement. A caruncle extends posteriorly to the end of the third setiger. The anterior end of the prostomium is somewhat prolonged, weakly incised. The first setiger lacks dorsal setae but has a ventral fascicle on either side. The stout spines of the fifth are smooth, slightly falcate, their companion pennoned setae fairly large (pl. 48, fig. 44). Hooded hooks are distally bifid, the hooked end oblique to the main stalk (pl. 48, fig. 45). The nature of the pygidium could not be determined. These specimens agree very well with the description by Okuda, but differ in some details from the original description.

P. redeki Horst was originally shown with a caruncle extending only to the middle of the second setiger; in the present specimens it is continued to the end of the third segment. Also, Horst shows the 4 prostomial eyes in a nearly transverse line and says, "De koplob is zwak ingesneden en voorzien van twee paar oogen, die alle op één dwarse lijn staan." In ours the 4 eyes are in quadrangular arrangement. The nature of uncini and the kind of pygidium were not disclosed by Horst.

Genus **POLYDORA** Bosc

Polydora is distinguished from *Boccardia* in lacking branchiae on segments anterior to the modified fifth segment. It was originally erected for *P. cornuta* Bosc, from South Carolina, but was not sufficiently defined to reidentify; the type of the genus remains unknown except as a member of this group. The genus has been revised by Mesnil (1896), Söderström (1920), and others.

Key to Species of *Polydora* from California

1. Prostomium and palpi very short; major spines of fifth modified segment falcate with a long, lateral sheath; pygidium with about 14 papillae; commensal with hermit crab *P. commensalis,* p. 308
1. Prostomium with palpi otherwise; major spines of fifth segment without a long sheath if falcate; pygidium without numerous papillae; not commensal with hermit crab 2
2. Pygidium with 4 cirri disposed in a cross; major spines of fifth segment of 2 kinds, both with bristly top (pl. 45, figs. 12, 13); prostomial ridge very narrow, greatly eclipsed by the large peristomium; bright yellow in life . . . . *P. citrona,* p. 310
2. Pygidium disklike; major spines of fifth segment otherwise; prostomial ridge not so reduced 3
3. With conspicuous bundles of heavy spines in a few posterior segments; major spines of fifth segment falcate, with a large overhanging flange (pl. 48, fig. 39); in coralline hummocks . . . . *P. armata,* p. 306
3. Without such spinous fascicles in posterior segments; major spines of fifth segment without overhanging flange 4
4. Prostomial caruncle with a median antenna; major spines of fifth segment falcate with sharp accessory tooth in concavity (pl. 48, fig. 48) . . . . *P. ligni,* p. 309
4. Prostomial caruncle without median antenna; major spines of fifth segment otherwise 5

5. Major spines of fifth segment falcate with pectinate top . . . . *P. brachycephala* Hartman
5. Major spines of fifth segment otherwise 6
6. Branchiae present from tenth setiger to about the twenty-fifth, a posterior region abranchiate . . . . . *P. giardi,* p. 309
6. Branchiae present from seventh or eighth setiger 7
7. Major spines of fifth setiger of 2 kinds, falcate and tricuspid . . . . *P. tricuspa* Hartman
7. Major spines of fifth of a single kind, not tridentate . . . 8
8. Major spines of fifth segment with a lateral, sheathlike tooth (pl. 48, fig. 40) ; branchiae present from seventh segment . . . . *P. ciliata,* p. 308
8. Major spines of fifth segment falcate, with boss in concavity (pl. 48, fig. 41) ; branchiae present from eighth segment . . . . *P. socialis,* p. 310

Polydora armata Langerhans

Plate 48, Figs. 38, 39

Langerhans, 1880, pp. 93-94, pl. 4, fig. 5; Fauvel, 1927, pp. 55-56, fig. 19; Okuda, 1937, pp. 230-231, fig. 10.

Along much of the intertidal zone of southern California, where low-lying reefs, flat rocks, and shallow crevices are found, harder surfaces are frequently covered over by an encrusting pale red alga. Some of these masses appear coarsely prickly; at the tip of each small elevation a small aperture may be distinguished. These mark the openings of burrows of *P. armata.* The burrows ramify irregularly through the calcareous matrix.

Specimens from La Jolla are small, inconspicuous, number of segments about 32. The prostomium is weakly bifid at its anterior margin; it lacks eyespots (observed in life). Branchiae are first present from the seventh segment, number only 5 or 6 pairs, and are continued on segments 7 to 12 or 13; they are large, with long cilia continued along their length. The first segment has both dorsal and ventral setal fascicles.

The fifth segment has a dorsal fascicle of stout spines accompanied by bipinnate setae and a ventral fascicle of about 5 slender capillary setae. The modified spines have a falcate tip with heavy flange at the geniculate portion (pl. 48, fig. 39). Hooded hooks are distally bifid (pl. 48, fig. 38), present from the seventh segment to the end. Parapodial glands occur in segments 7 to 11. Fascicles of heavy spines are present in notopodia of the

CHART OF THE SPECIES OF *POLYDORA* FROM CALIFORNIA

Name of species	*Branchial pairs, presence and number*	*First setiger*	*Posterior spines*	*Major spines in fifth*	*Prosto-mial eyes*	*Hooded hooks*	*Nature of pygidium*	*Other unique features*
armata	from seventh, 5-7 pairs	with dorsal and ventral fascicle	with close fascicle of many	1 kind: falcate with broad flange	absent	from seventh segment	disklike	burrows in corallines
brachycephala	from seventh to about twentieth last	with dorsal and ventral fascicle	absent	1 kind: falcate with pectinate top	present	from seventh segment	disklike	
ciliata	from seventh to about tenth last	with only ventral fascicle	absent	1 kind: falcate with accessory sheath	present	from seventh segment	disklike	burrows in calcareous structures
citrona	from seventh through anterior third	with dorsal and ventral fascicle	absent	2 kinds: with bristly tops	present	from tenth segment	with 4 cirri	minute prostomium; pointed hooded setae post
commensalis	from sixth through most of length	with dorsal and ventral fascicle	absent	1 kind: falcate with lateral flange	present	from twelfth segment	with about 14 papillae	very short palpi and prostomium; commensal
giardi	from tenth to about twenty-fifth	dorsal and ventral fascicle vestigial	absent	1 kind: falcate with close accessory tooth	absent?	from seventh segment	disklike	
ligni	from eighth to about tenth last segment	with only ventral fascicle	absent	1 kind: falcate with sharp accessory tooth	present	from seventh segment	disklike	
socialis	from eighth nearly to end	with only ventral fascicle	absent	1 kind: falcate with small subterminal boss	present	from seventh segment	disklike	
tricuspa	from eighth to about twenty-fifth	with only ventral fascicle	absent	2 kinds: simple falcate and tricuspid	present	from seventh segment	?	

last 6 segments; those in the fifth and sixth last segments are unusually conspicuous bundles; those in the last 4 segments are much smaller; the neuropodia of these segments are provided with a series of about 4 hooded hooks and a lanceolate seta.

The pygidium is a narrow collar, not much wider than the posterior end of the body. A simple gregarine has been found in the alimentary tract.

This is the first record of *P. armata* from the eastern Pacific. Okuda (1937, pp. 230-231) has recorded it from Japan, associated with coral, algae, sponge, and a mollusk.

Polydora ciliata (Johnston)

Plate 48, Fig. 40

Fauvel, 1927, pp. 49-50, fig. 16; Berkeley, 1936, p. 472; Okuda, 1937, p. 230, fig. 9.

Numerous collections from Point Richmond, San Francisco Bay, Muir Beach, San Mateo County, and others from Mission Bay near San Diego, all from the intertidal zones, are attributed to this species. They agree with descriptions indicated in the synonymy above. The heavy modified spines of the fifth setiger are falcate, with a lateral sheath; their companion pennoned setae are proportionately large (pl. 48, fig. 40).

P. ciliata has been widely reported from many seas; it is known especially for perforating calcareous shells and has been shown to be injurious to shell-fish industries (Lunz, 1940, p. 310).

Polydora commensalis Andrews

Andrews, 1891, pp. 25-35, 2 pls.; Berkeley, 1936, pp. 469-471; Annenkova, 1938, p. 178, fig. 14.

This has been recovered from shells of Ilyanassa occupied by hermit crabs, from beaches in southern California. Unique features of this species include: (1) the large robust body with short, thick palpi and short prostomium; (2) broad, straplike branchiae; (3) modified falcate spines in the fifth segment, with a long, narrow sheath. First described from Beaufort, North Carolina, it has since been reported from British Columbia (Berkeley) and the North Japan Sea (Annenkova). Another specimen in our collections comes from Mazatlan, Mexico (collected by Dr. Martin W. Johnson), also found with a hermit crab.

Polydora giardi Mesnil

Plate 48, Fig. 43

Mesnil, 1896, pp. 195-202, pl. 13, figs. 1-12.

Numerous collections have been made from La Jolla, California, from narrow crevices in low-lying shales, occupying a niche much like that of *Boccardia proboscidea,* but in a lower zone. This is a much smaller, slenderer species than that of the Boccardia, hardly exceeding 10-15 mm in length, and differs in other morphological characters. Branchiae are first present from the tenth setiger, and continue posteriorly through at least 24 segments; a long posterior region is abranchiate.

The prostomium is distinctly bifid at its anterior margin; a caruncle extends back nearly to the middle of the fourth setiger. Modified spines of the fifth are falcate, with an accessory, closely appressed tooth on those embedded; those exposed are simple, falcate, or with only a minute tooth. A series of hooks from one side is shown in pl. 48, fig. 43. Hooded hooks are distally bifid, the stalk at an oblique angle to the tip. The pygidium is a thick, collarlike disk, nearly half as long as broad, only slightly flaring, with dorsal and dorsolateral notches. Prostomial eyes have not been distinguished.

P. giardi has remained unreported save from Europe. Because of its small size and inconspicuous niche, it may have escaped detection in some places.

Polydora ligni Webster

Plate 48, Figs. 47-49

Webster, 1879, p. 119. [The figures here cited were not published until 1886, in the 39th Ann. Report.]

Berkeley, 1936, pp. 471-472.

P. amarincola Hartman, 1936, p. 49, figs. 6-10.

Both adults and what are believed to be planktonic juveniles of this species have been collected from central and southern California. The following features are characteristic: (1) the prostomium is distinctly bifid at its anterior margin; (2) the prostomial caruncle has a slender, cirriform antenna; (3) branchiae are present from the seventh setiger nearly to the posterior end; (4) the pygidial disk is broad, flaring; and (5) the modified spines of the fifth setiger are falcate with a sharp secondary tooth in the concave region (pl. 48, fig. 48).

Planktonic stages of what are believed to be this species have been taken during April at La Jolla. The 3-segmented larva has conspicuous dark eyespots and paired black stripes dorsally (pl. 48, fig. 49). Later stages, up to a 19-segmented, have been taken from tows. One of the later stages is shown in pl. 48, fig. 47. These larvae have modified spines (pl. 48, fig. 48) in the fifth setiger as typical of the adult.

P. ligni has been collected from Mission Bay (with *P. citrona*) north to San Francisco Bay, especially from estuarine habitats. As *P. amarincola* (Hartman, 1936, p. 49) it has been reported from Lake Merritt, Oakland, an inland arm of the sea with highly fluctuating salinity, especially on the brackish side. Inclusion of these specimens with Webster's *P. ligni* (1879) from New Jersey was first considered doubtful because of the striking differences in size between the two. *P. ligni* was described as measuring only 1 to 4 mm long; specimens from California measure 25 to 30 mm long. Since these studies were begun, it has been possible to examine not only Webster's types but also collections from other parts of eastern America, and these all agree in morphological details with the specimens from California; individuals from North Carolina are approximately as large as those from southern California.

Polydora socialis (Schmarda)

Plate 48, Figs. 41, 42

Mesnil, 1896, pp. 193-194, pl. 12, figs. 30-32.

Numerous collections from Mugu Lagoon, southern California, and several from Point Richmond, San Francisco Bay, are referred to this species. The former are much smaller than their more northern representatives—their lengths only 8-10 mm as against 25-30 mm. At Mugu Lagoon it forms extensive beds, over a muddy sand substratum, the soft, gray, mucoid tubes lying over or near the surface, close to one another. The specimens from San Francisco Bay were taken from a low, intertidal eel grass bed. Originally described (1861) from Chile, this has remained unknown except through Mesnil's redescription (1896) of the type collection. This author concluded that this is "une espèce surtout voisine de *P. caeca*. Les ressemblances sont grandes, et les diffèrences d'importance secondaire." Berkeley (1936, p. 468) has described a subspecies, *P. socialis plena* from Nanaimo, British Columbia, which differs from the stem form in having notosetae in the first segment.

Specimens examined have the following characters. The body is long, attenuate. The prostomium is clearly bifid at its anterior margin; its caruncle extends back to the posterior margin of the fourth setiger (hence much longer than in *P. caeca* Oersted). The first setiger has only a neurosetal fascicle. Branchiae are first present from the eighth setiger, though small; from the ninth they are larger and are continued posteriorly nearly to the end (in *P. caeca* they are missing from a long posterior end). Hooded hooks are first present from the seventh; they are distally bifid, the angle of the stalk and tip oblique (pl. 48, fig. 42). Stout spines of the fifth setiger are falcate, with an enlargement or boss in the concave region (pl. 48, fig. 41). The pygidium is a flaring disk, entire in its ventral portion, with deep dorsal notch (specimens from San Francisco) or also with shallow lateral notches (specimens from Mugu Lagoon).

P. socialis may be typically an estuarine form. The type locality was given only as "Chile."

Polydora citrona, new species

Plate 45, Figs. 9-16

The general form is long, attenuate, length 20-30 mm, number of segments 120 or over. It is ochre yellow in life, in striking contrast to the dark sandy mud in which it lives, associated with an anomurid crab *(Upogebia)*. Palpi (preserved) extend posteriorly to about segment 8-10. The prostomial ridge is greatly reduced, a minute longitudinal ridge superimposed on the much larger, inflated peristomial, pouchlike ring (pl. 45, fig. 10). Four minute black eyespots, nearly in a straight line, lie just in front of the palpal bases on the ridge. The anterior margin of the prostomium is bluntly rounded, somewhat turned up distally (in lateral view) (pl. 45, fig. 9). A caruncle extends posteriorly to the third setiger but is not conspicuous.

The first 4 setigers have noto- and neuropodial fascicles increasing in size gradually posteriorly, those of the first the smallest. The postsetal lamellae likewise increase in size proportionately, but nowhere are they larger than those of the postmodified segments. The fifth (modified) segment is large, inflated, fully twice as long as segments proximal to it. It bears a heavy dorsal fascicle of brown spines and a neuropodial fascicle of capillary setae which are nearly as large as those of the next segment, thus not as in most species of *Polydora* where they are usually much reduced in size and number. The heavy spines are of 2 kinds—a larger anterior row of about 5 or 6, with a heavy cylindrical stem and an expanded, bushy top (pl. 45, fig. 12), accompanied by an equal number of smaller spines with weaker stem and weakly bifid, hooded top beset with short bristles (pl. 45, fig. 13).

Branchiae, first present from the seventh setiger, are continued through about 50 to 70 segments, but absent from about the posterior two thirds of the body. They are broad, straplike, those of opposite sides directed inward and backward, not quite touching medially (preserved). Hooded hooks are first present in the tenth neuropodium; here there are about 5 hooks medially, accompanied with capillary setae above and below. By the twelfth there are about 8 such hooks with only 1 or 2 capillaries. Hooded hooks in anterior parapodia have a bifid tip, the distal end at an oblique angle to the main stalk. In middle and posterior segments these are gradually replaced by hooded setae that are distally pointed (pl. 45, fig. 14). In a posterior segment there are about 12 such hooded setae; when their tips are broken off they somewhat resemble irregular hooks, but their incomplete condition may be checked by an examination of their hood, which extends far beyond the broken tip (pl. 45, fig. 15) or by comparison with others in the same fascicle (compare pl. 45, figs. 14, 15). In so far as I am aware, this is the only described species of *Polydora* with such hooded setae. Another aberrant feature is the pygidium—here provided with 4 subequal clavate papillae, disposed in a cross, instead of a flaring or disklike membrane (pl. 45, fig. 11).

The eggs are white, laid singly within the tube where the young develop. No stage later than a 3-segmented was observed. This is a typical spionid chaetiger; the long provisional setae of the first 3 segments extend well beyond the pygidial region (pl. 45, fig. 16); prototroch and telotroch are developed. This stage is colorless save for 4 black eyes and a dark alimentary tract.

P. citrona differs from other species of the genus in having a minute prostomial ridge, in having modified spines of 2 kinds, both with bristled tops, in having its posterior hooded neurosetae terminate in a point, and in having pygidium provided with 4 cirri. It has been found only in Mission Bay, near the Causeway, during September, 1938, in beds of *Upogebia,* but was probably not commensal.

Holotype.—AHF no. 33.

Type locality.—Mission Bay, California.

Spionid larva

Plate 48, Figs. 50-53

During April and May, 1938, a small, spionid larva was encountered many times in plankton taken from the pier of the Scripps Institution. This differed from all other spionid larvae in having a conspicuously prickly pygidium, hemispherical in shape (pl. 48, figs. 51, 52). It lacked pigment except for 4 dark eyes on the prostomium and yellow alimentary tract. Like other spionid chaetigers, when disturbed, it thrust its setae laterally; this is also the position assumed when fixed (pl. 48, fig. 50). In life the long, larval setae were directed posteriorly or laterally. In addition to prototroch and telotroch, there were paratrochs on the third and fifth setigers. A 9-segmented larva had bifid hooded hooks (pl. 48, fig. 53) in neuropodia of segments 8 and 9, 2 in each foot of segment 8, and 1 in each of the ninth. All other segments had smooth capillary setae only, those of the first 2 segments the longest.

Only a few spionids are known to have a papillated pygidium; none has been recorded from western America which agrees with the conditions in this larva.

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PLATE 45

Figures 1 to 8, *Nerinides acuta:* Fig. 1, anterior end of adult, from life, x 53; Fig. 2, anterior end of planktonic larva near the settling stage, in dorsal view, x 107; Fig. 3, same, in left lateral view, x 107; Fig. 4, tridentate hook from a posterior parapodium of adult, in frontal view, x 650; Fig. 5, same hook seen from side without hood, x 650; Fig. 6, spermatozoon from adult in May, x 650; Fig. 7, cross section of egg membrane, x 650; Fig. 8, surface view of egg membrane, the smaller circles represent punctations between the larger, raised areas, x 650.

Figures 9 to 16, *Polydora citrona:* Fig. 9, anterior end from left side, showing greatly reduced prostomium over large peristomial ring, with small eyespots at sides, x 107; Fig. 10, anterior end from front, the triangular area represents oral aperture, the small dorsal lobe the reduced prostomium, x 107; Fig. 11, pygidium in posterior view, with 4 clavate cirri, x 260; Fig. 12, one of 5 larger, anterior modified spines from fifth setiger, x 260; Fig. 13, 2 of the smaller, posterior modified spines from fifth setiger, x 260; Fig. 14, an unbroken hooded setae from a posterior neuropodium, x 370; Fig. 15, a similar seta with broken tip, showing the hooded cap extending far beyond the broken tip, x 370; Fig. 16, a 3-segmented larva taken from tube of adult, x 260.

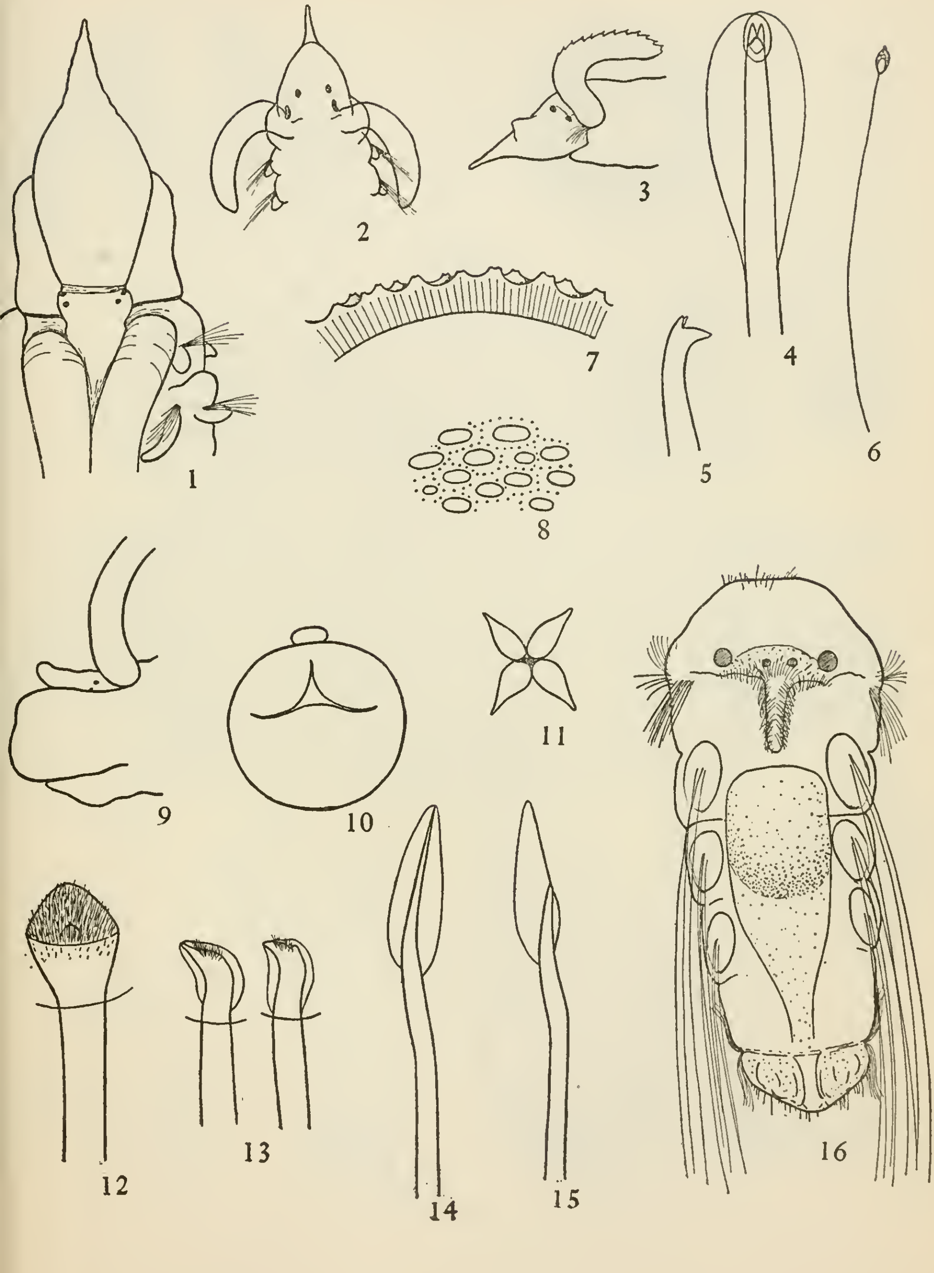
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PLATE 46

Figures 17 to 21, *Spiophanes missionensis:* Fig. 17, anterior end in dorsal view, palpi removed, some setae indicated, x 32; Fig. 18, a tridentate hook from a posterior parapodium, x 650; Fig. 19, outline of egg from adult in May, enlarged; Fig. 20, posterior end in left lateral view, with long paired cirri and short median papilla, x 32; Fig. 21, first parapodium from left side in anterior view, showing position of heavy spine in neuropodium, x 65.

Figures 22 to 28, *Boccardia proboscidea:* Fig. 22, anterior end in dorsal view with most of left palpus removed, x 12; Fig. 23, same, in ventral view, x 12; Fig. 24, a pair of modified spines from modified fifth segment from a young, recently settled stage, x 650; Fig. 25, early larva from capsule, in left lateral view, enlarged; Fig. 26, capsule with 3 remaining larvae in which cannibalism has taken place, enlarged; Fig. 27, diagram illustrating possible method of cocoon formation near the close of the process, the body in cross section shown applied to the points of closure of the cocoon (after Söderström); Fig. 28, several capsules attached to wall of tube of adult, slightly enlarged.


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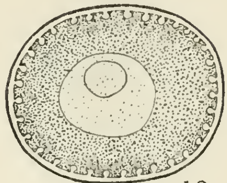
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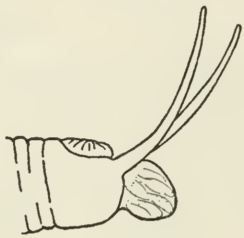
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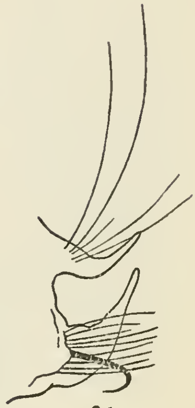
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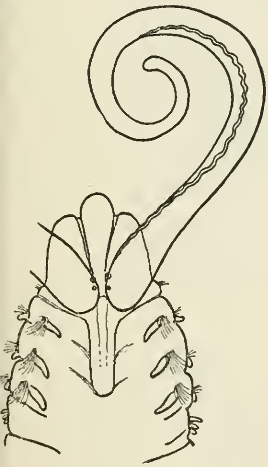
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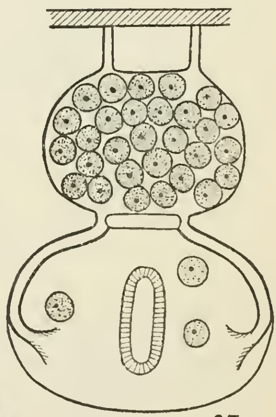
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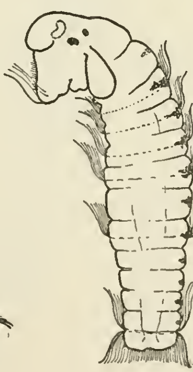
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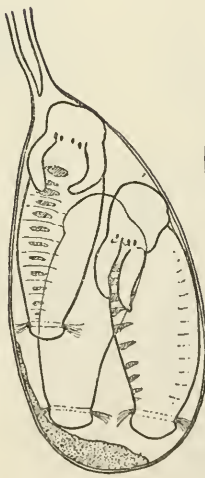
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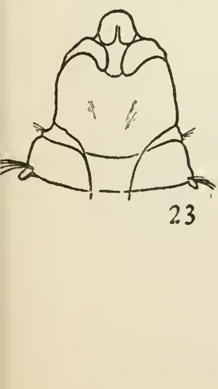
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PLATE 47

Figure 29, *Nerinides acuta,* anterior end of planktonic larva believed to be of this species, after fixation in formalin, x 240.

Figures 30 to 37, *Boccardia proboscidea:* Fig. 30, young larva from cocoon in ventral view, x 240; Fig. 31, a similar though slightly later stage in right lateral view, x 240; Fig. 32, young larva in cocoon attacking a proximal blastula, x 240; Fig. 33, a capsule shortly after laid down, showing double stalk and outline of eggs, x 50; Fig. 34, a 12-segmented, planktonic larva after fixation in Bouin's, x 85; Fig. 35, a 15-segmented larva from plankton, in ventral view, from life, x 85; Fig. 36, modified spine from fifth segment of same larva, x 240; Fig. 37, a 3-segmented larva from capsule, setae thrust laterally, x 240.

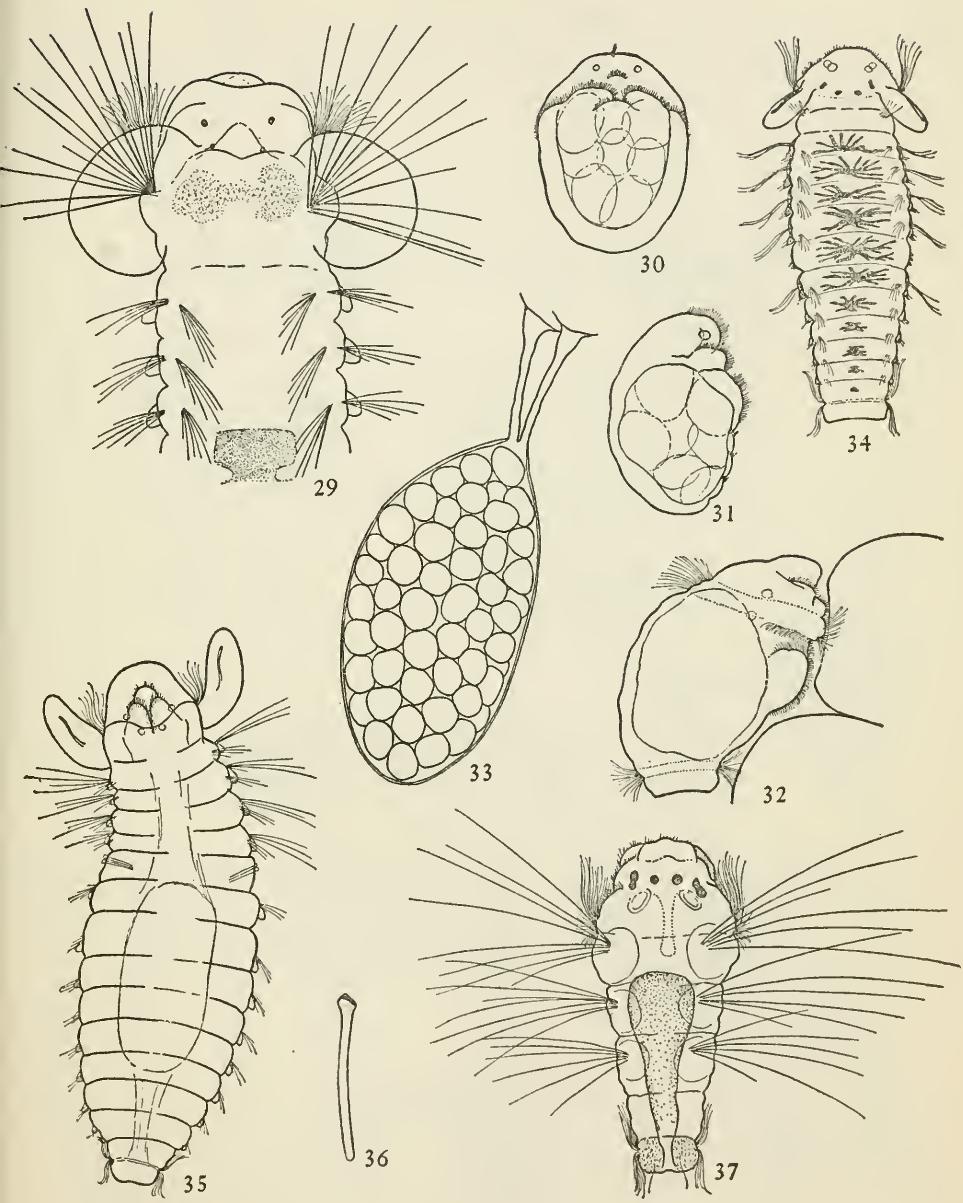
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PLATE 48

Figures 38, 39, *Polydora armata:* Fig. 38, a hooded hook from a posterior segment, x 650; Fig. 39, two modified spines from fifth setiger, x 370.

Figure 40, *Polydora ciliata,* modified spine and its companion pennoned seta from fifth setiger, x 370.

Figures 41, 42, *Polydora socialis:* Fig. 41, modified spine from fifth setiger, x 290; Fig. 42, hooded seta from seventh setiger, x 290.

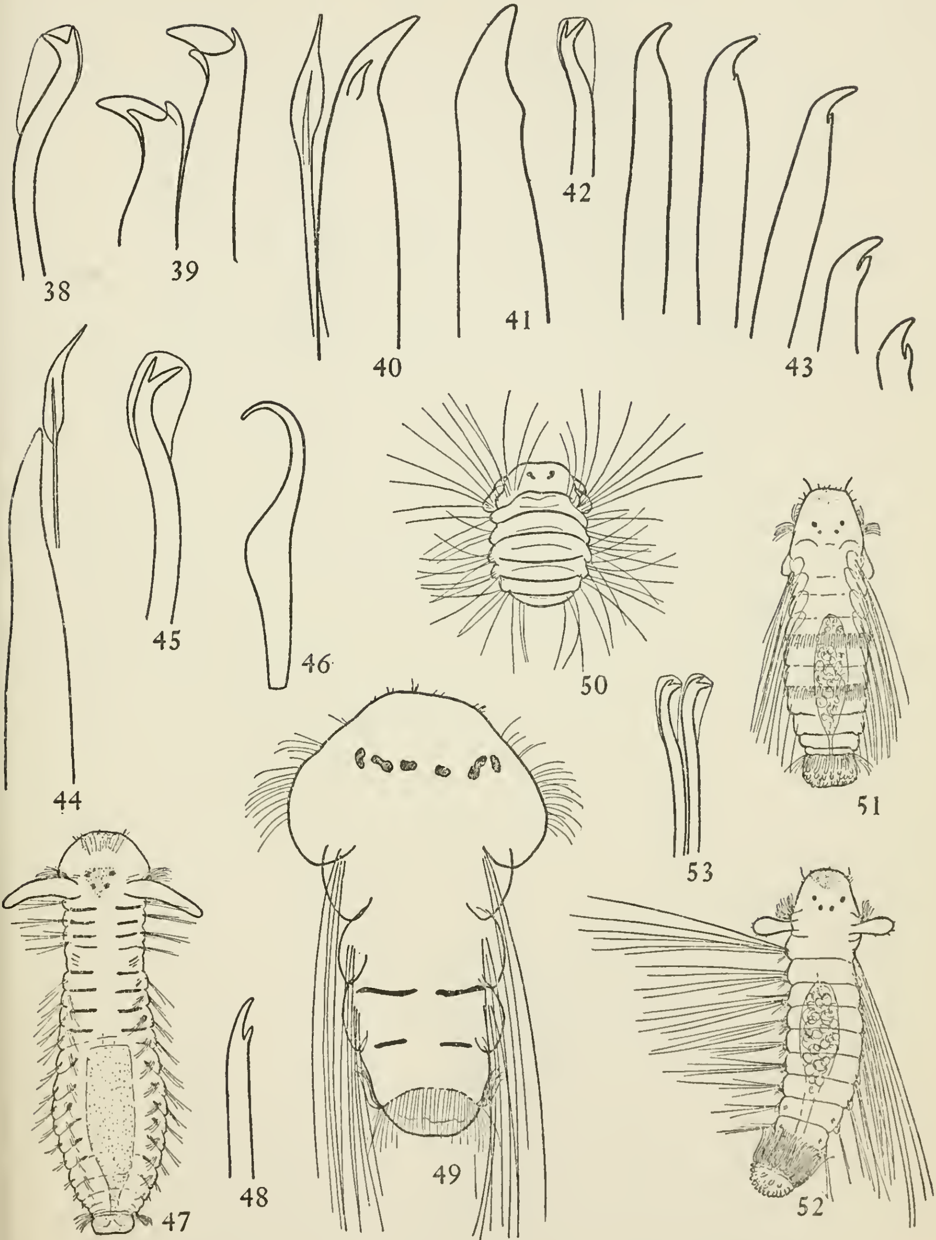
Figure 43, *Polydora giardi,* series of 5 modified hooks from one side of fifth setiger, showing gradation of changes in accessory tooth, x 370.

Figures 44, 45, ?*Boccardia redeki:* Fig. 44, modified hook with companion pennoned seta from fifth setiger, x 290; Fig. 45, hooded hook from a posterior segment, x 290.

Figure 46, *Polydora uncata,* a modified spine from a posterior parapodium, x 65.

Figures 47 to 49, *Polydora ligni:* Fig. 47, a 19-segmented larva from plankton, showing characteristic paired pigment pattern on anterior segments, x 53; Fig. 48, a modified spine from fifth segment from same individual, x 370; Fig. 49, a 3-segmented planktonic larva, believed to be this species, x 260.

Figures 50 to 53, Spionid larva: Fig. 50, chaetosphaere position after fixation, x 85; Fig. 51, a young planktonic larva with prickly pygidium, in life, x 85; Fig. 52, another similar larva with setae partly thrust laterally, x 85; Fig. 53, a pair of hooded hooks from ninth segment of preceding, showing bifid distal end, x 650.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ALLAN HANCOCK PACIFIC EXPEDITIONS

VOLUME 7 NUMBER 5

POLYCHAETOUS ANNELIDS

Part IV. Pectinariidae

With a Review of All Species from the Western Hemisphere

(Plates 49-52)

by

OLGA HARTMAN
ALLAN HANCOCK FOUNDATION

SMITHSONIAN INSTITUTION
APR 10 1942
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REPORTS ON THE COLLECTIONS OBTAINED BY ALLAN HANCOCK PACIFIC EXPEDITIONS OF VELERO III OFF THE COAST OF MEXICO, CENTRAL AMERICA, SOUTH AMERICA, AND GALAPAGOS ISLANDS IN 1932, IN 1933, IN 1934, IN 1935, IN 1936, IN 1937, IN 1938, IN 1939, AND IN 1940.

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The family PECTINARIIDAE (sometimes called Amphictenidae) is usually recognized for 5 genera or subgenera, including (1) *Amphictene* Savigny with type *A. auricoma* (O. F. Müller), (2) *Cistenides* Malmgren with type *C. granulata* (Linnaeus), (3) *Lagis* Malmgren with type *L. koreni* Malmgren, (4) *Pectinaria* Lamarck (sensu Malmgren) with type *P. belgica* (Pallas), and (5) *Petta* Malmgren with type *P. pusilla* Malmgren. Three of these, *Amphictene, Pectinaria,* and *Cistenides,* are much more nearly related to one another than to any of the others, and 2 of these, *Cistenides* and *Pectinaria,* are sometimes separated with difficulty. Originally, Malmgren (1866, p. 358) distinguished *Pectinaria* as having a straight tube, 13 uncinigerous segments, and uncini with 7 or 8 major teeth, whereas *Cistenides* was said to have an arcuate tube, 12 uncinigerous segments, and uncini with 3 major teeth. However, several species have been found in both genera in which these characters intergrade. Fauvel (1927, p. 220) considers *Lagis, Amphictene, Pectinaria,* and *Cistenides* as subgenera of *Pectinaria* Lamarck, and separates the last 2 by the character of the tube, whether straight or arcuate, as Malmgren had done. Nilsson (1928, p. 23) also retains *Cistenides* as a subgenus, referring to it those species that have a higher number of scaphal hooks (6-10-22 pairs) covered by a small fold of skin, and subgenus *Pectinaria* for those whose scaphal hooks number only about 4-6-12 pairs, not covered by a fold of skin. These characters are also difficult to distinguish in some species, since they show intergradations from one to the next.

A striking morphological character concerns the structure of the uncini and may permit a more natural line of separation. In one group, *Pectinaria* (with type *P. belgica*), the major teeth of the uncini are disposed in 2 or more series as seen in frontal view, making usually for a thicker, though smaller, hook, one not apt to lie flat. In another group, *Cistenides* (with type *C. granulata*), the major teeth of the uncini are disposed in a single row, making for a hook that is thin, readily lying flat (see also p. 331).

The 5 genera or subgenera of PECTINARIIDAE are separable as follows:

1. Scaphe not sharply set off from the rest of the body; antennular membrane not fringed . . . . *Petta* Malmgren
1. Scaphe sharply set off from the main part of the body; antennular membrane fringed 2
2. Lateral portions of antennular membrane fused with paleal segment . . . . *Lagis* Malmgren
2. Lateral portions of antennular membrane free from paleal segment 3
3. Dorsal margin of cephalic plaque fringed . *Amphictene* Savigny
3. Dorsal margin of cephalic plaque entire 4
4. Uncini with major teeth in a single row *Cistenides* Malmgren
4. Uncini with major teeth in 2 or more rows . . . . *Pectinaria,* sensu Malmgren

The genus *Lagis* is not known from the Western Hemisphere; *Petta* is known only through one species, *P. pellucida* Ehlers (1887, p. 194), from Florida. *Amphictene* has been described or reported from the Western Hemisphere through 3 species:

A. auricoma (O. F. Müller), from Alaska (Moore, 1908, p. 353) south to Elkhorn Slough, California (MacGinitie, 1935, p. 694);

A. guatemalensis Nilsson (1928, p. 46), from the Pacific side of Central America;

A. catharinensis F. Müller (see Nilsson, 1928, p. 43), from Desterro, Brazil.

No representatives of *Amphictene* have turned up in the Hancock collections. Both *Cistenides* and *Pectinaria* are represented by several species (see below).

In a recent monograph of the family, Nilsson (1928, p. 23) considered 13 species in these 2 subgenera. These included 6 species in *Cistenides: aegyptia* (Savigny), *chilensis* Nilsson, *ehlersi* Hessle, *gouldii* Verrill, *granulata* (Linnaeus), *hyperborea* Malmgren; and 7 species in *Pectinaria: antipoda* Schmarda, *australis* Ehlers, *belgica* (Pallas), *brevispinis* Grube, *clava* Grube, *conchilega* Grube, and *parvibranchis* Grube.

If we separate these on the character suggested above—uncini with teeth in single series *(Cistenides)*, or teeth in several series *(Pectinaria)* —the separation differs slightly. The following 4 species go to *Cistenides*. (The American species, preceded by an asterisk, are distinguished in the key on p. 330.)

**C. ehlersi* Hessle, from Patagonia,

**C. gouldii* Verrill, from eastern North America, south to the West Indies,

**C. granulata* (Linnaeus), from Arctic and North Atlantic oceans,

**C. hyperborea* (Malmgren), from Arctic, North Atlantic, and North Pacific oceans.

The following 9 species go to *Pectinaria:*

P. aegyptia (Savigny), from the Red Sea,

P. antipoda Schmarda, from New Zealand and Australia,

P. australis Ehlers, from New Zealand,

P. belgica (Pallas), from western Europe,

P. brevispinis Grube, from the Philippines,

**P. chilensis* (Nilsson), from Chile, p. 333,

P. clava Grube, from the Philippines,

P. conchilega Grube, from the Philippines, and

P. parvibranchis Grube, from the Philippines.

To these, discussed by Nilsson (1928), may be added 3 others in *Cistenides* and 2 in *Pectinaria:*

**C. brevicoma* Johnson (1901, p. 243), from Alaska south to California, p. 331,

**C. regalis* Verrill (1902, p. 38), from Bermuda, p. 332,

C. soldatovi Annenkova (1929, p. 486), from north Japan and northeast Asia, bringing the total of *Cistenides* to 7 species; and

**P. californiensis,* new species, from southern California, p. 333,

**P. californiensis newportensis,* new subspecies, from Newport Bay, p. 335,

bringing the total of *Pectinaria* to 11 species. Two others, *P. capensis* (Pallas) from southern Africa and *P. panava* Willey (1905, p. 295) from Ceylon seas, are incompletely known.

The following chart shows the distribution of some of the more diagnostic characters of these species.

Diagnoses of Species of the Subgenus CISTENIDES

Name of species	*Distribution*	*Setigerous/ uncinigerous formula*	*Number of scaphal hooks*	*Rows of major teeth on uncini*	*Number of larger teeth in a row on uncini*	*Number of cephalic spines*	*Color of cephalic spines*	*Length of body/length of tube, in mm*	*Number of fringes on antennular membrane*	*Shape of cephalic spines*	*Tube, nature of substance*
1. brevicoma	northeast Pacific	17/12	6-10 pairs	single	3	12-13 pairs	brassy	31/53	28-30	short, blunt	moderately coarse sand, black and white
2. ehlersi	Patagonia	17/13	about 10 pairs	single	4	8-13 pairs	?	28/44	about 25	long, pointed	fine sand
3. gouldii	eastern North America, south to West Indies	15/12	about 15 pairs	single	7	about 15 pairs	brassy yellow	37/54+	about 32	long, pointed	very fine sand
4. granulata	Arctic, North Atlantic	17/12	6-10 pairs	single	3	7-10 pairs	yellow	23/48	30-35-50	blunt	coarse sand
5. hyperborea	Arctic, North Atlantic, North Pacific	17/12	6-9 pairs	single	3	10-15 pairs	yellow	50/60	30-35	long, pointed	fine sand
6. regalis	Bermuda, Socorro Island	16/12	3 (or 4) pairs	single	11	11-14 pairs	brassy yellow	48/95	about 21-30	short, taper to fine points	very coarse sand
7. soldatovi	north Japan, northeast Asia	17/12	5-6 pairs	single	4	10-13 pairs	gold	18-20/38	20-30	long, pointed, tips recurved	coarse sand

Diagnoses of Species of the Subgenus PECTINARIA

Name of species	*Distribution*	*Setigerous/uncinigerous formula*	*Number of scaphal hooks*	*Rows of major teeth on uncini*	*Number of larger teeth in a row on uncini*	*Number of cephalic spines*	*Color of cephalic spines*	*Length of body/length of tube, in mm*	*Number of fringes on antennular membrane*	*Shape of cephalic spines*	*Tube, nature of substance*
1. aegyptia	Red Sea	17/13	(?) 4-5 pairs	double	8	16-17 pairs	dark gold	70/?	about 65	long, pointed	?
2. antipoda	Australia, North Caledonia, Persian Gulf	17/13	10-11 to 4-5 pairs	double	7-8	10-13 pairs	yellow	42/71	22-25	blunt	fragile, coarse quartz grains
3. australis	New Zealand	16/12	4 pairs	double or triple	4-5	11-14 pairs	yellow	11/?	16-20	long, pointed	[much as in belgica]
4. belgica	western Europe	17/13	6-12 pairs	triple or 4-ple	7-8	8-10-15 pairs	copper red	30-70/90-100	17-28	long, pointed	fine sand
5. brevispinis	Philippines, Australia	17/13	4-6(?) pairs (Grube says 10)	double	8	12-13 pairs	dark gold	90/105	about 24	blunt	coarse, smooth sand
6. californiensis	southern California	16/13	13 pairs	double	5	13-14 pairs	coppery	19/28-57	25-30	long, pointed, recurved	very fine sand, reddish
7. newportensis	California	16/13	12-13 pairs	double	5	12-14 pairs	brassy (slightly coppery)	22/40+	about 19	long, pointed, tip coiled	fine sand, gray
8. chilensis	Chile, Peru	16/12	13-15 pairs	double	6	9-10 pairs	brassy	46-75	about 60	moderately long, pointed	fine to very fine sand
9. clava	Philippines	17/12	6 pairs	triple	5-6	11 pairs	?	17/?	10-12	long, pointed	?
10. conchilega	Philippines	17/13	4 pairs	3-4 rows	5-6	11 pairs	light yellow	32/29+	about 12	long, pointed	?
11. parvibranchis	Philippines	16/13	4 pairs	3-4 rows	6	10-11 pairs	light yellow	14/13+	12-13	long, pointed	rather large shell fragments

Key to American Species of *PECTINARIA* (sensu latiore)

1. Uncini with major teeth in single series *(Cistenides)* 2
1. Uncini with major teeth in 2 or more series *(Pectinaria)* . . 7
2. Shorter notopodial setae strongly incised (pl. 50, fig. 17); scaphal hooks distally oblique, terminating in a small knob (pl. 50, fig. 11); tubes constructed of very fine, light-colored sand grains . . . . *C. gouldii*
2. Shorter notopodial setae not incised; scaphal hooks otherwise . 3
3. Tube constructed of very coarse sand 4
3. Tube constructed of moderately coarse to fine sand particles . 5
4. Scaphal hooks few, only 2 or 3 pairs, distally straight (pl. 50, fig. 10); uncini with 10-12 major teeth . . *C. regalis,* p. 332
4. Scaphal hooks 6-10 pairs, distally roundly curved; uncini with only 3 major teeth . . . . *C. granulata*
5. Tube constructed of moderately coarse, black and white sand grains; uncini typically with 4 major teeth (pl. 50, fig. 14); cephalic spines blunt, short . . . . . *C. brevicoma,* p. 331
5. Tube constructed of fine sand grains; cephalic spines long, pointed 6
6. With 13 uncinigerous segments; uncini with 4 major teeth . . . . *C. ehlersi*
6. With 12 uncinigerous segments; uncini with 3 major teeth . . . . *C. hyperborea*
7. Larger, to 46 mm long; with 12 uncinigerous segments; uncini with 7-8 major teeth (pl. 50, fig. 12) in each of 2 rows . . . . *P. chilensis,* p. 333
7. Smaller, not over 25-30 mm long; with 13 uncinigerous segments; uncini with 5 major teeth in each of 2 rows 8
8. Cephalic spines coppery red; scaphal hooks gently curved (pl. 49, fig. 2); tubes reddish . . . . *P. californiensis,* p. 333
8. Cephalic spines brassy with coppery tinge; scaphal hooks more strongly curved; tubes grayish . . *P. c. newportensis,* p. 335

Genus **PECTINARIA** Lamarck
Subgenus **Cistenides** Malmgren
Type **C. granulata** (Linnaeus)

The dorsal margin of the cephalic plaque is entire; the antennular membrane is fringed, entirely free from the paleal segment, and usually more or less surrounds the base of the oral tentacles. Setigerous segments vary from 15 to 17 in number, uncinigerous from 12 to 13. Uncini have a single series of larger teeth, varying from 3 to 10 or 14. Notopodial fascicles typically have long, pointed setae of 2 kinds, a longer, broader, limbate seta with entire margin, and a shorter, slender one with cutting edge denticular, incised or smooth. The tube is more or less arcuate *(brevicoma, regalis, granulata, hyperborea, gouldii).*

Cistenides brevicoma (Johnson)

Plate 50, Figs. 13, 14, 16; Pl. 52, Fig. 23

Pectinaria brevicoma Johnson, 1901, pp. 423-424, pl. 15, figs. 151-156; Moore, 1909, p. 277.

Collections.—259-34, Tangola-Tangola, Mexico, in 15-20 fms, (1); 887-38, east of Middle Farallon Island, in 37 fms, (2); 1191-40, south side of Santa Cruz Island, in 37-40 fms, (1); Burch 397, off Redondo Beach, dredged, (14 tubes); Burch 3924, off Redondo Beach, in 25 fms, (1); Dillon Beach, California (collection by Dr. O. L. Williams), littoral, (1); Monterey shales, California (collection by E. F. Ricketts), (1); Wollochet Bay, Washington (collection by E. F. Ricketts), (4).

In all examples the tube is dark, composed of moderately coarse black with white sand grains. It measures to 52 mm long, 8 mm wide at its larger end, and 2 mm at its narrower end; it is distinctly arcuate (pl. 50, fig. 16). A specimen from a longer tube measures 31 mm long. Setigerous segments have the following arrangement: 3 anterior segments with limbate setae disposed in fascicles that are about as large as those following; 12 segments provided with pointed setae dorsally and uncinigerous tori ventrally (Johnson originally described 13 uncinigerous segments), followed by 2 setigers with greatly reduced notopodial fascicles.

There are 12 or 13 pairs of brassy yellow, cephalic paleae, short, distally blunt save the outermost, which are shorter, taper rapidly to pointed, acute tips. The antennular membrane has 28-30 marginal papillae (Johnson described 33). The 2 pairs of branchiae are short, nearly equal to each other in size. Scaphal setae number 8-10 pairs, are distally hooked (pl. 50, fig. 13). The anal tongue is broadly rounded, with entire margin and a small elongate papilla on its dorsal side. Uncini have 4 major teeth in a single series and 4 or 5 smaller ones distally (pl. 50, fig. 14). (Johnson found 4 teeth usually, 5 rarely.)

The materials examined (listed above) extend the known range from Alaska south to Tangola-Tangola, western Mexico, in depths ranging from intertidal to 40 fms (Santa Cruz Island).

Cistenides regalis (Verrill)

Plate 50, Figs. 9, 10

Pectinaria regalis Verrill, 1901, p. 38, pl. 8, figs. 6, 7.

Collections.—292-34, Socorro Island, Mexico, dredged in 30 fms (1 specimen and tube); 129-34, Braithwaite Bay, Socorro Island, in 14-18 fms (1 tube).

Cephalic setae are stout, brassy yellow, number 11 or 12 on a side, and taper distally to fine points. The antennular membrane has 21 to 30 fringes. There are 16 setigerous segments and 12 uncinigerous; the sixteenth setiger is made out with difficulty because of the greatly reduced size of the fascicle. Scaphal setae number only 3 or 4 on a side; they are pale, straight or nearly so, distally blunt (pl. 50, fig. 10). Uncini have their major teeth disposed in single series, number 10 to 12, but these intergrade in size and form with the fine, medial teeth (pl. 50, fig. 9). The shorter notosetae resemble the longer except that they have a denticulate edge.

C. regalis is to be classed with the larger forms, using coarse, light-colored sand grains in its tube (pl. 51, fig. 18). It has been known only through collections made by Verrill (1901) from Bermuda. I have examined the original materials at the Peabody Museum of Natural History, Yale University, where there are numerous fine examples, taken from Coney Island and from other points in Bermuda. The specimen from Socorro Island, Pacific side of Mexico, agrees well with individuals from Bermuda.

Subgenus Pectinaria Malmgren

Type **P. belgica** (Pallas)

This differs from *Cistenides* Malmgren in that the uncini are provided with 2 or more rows of teeth in the major series, instead of a single series. The tube is straight or only slightly arcuate.

Pectinaria chilensis (Nilsson)

Plate 50, Figs. 12, 15; Pl. 51, Fig. 19

Pectinaria (Cistenides) chilensis Nilsson, 1928, pp. 37-40, figs. 11 A-G.

Collections.—379-35, Independencia Bay, Peru, in 20 fms (8); 380/381-35, same, in 5-20 fms (9); 831-38, same, shore (2); 834-38, same, in 21 fms (3 and tube fragments); 835-38, same, in 18 fms (5 and 2 tubes).

The tubes are straight (pl. 51, fig. 19), white or grayish, thin, fragile, to 75 mm long, about 18 mm wide at the larger end, and 9 mm at the smaller end, though perhaps not complete. Specimens measure about 46 mm long and 15 mm wide in the thoracic region. Cephalic spines are brassy yellow, number 9 or 10 on a side, are distally long, attenuate when unbroken or unworn, but most are distally blunt (because of wear). There are 16 segments with notopodial fascicles, 12 with uncinigerous tori, the last podous segment lacks setae. The antennular membrane has 30 to 60 filiform fringes at its free edge, the greater number on larger specimens. The first pair of branchiae may greatly exceed the second (as Nilsson found on his only specimen), or the 2 pairs of branchiae may be subequal in size.

Scaphal setae are disposed in transverse series, number 13 to 15 on a side; their tips are slightly curved, as Nilsson has shown. The inner 6 to 8 of each series are somewhat smaller than the outer one. Setal fascicles of the first 3 segments are notably smaller than those in succeeding segments. Uncini have their major teeth in double series, each row with 7 (pl. 50, fig. 12) or 8 teeth. The anal tongue has a crenulate margin.

These specimens agree with Nilsson's description except that the second branchiae may be quite as large as the first, and the shorter notopodial setae (pl. 50, fig. 15) taper distally more rapidly, lacking a distinct knee (Nilsson, 1928, figs. 11 d-e). This has heretofore been known for only a single specimen from Coronel, Chile. The numerous collections listed above are entirely from Independencia Bay, Peru, shore to 21 fathoms.

Pectinaria californiensis, new species

Plate 49, Figs. 1-6; Pl. 52, Fig. 21

Collections.—(All are California.)
876-38, northeast of Anacapa Island, in 45 fms, (1 tube);
893-38, off Point Arguello, in 15-30 fms, (1);

903-38, Anaheim Slough, shore, (1 and 2 tubes);
905-38, Anaheim Slough, shore, (2 and 2 tubes);
987-39, south of San Miguel Island, in 165-170 fms, (1);
996-39, Prisoner's Harbor, Santa Cruz Island, in 35-45 fms, (several and 9 tubes);
1125-40, southeast side of San Nicolas Island, in 97 fms, (1 and tube);
1130-40, off Laguna Beach, in 150-174 feet, (about 35 and tubes);
1131-40, off Laguna Beach, in 54-57 fms, (about 25 and tubes);
1132-40, off Redondo Beach, in 43-85 fms, (about 8 and 15 tubes);
1133-40 (TYPE), off Redondo Beach, in 18-45 fms, (about 20 and tubes);
1137-40, off Redondo Beach, in 96-120 fms, (about 15 and tubes);
1138-40, off Redondo Beach, 33° 50′ 05″ N, 118° 24′ W, 13-22 fms;
1149-40, Avalon Bay, Catalina Island, in 82-88 fms, (about 10 and tubes);
1160-40, 11½ miles south of Long Beach, in 32-52 fms, (1 and tube);
1163-40, 13½ miles south of Seal Beach, in 215-225 fms, (1 and tube);
1182-40, north of Catalina, Howland's landing, in 160 fms, (1 and tube);
1191-40, south side of Santa Cruz Island, in 37-40 fms, (about 30 and tubes);
1192-40, off Bowen Point, Santa Cruz Island, in 58-90 fms, (3 and tubes);
1200-40, west end of Catalina Island, in 126-132 fms, (1 and 4 tubes);
1202-40, off Point Fermin, in 16-18 fms, (several and 10 tubes);
1220-40, 1½ miles off Dutch Harbor, San Nicolas Island, 83 fms, (several and 10 tubes);
Todos Santos Bay, Lower California, (1 and tube) (collection by T. Burch);
off Redondo Beach, in 25-75 fms, (over 50) (collection by T. Burch).

The tube is usually about 30 mm long or less, but may attain 58 mm (from Redondo Beach, in 136-172 fms); it is straight or nearly so (pl. 49, fig. 5), constructed of very fine, reddish sand particles (pl. 52, fig. 21), thin, though not so fragile as those of some other species having similar thickness. Length of the body is 19 or 20 mm to as much as 35 mm; its texture is typically soft, translucent in the posterior third. Cephalic spines have a distinct metallic luster, coppery or reddish; they are long, flattened through most of their length, taper to fine, attenuate tips that extend well beyond the cephalic plate, but their tips are recurved and bent backward (pl. 49, fig. 4). The antennular membrane has 18 to 25 or 30 long, filiform fringes. The oral tentacles are numerous, over 30, long, crowded, of varying sizes. Branchiae are nearly equal to one another, or the first pair is slightly the larger.

The setal fascicles of the first 3 setigers are reduced, much smaller than those in succeeding notopodia, but resembling those farther back. The next 13 segments have larger notopodial fascicles and uncinigerous, neuropodial tori. The last 2 segments lack setae (rarely the next to the last has a tiny fascicle). The shorter notosetae resemble the longer except that their cutting edge is delicately denticulate. Uncini have their major teeth disposed in 2 rows, about 5 teeth in a row (pl. 49, fig. 6), but the top row tends to have 3 smaller teeth (pl. 49, fig. 3); medially there is a tuft of very fine teeth.

Scaphal hooks number about 13 on a side, the outermost are the largest, decreasing in size medially, the innermost greatly smaller (pl. 49, fig. 2). All are gently curved distally. The margin of the scapha is weakly lobed (pl. 49, fig. 1). The anal tongue has an irregular, crenulate margin and a median papilla.

P. californiensis belongs to a small group in which the number of scaphal hooks is large (about 13 pairs); to it belong *chilensis, antipoda,* and *belgica. P. antipoda* is characterized by having a pair of crenulate folds on the ventral side of the second setiger; *P. chilensis* is a much larger species (see page 333), its scaphal hooks are distally oblique, and uncini have 7 or 8 rows of teeth; *P. belgica* has scaphal hooks that are weakly bent.

P. californiensis has been collected in quantity from numerous stations, all save one (Todos Santos, Lower California) in southern California. Its optimum density appears to be between Laguna Beach and Redondo Beach, in 25 to 100 fms, but it occurs also in the intertidal (Anaheim Slough). It is usually associated with fine, dark or muddy sand, but its tube is reddish. It is sometimes found near *Cistenides brevicoma,* from which it may be distinguished in that the former has a nearly straight tube of finer sand grains, whereas *C. brevicoma* uses darker, coarser materials.

Holotype.—AHF no. 34.

Pectinaria californiensis newportensis, new subspecies

Plate 49, Fig. 8; Plate 52, Fig. 22

Collections.—Newport Bay, California, shore (3 with tubes).

The tube attains a length of over 40 mm, is nearly straight, and is constructed of moderately coarse sand particles that are closely spaced (pl. 52, fig. 22). The cephalic spines are brassy yellow with slight coppery tinge on the innermost spines. They are long, slender, basally flattened, tapering to fine points that are distally coiled in a single whorl; they number 9 to 13 on a side, the outermost and innermost being the smallest. The antennular membrane has about 19 slender, widely spaced fringes, completely concealed from view by the long oral tentacles; the latter are grooved and number over 24, some being longer than others.

Branchiae are small, only about half as long as the width of the body whence they arise; the first pair is nearly twice as large as the second. The first 3 setigers have only notopodial fascicles, greatly exceeded in size by the next, just as in the stem form. The next 13 segments have a larger notopodial fascicle and uncinigerous, neuropodial tori. All setae are pale yellow or almost colorless. The shorter, notopodial setae resemble the longer except that they are slenderer and the tips are finely denticulate. Uncini have their main teeth in double rows, numbering about 5 in a row, with a tuft of fine, long teeth medially, as in the stem form. Scaphal hooks number 10 to 12 on a side; they are basally thick and distally strongly hooked (pl. 49, fig. 8), much more so than in *P. californiensis;* the innermost are much the smallest. The anal tongue is nearly circular, surrounded at the sides and end with about 16 clavate papillae, and a single, larger papilla is inserted on its dorsal side. A broad, conspicuous, glandular area fills the space between the last 2 parapodia on the dorsal side, extending back to the scaphal hooks.

Though close to *P. californiensis,* it differs as follows: (1) the cephalic spines are brassy, not coppery, and are somewhat shorter in comparison; (2) the scaphal hooks are distally more strongly curved; (3) the tubes are constructed of coarser, lighter-colored sand.

Holotype.—AHF no. 35.

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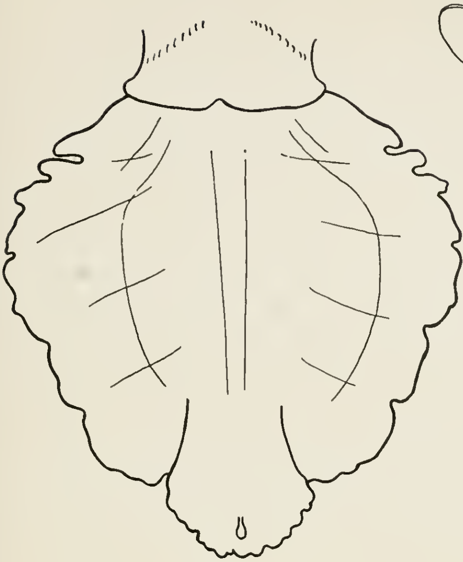
PLATE 49

Figures 1 to 6, *Pectinaria californiensis* (1130-40): Fig. 1, anal plaque in dorsal view, x 28; Fig. 2, 8 of 13 hooks in anal plaque from left side, I represents the innermost, XII the one next to the outermost (the seventh to tenth and thirteenth not shown), x 469; Fig. 3, uncinus in frontal view, x 770; Fig. 4, 3 outermost cephalic paleae, x 574; Fig. 5, outline of tube as usually found in collections, x 1.4 (compare pl. 4, fig. 21); Fig. 6, uncinus in lateral view, x 770.

Figure 7, *Cistenides granulata,* one of 6 scaphal hooks, showing shoulder below hooked end, enlarged.

Figure 8, *Pectinaria californiensis newportensis:* 3 of 13 scaphal hooks, including the innermost and outermost in a series, x 609.



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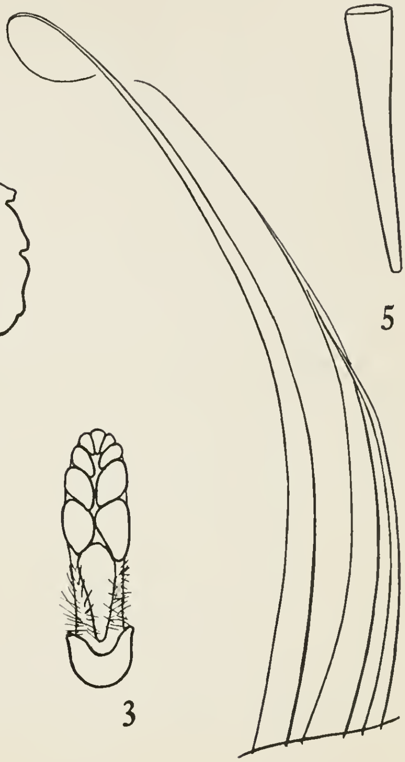

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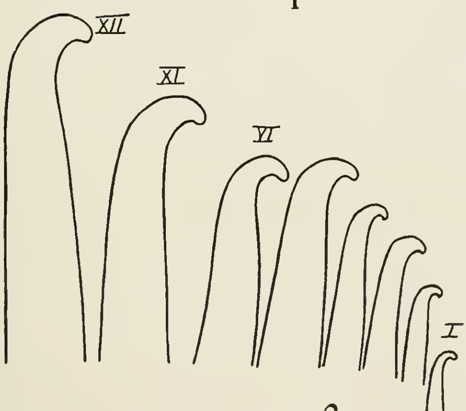

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PLATE 50

Figures 9, 10, *Cistenides regalis* (292-34): Fig. 9, uncinus in lateral view, x 455; Fig. 10, tip of one of 3 scaphal spines from left side, enlarged.

Figures 11, 17, *Cistenides gouldii:* Fig. 11, tip of one of 16 scaphal spines from one series, enlarged; Fig. 17, distal end of a shorter, limbate seta with incised margin, x 469.

Figures 12, 15, *Pectinaria chilensis* (835-38): uncinus in lateral view, x 770; Fig. 15, one of shorter limbate setae, x 143.

Figures 13, 14, 16, *Cistenides brevicoma* (887-38): scaphal spine, x 245; Fig. 14, uncinus in lateral view, x 770; Fig. 16, outline of tube in lateral view, x 1.4 (see also pl. 4, fig. 22).

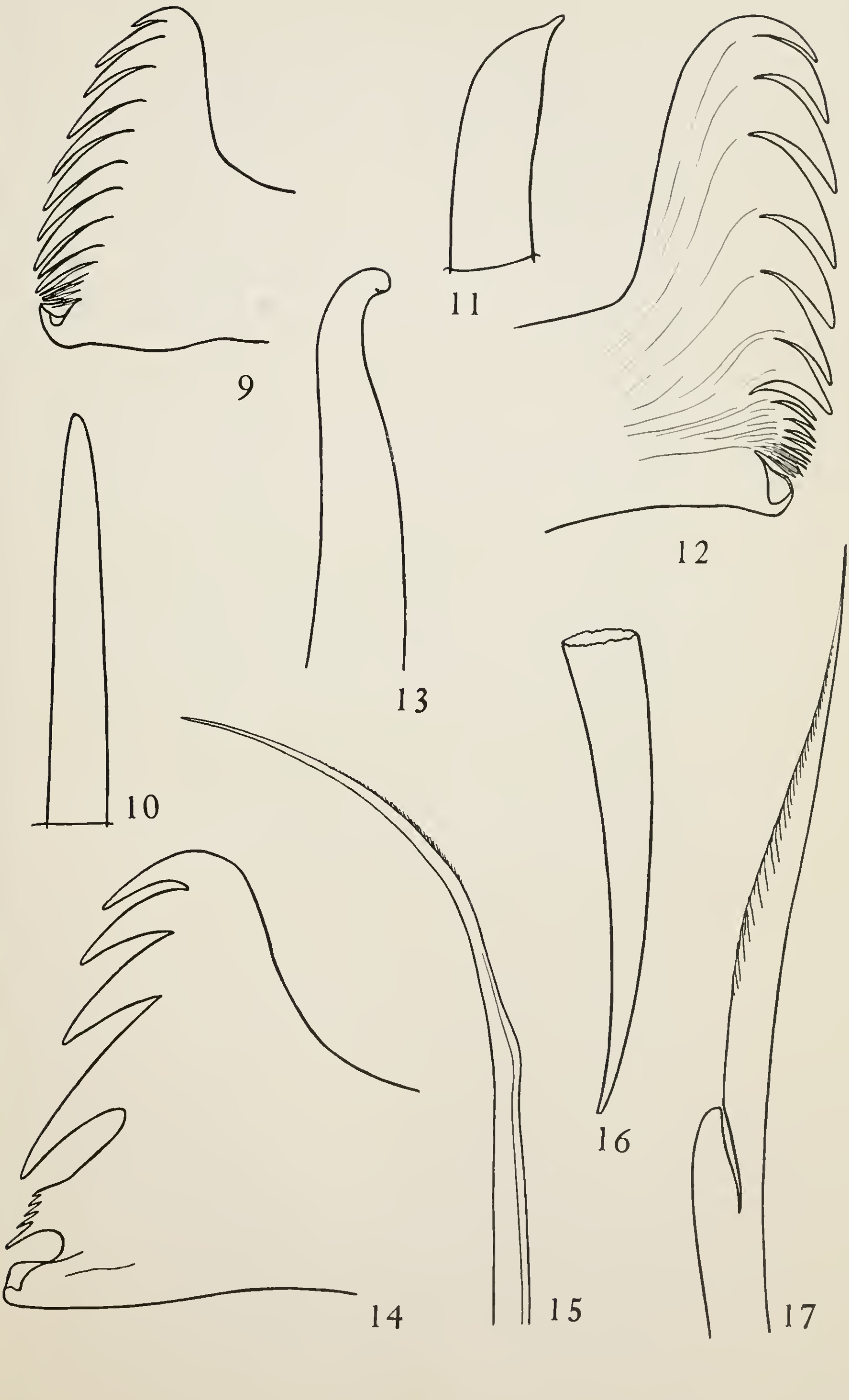
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PLATE 51

(Photographs by Mr. Granville Ashcraft; all natural size.)

Figure 18, *Cistenides regalis* (292-34): portion of tube in lateral view, and entire animal in dorsal view.

Figure 19, *Pectinaria chilensis* (835-38): portions of two tubes and 2 entire animals in ventral and dorsal views, from left to right.

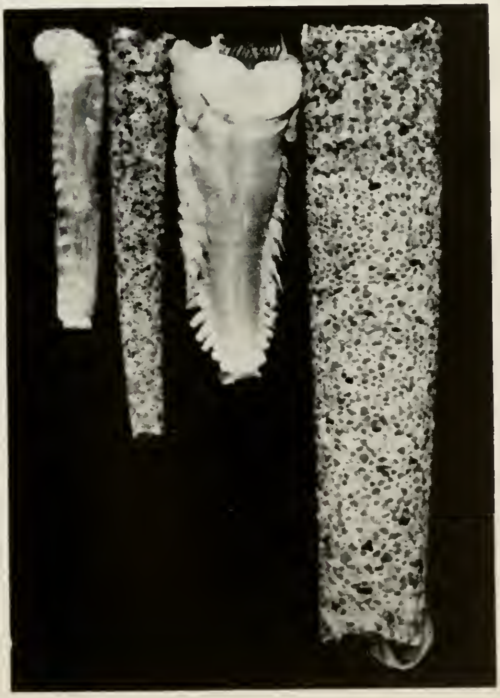

PLATE 52

(Photographs by Mr. Granville Ashcraft; all natural size.)

Figure 20, *Cistenides gouldii* (Beaufort, N.C.): tube in lateral view and animal in dorsal view.

Figure 21, *Pectinaria californiensis* (1130-40): unusually long tube, in lateral view, with animal in dorsal view.

Figure 22, *Pectinaria californiensis newportensis* (Newport): portion of tube and animal.

Figure 23, *Cistenides brevicoma* (887-38): tube in lateral view and animal in dorsal view.

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