

On Some Species of Phyllodocidae, Syllidae, Nephtyidae,  
Goniadidae, Apistobranchidae, and Spionidae  
(Polychaeta) from the Northeast  
Pacific Ocean<sup>1</sup>

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ABSTRACT: *Eteone pacifica* (synonym, *E. bistrata*) and *E. tuberculata* are re-described from the types. *Notophyllum* (*Hesperophyllum*) *tectum* is re-described from new material. Additions to the descriptions after study of type material are made for *Eulalia* (*Eulalia*) *quadrioculata* (synonym, *E. aviculisetata*), *Autolytus* (*Proceraea*) *trilineatus* (new combination), *Exogone lourei*, *E. uniformis*, *Syllis* (*Syllis*) *elongata*, *S. (Typosyllis) pulchra*, *S. (Typosyllis) stewarti*, *Nephtys assignis*, *N. discors*, *N. rickettsi*, and *Glycinde picta*. Additions to the descriptions on the basis of new material are made for *Eusyllis japonica*, *Odontosyllis fulgurans japonica*, *O. parva*, *O. phosphorea phosphorea* (synonym, *O. phosphorea nanaimoensis*), *Syllis (Typosyllis) adamantea adamantea*, *S. fasciata*, *Nephtys cornuta franciscana*, and *Apistobranchus ornatus*. Six new records are given for Washington and British Columbia.

New species are *Brania brevipharyngea* and *Exogone molesta*. *Neopygospio* is a synonym of *Polydora (Pseudopolydora)*.

WHILE CHECKING THE POLYCHAETOUS ANNE-  
LIDS in the Synoptic Collection of the Friday  
Harbor Laboratories, University of Washington,  
and while studying collections from Washington  
waters, I found several species in the Collection  
itself or as described from the San Juan Archi-  
pelago that were incompletely known. The study  
of the types of some of these is reported here  
together with the descriptions of two new  
species. Additions to the descriptions of other  
species are made, and seven new records for  
the cool temperate northeast Pacific Ocean are  
given.

The nomenclature follows Hartman (1959,  
1965a) when not indicated otherwise. For  
species not treated in detail, I have provided

only key references rather than the complete  
synonymy. Diagnoses of species are included  
when materially new information has become  
available which changes previously held views  
of the diagnostic characters.

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PHYLLODOCIDAE

*Eteone (Mysta?) pacifica* Hartman

Fig. 1 A-F

*Eteone maculata* Treadwell, 1922, p. 174 (pre-  
occupied name).

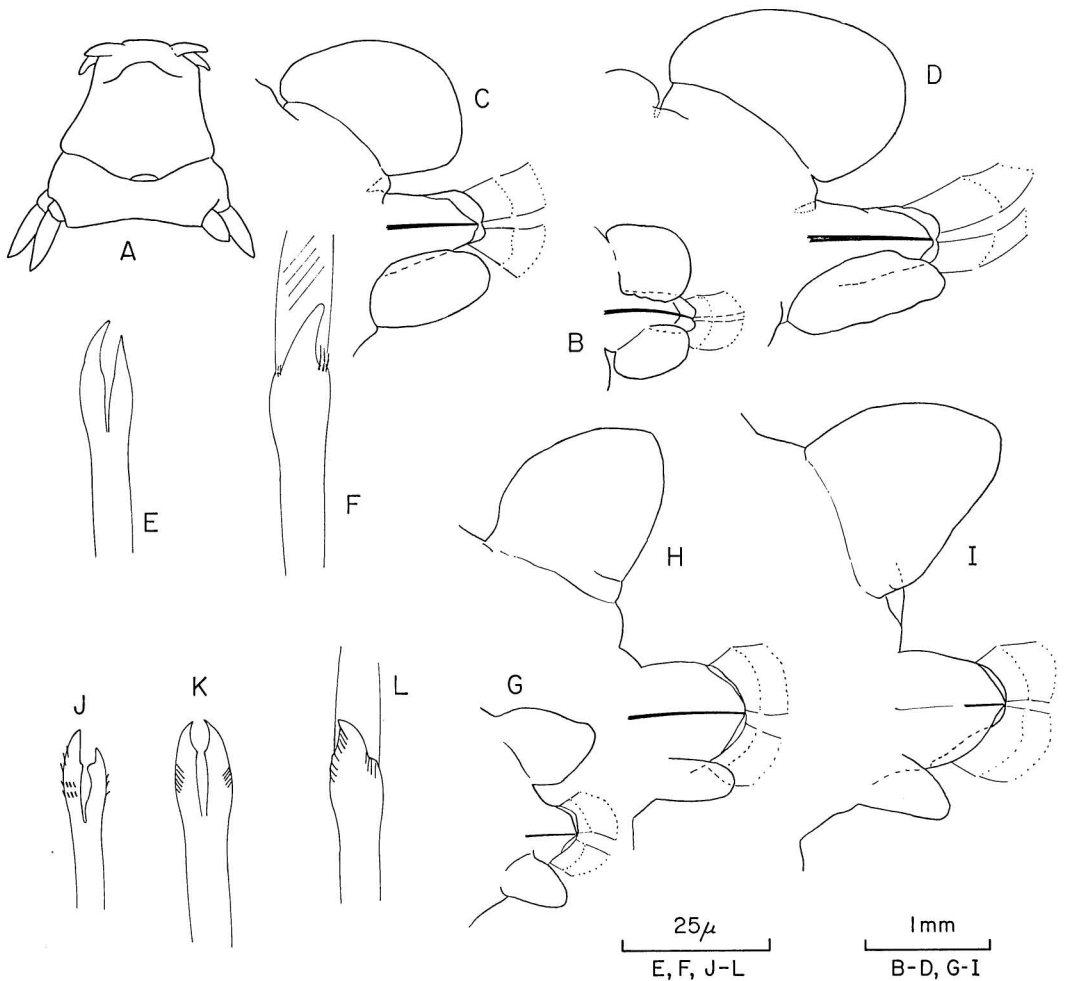


FIG. 1. *A-F*, *Eteone pacifica*, from holotype. *A*, dorsal view of anterior end (sketch, not to scale); *B-D*, posterior views of fifth, 39th, and 103rd parapodia; *E-F*, frontal and side views of setae. *G-L*, *Eteone tuberculata*, from holotype. *G-I*, posterior views of third, 41st, and 93rd parapodia; *J*, frontal view of shaft of seta from third parapodium; *K-L*, frontal and side views of setae from middle and posterior parapodia.

*Eteone pacifica* Hartman, 1936*a*, p. 31; 1936*b*, p. 128; 1956, p. 249; 1968, p. 255.

*Eteone (Mysta?) bistriata* Ushakov, 1953, p. 208.

*Eteone (Mysta) bistriata*.—Ushakov, 1955, p. 104.

#### Diagnosis

This is an *Eteone* species with a large prostomium and a minor nuchal papilla. Tentacular cirri are of about equal length. First parapodium is with setae. Auricular, strongly asymmetrical, dorsal cirri, arising from distinct cirrophores,

are found throughout the body. Ventral cirri are rounded and about as long as the setigerous lobes. Setae have shaft endings of unequal length and long blades. Pigment spots are present dorsally.

#### Material Examined

The holotype, from Friday Harbor, Washington, AMHN 1381, was examined.

#### Redescription

The complete, well-preserved specimen is 65 to 70 mm long and has 136 setigers followed

by a regenerating posterior end of about 15 segments (instead of a total of 300 as described in Treadwell, 1922). The color pattern has been fully described by Treadwell (1922), but the specimen is now almost free of pigment. The proboscis had been removed but was not described.

The posterior end of the prostomium (Fig. 1A) is about four-fifths as broad as the anterior segments. The nuchal papilla, which is visible only under very favorable illumination, is small. The tentacular cirri are of about equal length, at least on the left side where no regeneration is in progress; this is contrary to Treadwell (1922) and Hartman (1936b). The first normal segment carries parapodia with fairly numerous setae and ventral cirri. Three parapodia (Fig. 1B–D) demonstrate the strongly asymmetrical shape of the dorsal cirri; this asymmetry is least pronounced on the second foot. Except for the most anterior cirri, the dorsal cirri insert on cirrophores. In most of the body, the length (lateral extension) of a parapodium with its cirri is about one-third the width of the trunk of the body; in the last nonregenerating segments it is about one-half.

The number of setae vary from 24 to 30 per parapodium. The shafts of the setae end in two unequal prongs (Fig. 1E). The longer spines, appearing in side view before the cutting edge of the principal tooth (Fig. 1F), are primarily associated with the smaller prong. The blades are very long (150 to 200  $\mu$ ).

#### Remarks

Because I cannot present a review of all species of *Eteone* Savigny, I am emphasizing characters in the diagnosis that are needed for recognition of the species among other North Pacific representatives of the genus.

The description of *E. bistriata* by Ushakov (1955) agrees well with the redescription of *E. pacifica*. It may be noted that Treadwell (1922) did not observe an arrangement of pigment in lines as reported by Ushakov but stated for his only specimen that the dorsal pattern of dark dots was variable; also, Ushakov (1953) described briefly a variety of his species, variety *fuscodorsata*, suggesting again variability. No everted proboscis seems to have been observed

among the animals used for the description of *E. striata*. In 1955, apparently without additional records, the species was listed by Ushakov under the subgenus *Mysta*.

Berkeley and Berkeley (1942) recorded *E. pacifica* for British Columbia as a subspecies ("color variety," in their words) of *E. spetsbergensis* Malmgren. The feet of *E. spetsbergensis*, however, are not uniform throughout the body (cf. Bergström, 1914, p. 77). Because Berkeley and Berkeley (1948) again stated that their form was like the stem species except for the color pattern, these records should be checked before they are included under *E. pacifica*.

#### *Eteone tuberculata* Treadwell

##### Fig. 1G–L

*Eteone tuberculata* Treadwell, 1922, p. 174.—

Hartman, 1959, p. 147.

*Eteone? longa*—Hartman, 1956, p. 249.

#### Diagnosis

This is an *Eteone* species with a small prostomium and a conspicuous nuchal papilla. Tentacular cirri are of equal length. First parapodium is without setae (?). Dorsal cirri are bluntly conical, almost symmetrical, and without a distinct cirrophore in middle part of body. Ventral cirri are rounded and about half as long as the setigerous lobes. Shaft endings of setae are of unequal length anteriorly; subsequently of equal length. Blades are of medium length. Anal cirri are conical.

#### Material Examined

The holotype, from Friday Harbor, Washington, AMNH 1382, was examined.

#### Redescription

The complete, well-preserved specimen is a female with polygonal eggs, of 105 mm length, and with 165 segments. Although it is now of a uniformly grey-brown color, Treadwell observed that the dorsal cirri were deep brown and much darker than the rest of the animal.

The prostomium (cf. Treadwell, 1922, fig. 7) is small; the posterior margin reaches about half the width of the following segments. A large and conspicuous nuchal papilla is sur-

rounded on three sides by the large peristomium. The tentacular cirri are of about equal length. On the left side of the next segment, the parapodial lobe and a ventral cirrus are much smaller than those of the following segments; setae are absent. Treadwell, who had excised the right foot of the segment (see his fig. 8), stated that setae were present, and drew an acicula.

The third segment carries the first normal parapodia. They are characterized by almost symmetrical, bluntly conical, dorsal cirri (Fig. 1G-I); the cirri become more narrow in the posterior segments. Cirrophores are not very distinct. The short ventral cirri are inserted with a broad basis and are proximally not as clearly set off from the parapodial lobes as in *E. pacifica* (cf. Fig. 1C, D). On most of the body, the parapodia are about one-fourth as long as the width of the trunk; posteriorly they are about one-third as long as the trunk is wide.

The setae number 48 to almost 60 per foot. In the third setiger their shafts end in two unequal prongs (Fig. 1J). In the feet drawn in Fig. 1H, I, the prongs are of equal length (Fig. 1K). In both types of setae the side view (or the plane view of the larger prong) is the same (Fig. 1L). The blades of the setae are of medium length (100 to 150  $\mu$ ). The anal cirri are conical.

#### Remarks

Again it must be noted that the proboscis is not known. The diagnosis, as with *E. pacifica*, emphasizes characters needed for recognition of the form among other North Pacific species of *Eteone*. If the reduced parapodial lobe on the first segment proves to be constant, it would be a good diagnostic character, as this is a rare condition in the genus. The species has not been recorded since the original description.

*Eteone tuberculata*, as well as *E. californica* Hartman, has been placed in the synonymy of *E. longa* (Fabricius) by Pettibone (1954); Hartman (1956) suggested that *E. tuberculata* is a doubtful synonym of *E. longa* but kept the species separate in 1959. *Eteone californica* has also been questionably synonymized with *E. longa* by Chlebovitch (1961). I believe, however, that *E. tuberculata* is distinct from *E. californica* because of its large ventral cirri; these

become quite minute in posterior segments of *E. californica* (see Hartman, 1948). Also, its dorsal cirri are rounded-conical instead of squat, almost quadrangular, as in the median segments of *E. californica* (cf. Hartman, 1936b). *Eteone tuberculata* is also distinct from *E. longa*; the latter has ventral cirri as long as the parapodial lobes, and homogomph setae (cf. Bergström, 1914, text fig. 72D).

#### *Enlalia (Enlalia) quadrioculata* Moore

Fig. 2A

*Enlalia quadrioculata* Moore, 1906, p. 220.—Hartman, 1968, p. 265.

*Enlalia aviculiseta* Hartman, 1936b, p. 122; 1968, p. 259.

#### Material Examined

The following materials were examined: the holotype, from the Strait of Juan de Fuca, USNM 5516; type series of *E. aviculiseta*, from California, USNM 20341 and AHF Poly. 0113, two specimens each; one specimen from Long Bay, British Columbia, August 1931, collected by E. and C. Berkeley and identified as *E. aviculiseta*, USNM 35118, unpublished record.

#### Additions to the Description

In the holotype the outer third of the everted proboscis is thickened and densely covered with small papillae. The proximal parts appear smooth but this is clearly an artifact due to rupture of the outer wall near the mouth. The proboscis terminates in 21 large papillae. All tentacular segments are free of each other; the first one is especially large. The drawing by Moore (1906, pl. 10, fig. 4) is correct in respect to the insertion of the tentacular cirri only for the second and third segments. The dorsal tentacular cirri originate on distinct cirrophores. The ventral tentacular cirri on the second segment are slightly flattened. Median and posterior setigers are not biannulated as stated by Moore, but the middle portion of each segment is elevated.

A seta is shown in Fig. 2A. Contrary to Moore (1906, pl. 10, fig. 8), the ends of the shafts of the setae of all specimens have conspicuous beaks; the small spines occur in several rows not shown in the figure.

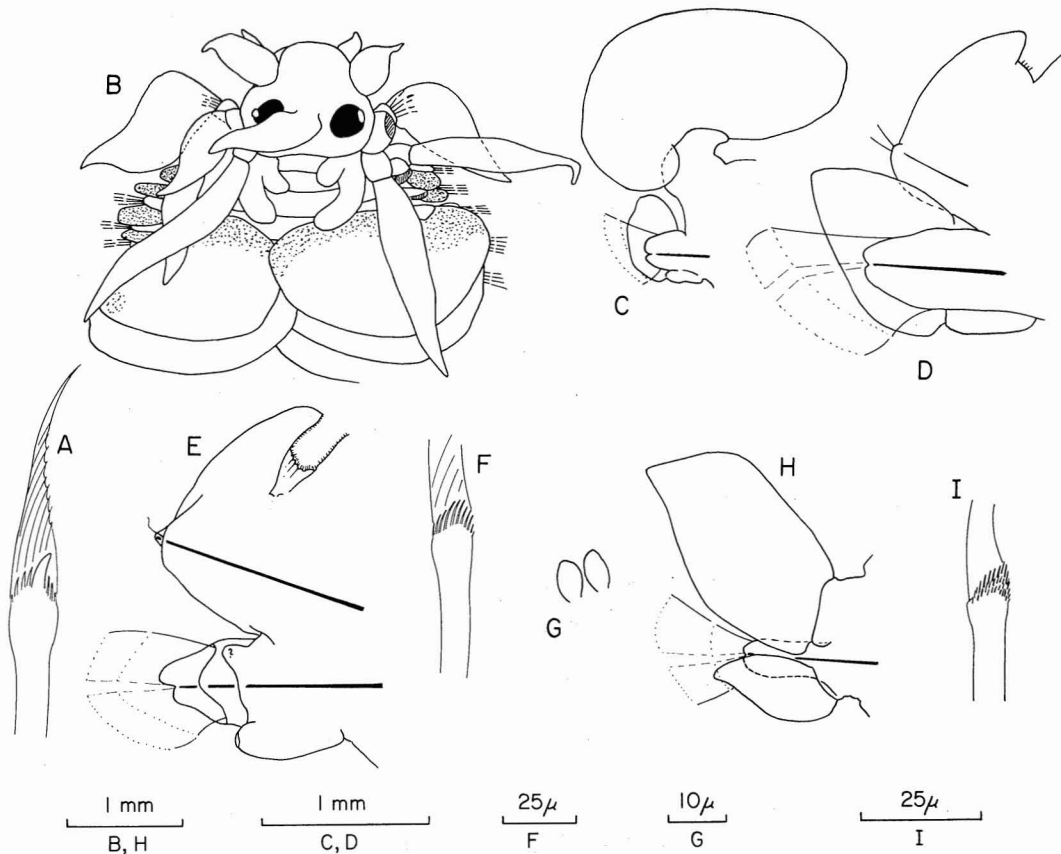


FIG. 2. A, *Eulalia quadrioculata*, from paratype of *E. aviculiseta* (AHF). A, seta. B-F, *Notophyllum tectum*. B, anterior end from above. The ventral cirrus of the third segment on the right side is omitted. Scars of lost cirri hatched. Pigment spots on cirri schematic; C-D, anterior views of parapodia on 25th and 68th segments; E, detail of parapodium on 54th segment; F, shaft of seta from this foot. G-I, *Phyllococe madeirensis*. G, lateral papillae on proboscis; H, posterior view of parapodium on 43rd segment; I, shaft of seta from this segment.

#### Remarks

The largest of the types of *E. aviculiseta* (USNM 20341) is the one figured by Hartman (1936b, fig. 2). The papillae on the proximal part of the proboscis are separated from each other by approximately their own diameter, whereas they are much farther apart (up to 10 diameters) on the distal part. The number of terminal large papillae is 18. The ventral tentacular cirri on the second segment are slightly broadened, contrary to the drawing by Hartman (1936b, fig. 1); setae are absent on this segment.

The proboscis of the specimen from Long Bay, British Columbia is proximally and medi-

ally densely covered with papillae but has only scattered papillae distally, similar to that of the material from California. There are 14 terminal papillae. The setae have the form as in Fig. 2A. The specimen has the irregular pigment near the eyes described by Moore for *E. quadrioculata*, as well as the intersegmental dorsal black bands described by Hartman for *E. aviculiseta*.

On the basis of the type material, *E. aviculiseta* must be considered a synonym of *E. quadrioculata*.

*Notophyllum (Hesperophyllum) tectum*  
(Chamberlin)

Fig. 2B-F

*Hesperophyllum tectum* Chamberlin, 1919, p. 4.—Hartman, 1959, p. 153.

### Diagnosis

This is a *Notophyllum* species with a broadened ventral tentacular cirrus on second segment. A pair of bilobed nuchal organs are present. Notopodia are almost fused with dorsal cirrophores. Notosetae are like blades of neurosetae.

### Material Examined

A parapod of the holotype, from southern California, MCZ, was examined. The type specimen cannot be found (Dr. H. W. Levi, Harvard University, personal communication).

Also examined was one specimen from Peavine Pass, San Juan Islands, Washington, lat 48°35.5' N, long 122°48.5' W, 12 August 1960, MCZ, new record.

### Additions to the Description

Because the species is known only from the specimen on which the original brief description was based, I am making additions to the description. The incomplete but well-preserved specimen from Washington has about 80 segments and is almost 20 mm long. It agrees with the original description except in minor points: in the present specimen, the unpaired antenna is smooth, not "coarsely crenulate or wavy" as stated by Chamberlin (1919, p. 5). The parapodia agree with the imperfect slide preparation of a foot of the holotype. The slide does permit recognition of much of the outline of the parapodial lobe, a peculiar pigment-free line on the ventral side of it, the insertion and the shape of the ventral cirrus, part of the outline of the dorsal cirrus, and the end of the shaft of the setae.

The anterior end is shown in Fig. 2B (for the numbering of segments see below). On the right side of the animal is depicted the cirrophore of the lost tentacular cirrus of first segment; the cirrus is present on the left side. Below that cirrophore, the setal tuft and the ventral cirrus of the second segment are shown. The cirrus is almost as broad as, but more fleshy than, the corresponding one of, for example, species of *Pterocirrus* Claparède. Next are the dorsal ten-

tacular cirri of the second and third segments; the cirri of the third segment point posteriorly. The first normal ventral cirrus of the third segment is shown only on the left side of the animal. Almost between the tentacular cirri of the second and third segments, the cirrophore of the lost first normal dorsal cirrus on the fourth segment is visible. Below it are shown the setigerous lobe and the setae of this segment; behind, the ventral cirrus of this parapodium rises. The following cirrophore, on the fifth segment, is somewhat smaller. Finally, the cirrophore with the dorsal cirrus and the setae of the sixth segment are depicted. Setae could not be seen on the third segment, which is provided with a normal ventral cirrus, without dissection. Probably they are present because the preceding segment carries numerous setae. The first free segment, visible dorsally and less distinctly also ventrally, is the second segment.

The dorsal cirri were preserved only in the anterior half of the animal, where they cover the dorsum completely. However, contrary to the original description, they do not overlap with the ventral cirri in this region (Fig. 2C). The greater size of the ventral cirri in the posterior region (Fig. 2D) indicates that some overlap could have occurred there in the present specimen. A more detailed view of a parapodium without cirri is given in Fig. 2E. The notopodium is almost fused to the cirrophore of the dorsal cirrus, contrary to the condition in *N. imbricatum* Moore. One notoseta each was found in the 22nd and 51st feet and two were found in the 65th foot. The latter were almost straight, about 100  $\mu$  long, and had the same structure as the blades of the neurosetae. Each parapodium has 30 to 36 compound setae. Their blades are about 100  $\mu$  long, that is, of medium length. The ends of their shafts (Fig. 2F) are beset with about eight long, slightly curved spines on each side.

The color of the body is yellow-pink; that of the dorsal and ventral cirri, including their cirrophores, is brown, owing to many closely set pigment cells.

### Remarks

As shown in Fig 2B, the tentacular cirri are arranged more or less in two pairs, apparently

belonging to the two first visible segments. However, pending an anatomical study, I follow the view of Bergström (1914) presented for *Noto-phyllum* Örsted (cf. the description of *N. imbricatum* by Moore, 1906) and suggest that the cirri of the present species are also arranged

according to  $1 + S \frac{1}{1} + S \frac{1}{N}$ , the first seg-

ment being dorsally reduced. Consequently, I consider *Hesperophyllum* as a subgenus of *Noto-phyllum*, bearing presumably a similar relationship to the latter as do *Pterocirrus* Claparède or *Sige* Malmgren to *Eulalia* Savigny.

The species is new for Washington waters; it was known previously from southern California.

*Phyllodoce (Anaitides) madeirensis* Langerhans

Fig. 2G-I

*Phyllodoce (Anaitides) madeirensis* Berkeley & Berkeley, 1948, p. 45.

*Anaitides madeirensis* Hartman, 1959, p. 143; 1968, p. 231.

#### Material Examined

Four specimens from the Strait of Juan de Fuca were examined—lat 48°22.4' N, long 124°26.3' W, 140 m, gravel with mud (grab sample), 12 June 1965, collected by K. D. Hobson, unpublished record.

#### Remarks

Because Hartman (1961) suggested that occasional intergrading of this species with *P. (Anaitides) medipapillata* Moore may occur, salient features of this apparently typical specimen may be described. Up to 12 oval papillae (Fig. 2G) per lateral row are found proximally on the proboscis. The three or four papillae of the unpaired dorsal row are more conspicuous by their color than by their size. The proboscis terminates in 18 papillae. Setae are absent on the third segment. The dorsal cirri of the following three setigers are not abruptly smaller than those of the subsequent setigers (cf. *A. heterocirrus* Chamberlin, which is possibly a juvenile of *A. medipapillata*, *vide* Hartman, 1961). Median

dorsal cirri are asymmetrical (Fig. 2H). The shafts of the setae end with numerous spines of equal thickness (Fig. 2I).

## SYLLIDAE

*Autolytus (Proceraea) trilineatus*  
Berkeley & Berkeley

Fig. 3

*Autolytus trilineatus* Berkeley & Berkeley, 1945, p. 318; 1948, p. 69.—Pettibone, 1967, p. 5 (partial synonymy).

*Autolytus prismaticus*.—Pettibone, 1954, p. 249.—Berkeley, 1967, p. 1054 (in part).

#### Material Examined

The lectotype (selected by M. H. Pettibone in 1964), from Newcastle Island, near Nanaimo, British Columbia, 18 June 1943, USNM 32881, was examined.

#### Additions to the Description

The nuchal epaulets extend to the end of the tentacular segment (Fig. 3A). Conspicuous dorsal cirrophores are absent even in median segments. The parapodial lobes are of medium size. The upper simple bayonetlike setae (Fig. 3B) as observed in the 22nd and 32nd setigers are one-half to two-thirds as thick as the compound setae and have only terminal serrations. The distal teeth of the blades of the compound setae are smaller than the subterminal ones (Fig. 3C).

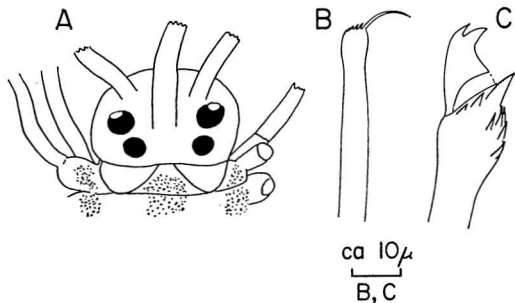


FIG. 3. *Autolytus trilineatus*, from lectotype (setae approximately to scale). A, dorsal view of anterior end (sketch); B, upper simple seta from 22nd setiger. Shaft of 3  $\mu$  diameter; C, end of median compound seta from eighth setiger. Shaft slightly turned, 4  $\mu$  diameter. Fine inconspicuous hairs on the cutting edge of the blade omitted.

The proventricle begins in the sixth setiger and extends through two and one-half segments. Berkeley and Berkeley (1945) have already stated that the pharynx is S-shaped and has 10 large and equal teeth, and Pettibone (1967) has observed that, in the lectotype, a head is budding between the 13th and 14th setiger ("anterior scissiparity").

#### Remarks

Using Gidholm's (1966) characterization, the species is herein referred to the subgenus *Proceraea* Ehlers, which includes also *A. aurantiacus* Claparède and *A. prismaticus* (Fabricius) (fide Gidholm). *A. trilineatus* was temporarily believed to be a synonym of *A. prismaticus* (cf. Pettibone, 1954; Berkeley, 1967). *A. trilineatus*, however, has 10 equal pharyngeal teeth as com-

pared with nine large and nine small teeth in *A. prismaticus* (cf. Imajima and Hartman, 1964).

#### *Brania brevipharyngea* new species

Fig. 4

#### Types

The holotype is from the southern side of the mouth of False Bay, San Juan Island, Washington, approximately lat 48°28'56" N, long 123°03'52" W, lower intertidal (—2 to —3 ft) among a colony of the polychaete *Fabricia Oregonica* Barse that was half covered with fine sand, in a pocket between rocks, 29 June 1969, USNM 40711.

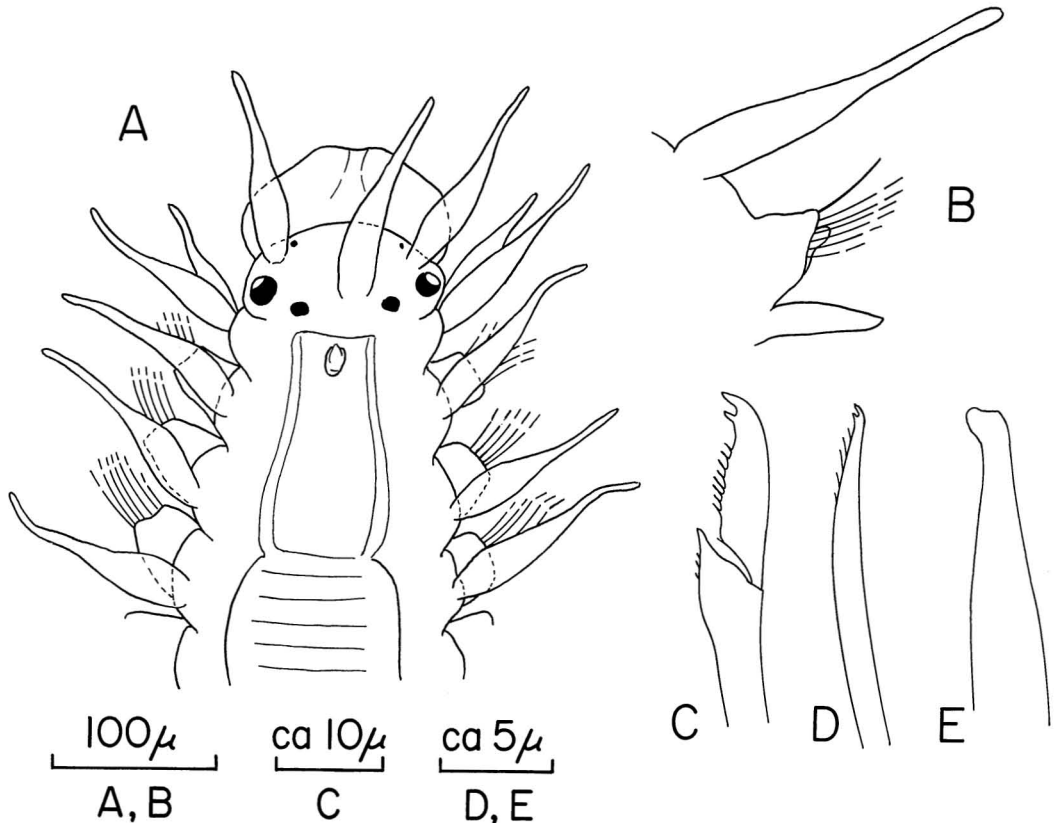


FIG. 4. *Brania brevipharyngea* new species (setae from median parapodium, not to scale). A, dorsal view of anterior end, setae schematic; B, posterior view of 16th parapodium; C, lowermost compound seta; D, simple dorsal seta; E, acicula.



Paratypes, five specimens, are from the same locality and date, USNM 40712.

#### Diagnosis

*Brania brevipharyngea* is a *Brania* species of 30 to 31 setigers with a pharynx about as long as two and one-half segments and a proventricle about as long as four segments. Tooth is at anterior end of pharynx. Antennae, tentacular cirri, and dorsal cirri are long, approximately uniform in size, bottle-shaped, and with long tips. Palps are fused over entire length. Median antenna inserts just anterior to posterior eyes. Dorsal cirri are found on all setigers. Compound setae are bidentate.

The name refers to the short pharyngeal tube.

#### Material Examined

The type series was examined.

#### Description

The type series consists of six complete specimens, one of which is a maturing female. The animals have up to 30 or 31 setigers and are almost 3 mm long. The holotype has 29 setigers and is 2.6 mm long (without cirri). Its greatest width is 0.20 mm without parapodia, and 0.35 mm with parapodia. The largest paratype is almost twice as wide.

The species has bottle-shaped antennae, tentacular cirri, and dorsal cirri (Fig. 4A) that in living specimens are slimmer than in the preserved animals. All of these appendages except the ventral tentacular cirri are of about equal length and only slightly shorter than the width of the body in preserved material. The median antenna inserts slightly before the connecting line between the posterior pair of eyes. The median pair of eyes has lenses. The palps are fused over their entire length.

The segment carrying the tentacular cirri is clearly visible from above. Usually, it is slightly pigmented, whereas the rest of the anterior part of the body is colorless. All body segments have dorsal and ventral cirri. Median parapodia are truncate and have a small anterior lip (Fig. 4B). Anal cirri are of the same form as the anterior dorsal cirri but are two to three times as long.

The entrance to the pharynx is apparently

slightly hardened; the surrounding epidermal fold seems to be free of papillae. The tooth is situated near the anterior margin of the organ. The pharyngeal tube is about as long as two and one-half segments and reaches back, when not extruded, to the posterior border of the second setiger. The proventricle is three and one-half to four and one-half setigers long and extends usually to the posterior border of the sixth setiger. It has 20 to 25 rows of muscular columns.

Most parapodia have seven to nine compound setae of which the lowermost ones have short blades as in Fig. 4C; the blades of the uppermost ones are about twice as long. A dorsal simple seta occurs in the holotype from the first setiger, in another specimen from the fourth setiger. As observed in median segments, the seta (Fig. 4D) has a bidentate tip; below the tip, serration is similar to that on the blades of the compound setae. In the approximately last 10 setigers also a ventral simple seta is found. The acicula (Fig. 5E) has a small, somewhat asymmetrical, knob at the end.

One specimen has faint brown bands across the dorsum in the posterior two-thirds of the body. One specimen has developing eggs, already rounded but of very variable size, in each of the seventh to 15th setigers. There are 12 eggs per segment. Some eggs are irregularly distributed in the anterior segment.

#### Remarks

Among the species of *Brania* listed by Hartman (1959; 1965a, here in part as *Grubea*), *B. adpersa* and *B. protandrica* are poorly known (cf. Fauvel, 1923). I was unable to obtain a description of *B. atokalis*. In two species there is disagreement about the setae (*B. furcelligera*, cf. Augener, 1913, and Day, 1967; *B. rhopalophora*, cf. Hartman, 1964, and Day, 1967) but both have palps that are only partly fused and are, therefore, easily distinguished from *B. brevipharyngea*. Among the remaining species, the following have bidentate seta: *B. balani*, *B. clavata*, *B. heterocirra*, *B. jonssonii*, *B. limbata arenacea*, and *B. quadrioculata*. *B. brevipharyngea* may be distinguished from these species, except from *B. balani*, by the combination of a short pharynx and a moderately long proven-

tricle. In *B. balani* the cirri are much shorter and the simple dorsal setae are pointed. *B. jons-sonii*, which is not fully known but appears to be similar, has a very short body length when mature and lacks the compound setae with longer blades. None of the others has the same combination of a short pharynx with a moderately long proventricle.

*Eusyllis japonica* Imajima & Hartman

*Eusyllis japonica* Imajima & Hartman, 1964, p. 111.—Imajima, 1966*b*, p. 102.

*Eusyllis blomstrandii*.—Berkeley and Berkeley, 1945, p. 317 (in part).

*Material Examined*

One specimen, taken near Nanaimo, Strait of Georgia, British Columbia (cf. Berkeley and Berkeley, 1945, as *Eusyllis blomstrandii*), USNM 35635, was examined. This is a new record.

One specimen from the Strait of Juan de Fuca, lat 48°22.4' N, long 124°26.3' W, 140 m, gravel with mud (grab sample), was also studied. It was collected by K. D. Hobson, 12 June 1965. It is catalogued as USNM 43217 and constitutes a new record.

*Remarks and Additions to the Description*

The identification of the specimen from the Strait of Juan de Fuca, almost complete and with 80 setigers, is based on the presence of a small occipital flap and a pharynx with about 48 small teeth. The teeth are present on three-quarters of the circumference of the entrance. The large tooth is situated at the anterior margin of the pharyngeal tube. Dorsal cirri alternate in length in the median region of the body, the larger ones being a little longer than the body is wide. The cirri are rather distinctly annulated; the articles are two to three times as long as they are wide. The ventral cirri on the first setiger are not enlarged. Two kinds of setae (see Imajima and Hartman, 1964, pl. 25, figs. *e* and *f*) are present in all parapodia except the most anterior ones where all blades are similar to, but somewhat longer than, those in fig. *f* (Imajima and Hartman, 1964).

The following points were not noted in the original description: the pharynx, when not

everted, extends through the ninth setiger. The proventricle has about 75 rows of muscle columns and extends to the 20th setiger. Three, five, and three brown aciculae are present in the first, seventh, and 35th parapodia, respectively.

The specimen from shallow water, referred to *E. blomstrandii* Malmgren by Berkeley and Berkeley (1945), has been partially dried but the occipital flap, pharyngeal teeth, and setae are in agreement with *E. japonica*. The other specimens of *E. blomstrandii*, reported by Berkeley and Berkeley (1945) from deeper water, are lost.

The species was known previously only from northern Japan.

*Exogone lourei* Berkeley & Berkeley

Fig. 5A–D

*Exogone lourei* Berkeley & Berkeley, 1938, p. 44.—?Rioja, 1941, p. 703.—Berkeley, 1967, p. 1055.—Pettibone, 1967, p. 5.—Banse and Hobson, 1968, p. 16.—Nichols, 1968, p. 57.

*Exogone uniformis* Hartman, 1961, p. 73 (in part); 1968, p. 427 (in part).

?*Exogone multisetosa* Friedrich, 1956, p. 59.

*Diagnosis*

This *Exogone* species has long spinigers, with greatly enlarged shaft endings on the second setiger. Falcigers are of uniform length, bidentate. Single upper simple setae are present from anterior setigers and bent at tips. Single lower setae are present in posterior setigers and bidentate. Unpaired antenna is long, paired antennae are short. Dorsal cirri are found on second setiger. Proventricle extends through four to five segments, with approximately 20 rows of muscular columns. Embryos are carried ventrally.

*Material Examined*

The following materials were examined: holotype, from False Narrows, British Columbia, USNM 32895; Puget Sound, Washington, stations of Nichols (1968)—some specimens, one of these, FHL 1353; off Point Vicente Light, southern California, AHF station 5102, lat 33°

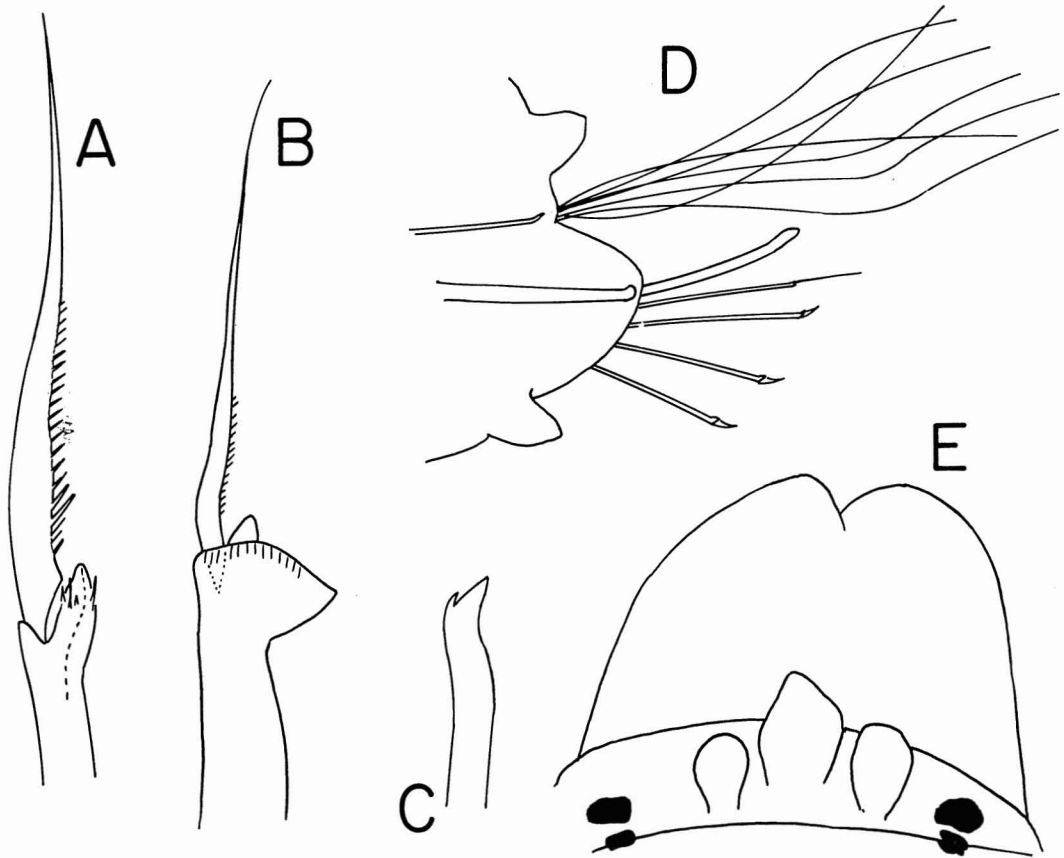


FIG. 5. A–D, *Exogone lourei*. A, C, from mature male from California; B, from West Sound, Washington. Figs. A and C somewhat enlarged over B. A, spiniger from third or fourth setiger, slightly turned. Dotted line at the shaft ending suggests profile; B, spiniger from second setiger; C, posterior lower simple seta; D, approximately 20th parapodium. E, *Exogone uniformis*, paratype, dorsal view of anterior end (sketch).

43°15' N, long 118°20'53" W, 20 m, coarse black sand, ΔHF without number, eight specimens, unpublished record; Strait of Juan de Fuca, lat 48°13.2' N, long 123°57' W, 153 m, gravel with mud (grab sample), 12 June 1965, collected by K. D. Hobson, one specimen, unpublished record; Strait of Juan de Fuca, lat 48°22.4' N, long 124°26.3' W, 140 m, gravel with mud (grab samples), 12 June 1965, collected by K. D. Hobson, 10 specimens, unpublished record; West Sound, Orcas Island, Washington, about lat 48°36' N, long 122°57' W, 40 m, mud, July 1967, collected by H. L. Sanders, seven specimens, unpublished record; False Bay, San Juan Island, Washington, approximately lat 48°28'56" N, long 123°03'52" W, lower intertidal (–2 to –3 ft), in a pocket

between rocks, among a colony of the polychaete *Fabricia oregonica* Banse that was half-covered with fine sand, 29 June 1969, several specimens, unpublished record.

#### Additions to the Description

The setae were originally incompletely described. The following, including the figures, is based largely on specimens from the new records but the observations have been checked in the holotype. Setigers number 48 to 53 in the few large animals studied, whereas the holotype had 45 setigers. The proventricle is usually found from the third to the sixth setiger. It has generally somewhat less than 20 (range, 16 to 22) rows of muscular columns.

The uppermost one or two compound setae

in each anterior and median foot are spinigers (Fig. 5A) with blades up to 70  $\mu$  long. On the second setiger the spinigers have greatly enlarged endings of the shafts (Fig. 5B). Occasionally, the spinigers on the first setiger have enlarged, although slightly smaller, shaft endings. Posteriorly, the blades of the spinigers decrease in length (down to about 10  $\mu$ ). As it is very difficult to place the spinigers in side view, they usually appear under low magnification as shown in Berkeley and Berkeley (1938, fig. 10).

Four to six compound setae with short blades occur per foot. One of these has been figured from the holotype by Banse and Hobson (1968, fig. 4e). The diameter of the shafts can vary within feet from about 2.5 to 4  $\mu$ . The length of the blades does not vary markedly within or between feet. Compound setae with long blades of the kind depicted by Berkeley and Berkeley (1938, fig. 11b) are absent on the 25 anterior setigers remaining of the holotype and were not found on the complete, newly collected material.

Single simple upper setae are present from the first parapodium in the holotype and one of the other specimens. In all the other specimens studied they start from the fifth to the 10th setiger. They are slightly thinner anteriorly than posteriorly and become progressively more bent on median and posterior setigers (cf. Hartman, 1961, pl. 7, fig. 3). Single lower simple setae (Fig. 5C) are present in the holotype from the 15th setiger but occur in all the other specimens only in median or posterior setigers, usually starting on the 35th to the 45th setigers, but occasionally on about the 25th. Aciculae number up to three in anterior segments. Swimming setae (see Fig. 5D) were observed in a male from California from the 17th to about the 35th setiger. Embryos are carried ventrally (cf. Hartman, 1961, pl. 6, fig. 1 and pl. 7, fig. 1).

#### Remarks

*Exogone lourei* is distinguished from all *Exogone* species except *E. uniformis* by the spiniger on the second setiger. It is differentiated from *E. uniformis* by the long unpaired antenna and the short proventricle. Parts of the description of *E. uniformis* Hartman (1961), especially the figures mentioned, were based on specimens of

*E. lourei* present in the type sample of *E. uniformis*. Possibly, *E. multi-setosa* from Peru is a synonym. However, the thickened spiniger on the second setiger has not been described fully.

The known distribution of *E. lourei* extends from southern British Columbia to southern California. Rioja (1941) recorded *E. lourei* from the west coast of Mexico but whether this record is valid cannot be ascertained from his description. As stated in the discussion of *E. uniformis* below, an undescribed species very similar to *E. lourei*, but without the specialized spinigers on the second setiger, occurs in the Pacific Ocean near Japan, so that possibly Rioja's record is of that species.

#### *Exogone uniformis* Hartman

##### Fig. 5E

*Exogone uniformis* Hartman, 1961, p. 73 (in part).—Hartman, 1968, p. 427 (in part). Not *E. uniformis* Imajima, 1966a, p. 401.

#### Diagnosis

This *Exogone* species has long spinigers, with greatly enlarged shaft endings on the second setiger. Falcigers are of uniform length, bidentate. Single upper setae are present from anterior setigers and bent at tips. Single lower setae are present in posterior setigers and bidentate. All antennae are short. Dorsal cirri occur on second setiger. Proventricle extends through seven to eight setigers, with 26 or 27 rows of muscular columns.

#### Material Examined

The holotype, from shallow water off southern California, AHF Poly. 0170, was examined. Also seen were the paratypes from same station, AHF Poly. 0171, three specimens.

#### Additions to the Description

The paratype has been studied carefully. The holotype, which is complete and has 55 setigers, has been inspected for the presence of the characteristic spiniger on the second setiger, the short unpaired antenna, and the long proventricle.

The paired antennae are only slightly shorter than the unpaired antenna (Fig. 5E). The proventricle extends through seven to eight setigers and has in the paratype 26 or 27 rows of mus-

cular columns. The form and size of all setae are the same as in *E. lourei*; the ventral simple setae, however, were not studied. The length of the blades of the falcigers on the seventh and eighth parapodia is about 12  $\mu$ , that on the 42nd foot, 9  $\mu$ . As in *E. lourei*, one falciger has a thinner shaft than the two or three others (42nd foot). The blade of the spiniger on this parapodium is 35  $\mu$  long. Single simple upper setae start from the 12th and 14th setigers in the holotype, and the 10th and 11th setigers in the paratype. The single lower simple seta occurs in the holotype from the 44th and 46th setigers and in the paratype, after the 42nd, the last setiger of this incomplete specimen.

#### Remarks

*Exogone uniformis* is distinguished from all *Exogone* species, except *E. lourei*, by the spiniger on the second setiger. It is differentiated from *E. lourei* by the short unpaired antenna and the long proventricle.

Hartman (1961) noted the variability of the length of the unpaired antenna in the original description. Here it is proposed that two species, *E. uniformis* and *E. lourei*, were involved. The four specimens of *E. uniformis* investigated by me do not have embryos or swimming setae as stated for the species in the original description; clearly, because of the long unpaired antenna, the figures of egg-bearing females by Hartman (1961, pl. 6, fig. 1, and pl. 7, fig. 1) show *E. lourei*.

Records other than the type sample from southern California (Hartman, 1963, p. 16) need to be checked. Imajima (1966a) reported the species from Japan. I had the opportunity in Tokyo to see briefly two specimens from the sample on which the record was based. The similarity with *E. lourei* is striking; single upper simple seta occurs from the first setiger but the characteristic falciger on the second setiger is absent, so that the species is neither *E. lourei* nor *E. uniformis*.

#### *Exogone molesta* new species

##### Fig. 6

#### Types

The holotype, from Harney Pass, near Orcas Island, Washington, was found at approximately

lat 48°35.5' N, long 122°55' W, mud, 27 m, July 1967. It was collected by H. L. Sanders, and catalogued as USNM 42012.

Paratypes, from same sample, are: USNM 42013, 12 specimens; FHL 1737, 10 specimens; AHF Poly. 0456, 12 specimens; from West Sound, Orcas Island, Washington, at approximately lat 48°36' N, long 122°57' W, mud, 40 m, July 1967, collected by H. L. Sanders.

#### Diagnosis

This is an *Exogone* species with unidentate (or subidentate) compound setae and with coarsely serrated blades. Some blades in anterior and median setigers are very long. Single upper simple setae are pointed, slightly serrated, and found in all parapodia; similar single lower setae are located posteriorly. Unpaired antenna are long; paired antennae, short. Dorsal cirri are absent on second setiger. Proventricle extends through four to four and one-half segments, with about 20 rows of muscular columns.

The name refers to the perfectly ordinary characters of the species which made its study a burden.

#### Description

The holotype is a complete specimen with 35 setigers, of 2.5 mm length and almost 0.2 greatest width (without parapodia; almost 0.3 mm with parapodia). The highest number of setigers in the about 60 specimens examined is 40.

Noteworthy features of the general form of the body are the pointed fused palps (Fig. 6A), the long median antenna, the fusion of the prostomium with the first segment, the absence of the dorsal cirrus on the second setiger, and the length of the proventricle which starts in the fourth or fifth setiger when the pharynx is not everted. The proventricle extends through four to four and one-half setigers and has approximately 20 rows of muscle columns. A looped anterior part of the intestine, about half as long as the proventricle, follows the latter. In some specimens, the looped section appears to have muscular columns similar to those of the proventricle.

Dorsal and ventral cirri are of the size usual for *Exogone* species (Fig. 6B). Anteriorly, each parapodium carries about 12 compound setae, and about half as many in median and posterior

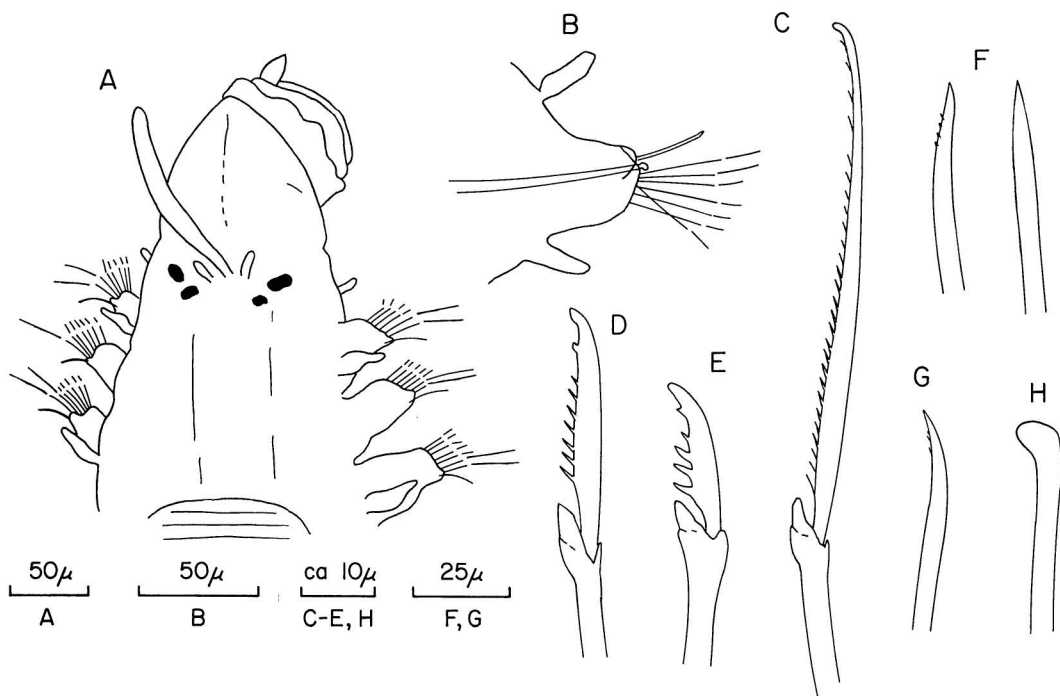


FIG. 6. *Exogone molesta* new species. *A*, from paratype; *B-H*, from holotype (setae not exactly to scale). *A*, anterior end in dorsal view, slightly from the right side. Setae schematic; *B*, 12th parapodium; *C*, spiniger from fourth setiger; *D*, falciger with medium-long blade from 16th setiger; *E*, falciger with short blade (11  $\mu$ ) from fourth setiger; *F*, upper simple seta from eighth setiger in two positions; *G*, lower simple seta from posterior setiger; *H*, acicula from 16th setiger.

setigers. Among these setae, up to four can be spinigers (Fig. 6C) with unidentate blades of about 40  $\mu$  length. In four specimens studied, the last spinigers were observed in the 15th, 19th, 19th, and 25th setigers, respectively. Their occurrence terminates abruptly, without obvious transitional setae. The other, lower compound setae have blades as in Figs. 6D and E. The longest and shortest blades measure 12 to 13  $\mu$  and 10 to 11  $\mu$  on the fourth, and 17 and 13  $\mu$  on the 16th setigers. Some blades appeared to have a very thin subapical tooth that had been broken off (for example, Fig. 6E), but I was unable to find any clearly bidentate blades. Single simple upper seta (Fig. 6F), pointed and almost straight, start on the first setiger; a slight serration is visible in side view. A similar seta (Fig. 6G) is present ventrally in each parapodium from approximately the 25th setiger. The acicula (Fig. 6H) ends in a rounded, bent knob.

#### Remarks

Hartman (1959, 1965a) has listed the known species of *Exogone* Örsted. Added to the lists by Hartman must be the recently described *E. homosetosa* Hartmann-Schröder, *E. parabebes* Hartmann-Schröder, *E. remanei* Storch, and *E. verugera profunda* Hartman. I could not obtain descriptions of *E. langerhansi*, *E. maderensis*, *E. cirrata*, and *E. edwardsi*. *E. martinsi* and *E. oerstedii* are unidentifiable. The last, at least, may belong to another genus. Also, *Oophylax minuta* is a species of *Sphaerosyllis* rather than of *Exogone*, according to Pettibone (1954).

Among the remaining species, *E. lourei*, *E. minuscula*, *E. multisetosa*, *E. remanei*, *E. rostrata* (see also the notes by Cognetti, 1957), and possibly *E. fauveli* seem to share the following characters with *E. molesta*: some compound setae with very long blades, a long unpaired antenna

and short paired antennae, and a proventricle extending through three or four segments. *E. molesta* differs, however, from all except *E. minuscula* because of its simple pointed setae. In addition, the blades of the compound setae of most of the other species are bidentate. *Exogone molesta* differs from *E. minuscula* in that the former has a shorter pharynx, and possibly a slightly longer proventricle, and the blades of its compound setae are coarsely serrated. Finally, the aciculae in *E. molesta* are more bent at the tip than they are in *E. minuscula*.

*Odontosyllis fulgurans japonica* Imajima

*Odontosyllis fulgurans japonica* Imajima, 1966*b*, p. 109.

*Odontosyllis phosphorea* Berkeley & Berkeley, 1938, p. 42 (in part).

*Material Examined*

The sample, collected by E. and C. Berkeley in False Narrows, Vancouver Island, British Columbia, on 29 June 1927, and identified as *O. phosphorea*, contains one anterior fragment and several pieces, possibly not all of the same specimen. It is catalogued as USNM 35624. This is a new record for this species.

*Remarks and Additions to the Description*

This well-preserved anterior fragment of 50 segments agrees with the description of the species by Imajima (1966*b*), especially in the diagnostic characters of pharyngeal teeth, compound setae, and the length of the proventricle. The occipital flap has some black color. Beneath it is a deep posterior indentation of the prostomium. Faint transverse black bands are present dorsally on the anterior parts of the segments. Until about the 30th segment, single thin white lines (a band of cilia according to Imajima) are present behind these bands. After about the 30th segment, another white line occurs in each segment anterior to the band of pigment which is moved to the middle of the segment. More posteriorly, the segments become biannulated, the dark band being the divider; the dorsal cirri and parapodia are on the second rings of each segment behind the second ring of cilia. None of the compound setae has subapical teeth as

reduced as in Imajima (1966*b*, fig. 35*g*) but the trend toward this condition is apparent. Simple setae were not present in any of the material, which included some posterior fragments.

It may be noted that the very long proventricle, extending in this animal from the seventh to 27th setigers (the first 23 setigers are contracted), is an additional diagnostic character separating *O. fulgurans japonica* from the nominate subspecies, besides those stated by Imajima (1966*b*). Marion and Bobretzky (1875) observed for Mediterranean material of *O. fulgurans fulgurans* that the proventricle extends through nine segments only.

The original label reads "*Odontosyllis phosphorea vera*" implying that this sample was the first from British Columbia believed by the Berkeleys to be of the nominate subspecies *O. phosphorea* rather than *O. phosphorea nanaimoensis*. The color pattern of the anterior end is suggestive indeed, but the dorsally spotted appearance of the midsection of the body of *O. phosphorea phosphorea* is absent. Because one lot of the two on which Berkeley and Berkeley (1938) based their record of *O. phosphorea phosphorea* is lost, the synonymy of their reference is partially left open. The lost lot seems to be the one referred to by Berkeley and Berkeley (1942) as *O. phosphorea*.

The species has been known previously from the Pacific coast of central Japan.

*Odontosyllis parva* Berkeley

Fig. 7A-F

*Odontosyllis parva* Berkeley, 1923, p. 208.—  
Hartman, 1944, p. 249; 1968, p. 439.—  
Berkeley and Berkeley, 1948, p. 83.

*Material Examined*

One broken mature female with swimming setae was taken from Departure Bay, Nanaimo, British Columbia, on a float (close to type locality), August 1921. It is catalogued as USNM 35628.

*Additions to the Description*

The armature of the pharynx and the setae of *O. parva* have not been figured previously. The armature of the pharynx entrance (Fig. 7A)

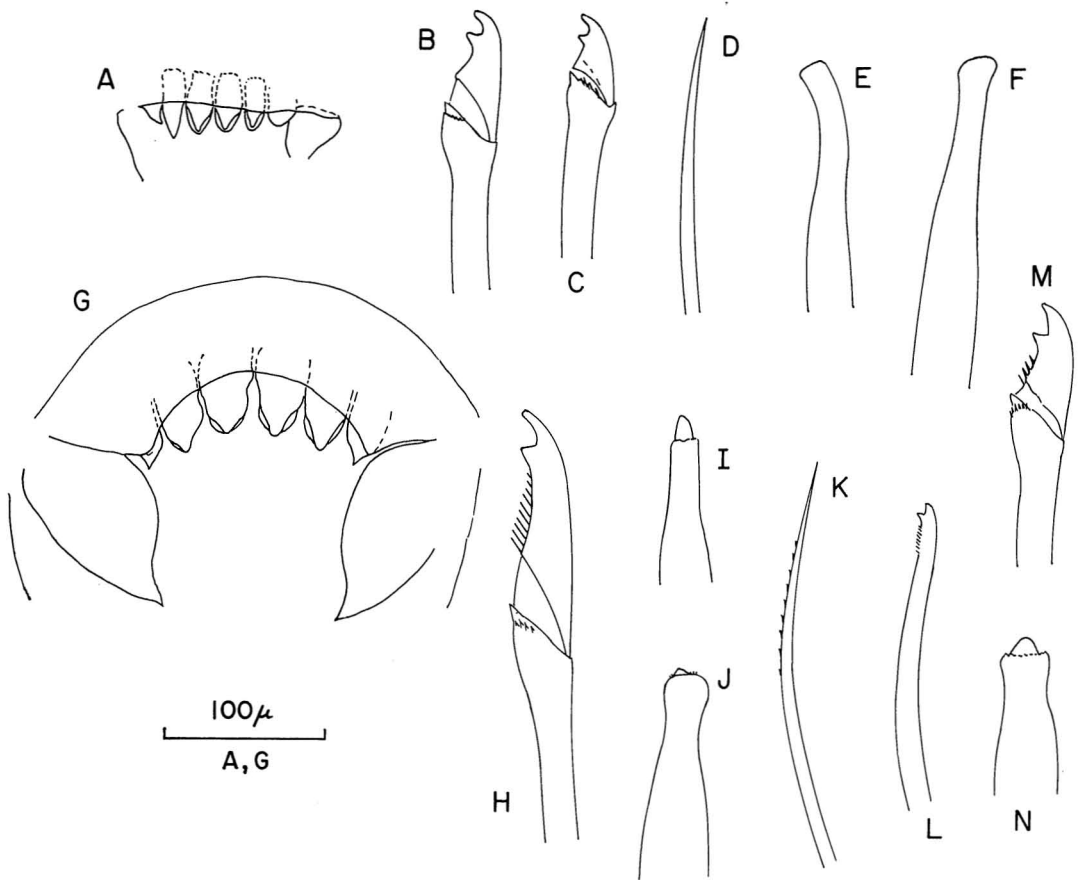


FIG. 7. A-F, *Odontosyllis parva* (setae approximately to scale). A, pharyngeal teeth; B, compound seta from 20th setiger; C, same, from posterior setiger; D, simple seta from this setiger; E, end of acicula from 20th setiger; F, same, from posterior setiger. G-N, *Odontosyllis phosphorea*. G, J-L, from Porlier Pass; H-I from syntypes of *O. phosphorea nanaimoensis*; M-N from Catalina Island (setae not to scale). G, teeth and lateral chitinized portions of pharyngeal entrance, anterior view; H, compound setae from 10th setiger; I-J, tips of aciculae from first setiger and a posterior segment; K, dorsal simple setae from posterior segment in side view; L, ventral simple seta from posterior segment; M, compound seta from 70th setiger; N, acicula from same segment.

consists of four central pointed teeth and a pair of either reduced or partially damaged lateral teeth. The proventricle lies in the sixth to 12th setiger and has roughly 40 muscular columns. The compound setae are short and have unusually thick shaft endings such that it is difficult to mount them on their sides. About 24 occur on the seventh setiger, and about 18 on the 20th (Fig. 7B). The length of the blades varies little within feet. Swimming setae start after the 20th setiger, the last segment of the anterior end of the specimen. These setae are about as long as the body is wide. In the setiger following the

last segment with swimming setae, about 10 compound setae with shortened blades (Fig. 7C) are found; in addition, an upper simple seta (Fig. 7D), which is a little less than half as thick as the shafts of the compound setae, is present. Two aciculae (Fig. 7E) were observed on the seventh and 20th setigers and one (Fig. 7F), on the segment following the last setiger with swimming setae.

#### Remarks

The dorsal cirri in the median parts of the specimen are about half as long as the body is



wide rather than "short and fusiform" (Berkeley and Berkeley, 1948, p. 83).

*Odontosyllis phosphorea* Moore

Fig. 7G-N

*Odontosyllis phosphorea* Moore, 1909, p. 327.—

Berkeley and Berkeley, 1948, p. 82.—

Hartman, 1961, p. 76; 1968, p. 441.

Not *Odontosyllis phosphorea* Berkeley & Berkeley, 1938, p. 42 (see *O. fulgurans japonica*).

*Odontosyllis phosphorea* Moore, var. *nanaimoensis* Berkeley, 1923, p. 207; 1961, p. 1321.—Berkeley and Berkeley, 1948, p. 82.—Pettibone, 1967, p. 5.

*Material Examined*

Somewhat more than 10 large specimens were taken from Porlier Pass, British Columbia, on 26 June 1914, and labeled by Berkeley as *O. phosphorea*. They are catalogued as USNM 35625. The original description of *O. phosphorea nanaimoensis* states ". . . dredged at Porlier Pass" (Berkeley, 1923, p. 207); there is no other sample from this site in the Berkeley collection in the U.S. National Museum. Therefore, I suspect that Berkeley did not change the label when she decided to designate a new subspecies of *O. phosphorea*.

Syntypes of *O. phosphorea nanaimoensis* (designated by M. H. Pettibone, 1964) from Departure Bay, Nanaimo, British Columbia, 13 August 1918, were examined. These 15 specimens, most with swimming setae, are designated USNM 32858.

One specimen, USNM 35626, taken from Smuggler's Cove, Santa Cruz Island, California, from minus 0.7 foot level, in eelgrass, 2 July 1939, was examined. It was collected by W. G. Hewatt, and identified by E. and C. Berkeley as *O. phosphorea*. This seems to be the specimen which "approximates to the variety *nanaimoensis* Berkeley" (Berkeley and Berkeley, 1941, p. 29).

Also examined were three specimens taken from near Catalina Harbor, on the west side of Catalina Island, California, from dipnet collection, 19 July 1949. They were collected by W. E. Barraclough, identified by E. Berkeley

as *O. phosphorea*, and are designated as USNM 35623. This is apparently an unpublished record.

Twelve specimens from the Strait of Juan de Fuca, lat 48°13.2' N, long 123°57' W, at 153 m, were examined. They were taken from gravel with mud (grab samples) on 12 June 1965 by K. D. Hobson. This is an unpublished record.

Twenty-five specimens from the Strait of Juan de Fuca, lat 48°22.4' N, long 124°26.3' W, were collected from 140 m in gravel with mud (grab samples). They were collected by K. D. Hobson on 12 June 1965. This is an unpublished record.

*Additions to the Description*

Because the subspecies *O. phosphorea nanaimoensis* has not been fully described, additions are presented before a comparison with material from California is made. It will then be argued that the subspecies should be withdrawn.

In material from British Columbia, a white line, presumably of cilia, runs across the dorsum of each segment from the middle of the section with swimming setae. The line ends at or behind the dorsal cirri which insert above and somewhat posteriorly to the parapodia. Dorsal cirri are cirriform, not lanceolate as observed by Berkeley (1923).

The entrance of the pharynx (Fig. 7G) is equipped with six teeth of which in some preparations the most lateral one on each side may be smaller and more rounded at the tip than shown. In specimens 15 mm long and 1 to 2 mm thick, the proventricle extends through nine or 10 segments, starting on the seventh to ninth setiger, and has 60 to 65 muscular columns.

Syntypes of *O. phosphorea nanaimoensis* have on the first setiger about 10 compound setae (Fig. 7H) with shafts of about 3.5  $\mu$  diameter (measured somewhat below the terminal thickening) and blades of 22 to 30  $\mu$  length. At least two of the three aciculae end as in Fig. 7I. On the 10th setiger, there are 30 slender compound setae with blades of 25  $\mu$  length, which do not vary much in length within feet, and four aciculae. As shown for a posterior foot, the ends of the aciculae (Fig. 7J) are fairly blunt but are surmounted by eccentrically placed protuberances, surrounded by small

spines. In the middle section (50th setiger) of the body, two aciculae are found with 24 compound setae. These have shafts of 7 to 8  $\mu$  diameter and blades of about 25 to 30  $\mu$  length. The blades change their form as compared with more anterior ones by being wider basally according to the thickness of the shafts. In the posterior section, there are 18 or so compound setae. They have shafts of about 4  $\mu$  diameter, and blades of 15 to 25  $\mu$  length. There are one or two aciculae. In the two to four last-developed setigers of some posterior ends (approximately 90th setiger in a complete specimen), a laterally flattened simple dorsal seta (Fig. 7K, 2  $\mu$  thick when seen from the broad side) and a bidentate simple ventral seta (Fig. 7L, 3  $\mu$  in diameter) are sometimes present. Swimming setae start in three specimens on the 21st setiger. One animal, clearly a male, has 51 segments provided with these setae; one, clearly a female, has 36 segments with these setae. In another specimen, they start at the 22nd, and on the 20th and 21st on one side, and on the 21st and 22nd setiger on the other side, respectively, in two other animals.

The material from Catalina Island, the type locality of *O. phosphorea*, has eyes dorsally on the prostomium instead of laterally as described by Moore (1909). The unpaired antenna arises between the anterior eyes on the forward-sloping part of the prostomium. The occipital flap is almost circular as in the northern animals (cf. Berkeley and Berkeley, 1948, fig. 122) and strongly pigmented. The dorsum is spotted by dark pigment which is concentrated middorsally in every fourth intersegmental furrow. Segments are uniannulate. A thin whitish line, presumably of cilia, runs over the dorsum between the dorsal cirri from approximately the 10th setiger. From the middle of the body section bearing swimming setae, a second, parallel, line is added which runs posteriorly to the plane of the dorsal cirri and parapodia. Dorsal cirri originate from small cirrophores.

Dissection of the partly everted pharynx was not fully successful. Five or six large teeth were recognizable in the preparations. The presence or absence of a seventh tooth cannot be ascertained. This would be of interest for comparison with *O. fulgurans japonica* (see above). The

proventricle extends in a normally contracted specimen from the seventh to the 17th setiger.

The first setiger has 24 setae as shown in Fig. 7H for northern material, with shafts of about 3.5  $\mu$  diameter and blades varying between 17 and 25  $\mu$  length. At least two of the three aciculae have endings as in Fig. 7I. By the 20th setiger, the shafts of the setae are 6 to 7  $\mu$  thick; the blades do not increase in length. On the 70th setiger, about 18 compound setae (Fig. 7M) with shafts of 8  $\mu$  diameter and blades of almost 25  $\mu$  length are found, together with two aciculae (Fig. 7N). Single upper simple setae are present in the very last feet of two posterior fragments. They appear to have the flattened form shown in Fig. 7K when viewed under 400 $\times$  without dissection. Swimming setae start from the 23rd setiger and are present on 31 segments in the one anterior fragment, a mature female. Moore (1909) had two animals before him where these setae also began on the 23rd setiger; they were present for 26 and 51 segments so that this character must be considered of little value until the variability has been well studied. Eggs are extruded below the neurocirri, as well as before and behind the section with swimming setae.

The swimming setae start on the same segment in the male specimen from Smuggler's Cove. This animal has a weakly, rather than strongly, pigmented occipital flap, one faint black band of pigment anteriorly on the dorsum of each of approximately the first 20 segments, and an indistinctly spotted dorsum (as described earlier) in the midregion of the body. A large crescentic black area of pigment lies below and behind the eyes, as described by Moore (1909). It is less well developed in the anterior end from Catalina Island.

#### Remarks

According to Berkeley (1923), *O. phosphorea nanaimoensis* was based on the pigmentation pattern (occipital flap without pigment; spotted appearance of dorsum by dark pigment in every third or fourth intersegmental furrow), presence of cirrophores for dorsal cirri, dorsal cirri of lanceolate shape, absence of a distal piece in the ventral cirri, and differences in the position of the subapical teeth of the blades of

the setae. After the study of more Californian material as presented here, the only remaining consistent differences are the absence of terminal pieces in the ventral cirri in the northern material, which are barely recognizable in the Californian animals, and the slight difference in the beginning of the swimming setae.

Although the present description has pointed out a difference in dorsal ciliary bands between the northern and southern forms, *O. phosphorea nanaimoensis* is considered to be synonymous with *O. phosphorea* Moore.

*Sphaerosyllis brandhorsti* Hartmann-Schröder

*Sphaerosyllis brandhorsti* Hartmann-Schröder, 1965, p. 124.

*Material Examined*

One specimen, collected from West Sound, Orcas Island, Washington, at approximately lat 48°36' N, long 122°57' W, was examined. It was collected from 40 m, in mud, by H. L. Sanders. This is a new record.

*Remarks*

The identification is based on the following: The specimen, a complete mature male with 22 setigers, 1.5 mm long and 0.2 mm wide (without parapodia; 0.3 mm with parapodia), has short, completely fused palps and three pairs of eyes. The unpaired antenna inserts between the posterior eyes. The prostomium is fused with the first segment bearing the tentacular cirri. The proventricle extends through four segments. The antennae, tentacular, dorsal, and anal cirri are piriform; an unpaired caudal appendix is not present. Dorsal cirri are present on the second setiger.

Parapodial lips were not found. Compound setae have unidentate blades of fairly uniform length within feet that are strongly serrated proximally on the cutting edges. Single simple setae occur dorsally from the first setiger, in posterior segments also ventrally. They are pointed, and possibly slightly serrated, on their concave sides. The single aciculae are tapered at the tips and slightly bent. Scattered epidermal papillae are found on the dorsal and ventral sides of the body but apparently not on the palps or prosto-

mium. They are usually 2 to 4  $\mu$  high, sometimes 6  $\mu$ , not conspicuous on the parapodia, and not arranged in rows. At least the large ones are about 30  $\mu$  apart.

The only differences between this specimen and that of the Chilean *S. brandhorsti* are the insertion of the unpaired antenna (slightly posterior), the fusion of the prostomium with the first segment, and the absence of epidermal papillae and parapodial lips. Without more specimens little weight can be laid on these differences.

The species was previously known from Chile, south of lat 38° S.

*Syllis (Syllis) elongata* Johnson

Fig. 8A-G

*Pionosyllis elongata* Johnson, 1901, p. 403.—Hartman, 1938a, p. 7.

*Typosyllis elongata*.—Hartman, 1948, p. 21 (synonymy).

*Syllis elongata*.—Berkeley and Berkeley, 1948, p. 75.—Hartman, 1959, p. 266; 1968, p. 461.

*Material Examined*

The paratype, number MCZ 1937, from Pacific Grove, California, was examined.

About 10 specimens (USNM 35662) from Gabriola Pass (reef), British Columbia, were examined. They were collected and identified by E. and C. Berkeley, the collection date being 8 July 1929.

Two specimens from Yakan Point, Queen Charlotte Islands, British Columbia, were seen. They were found on 23 June 1946 by E. F. Ricketts, presumably in the intertidal zone; the specimens were identified by E. and C. Berkeley as *S. stewarti*, and are catalogued as USNM 35634. This is an unpublished record.

*Additions to the Description*

The holotype is not at the MCZ (Hartman, 1938a) and may be lost. The paratype is an anterior fragment of about 95 setigers and 15 mm length, and 70 additional setigers in two small pieces. It is, therefore, not nearly as long as the holotype that had 198 segments and was 58.5 mm long. The dorsal cirri are not gradually

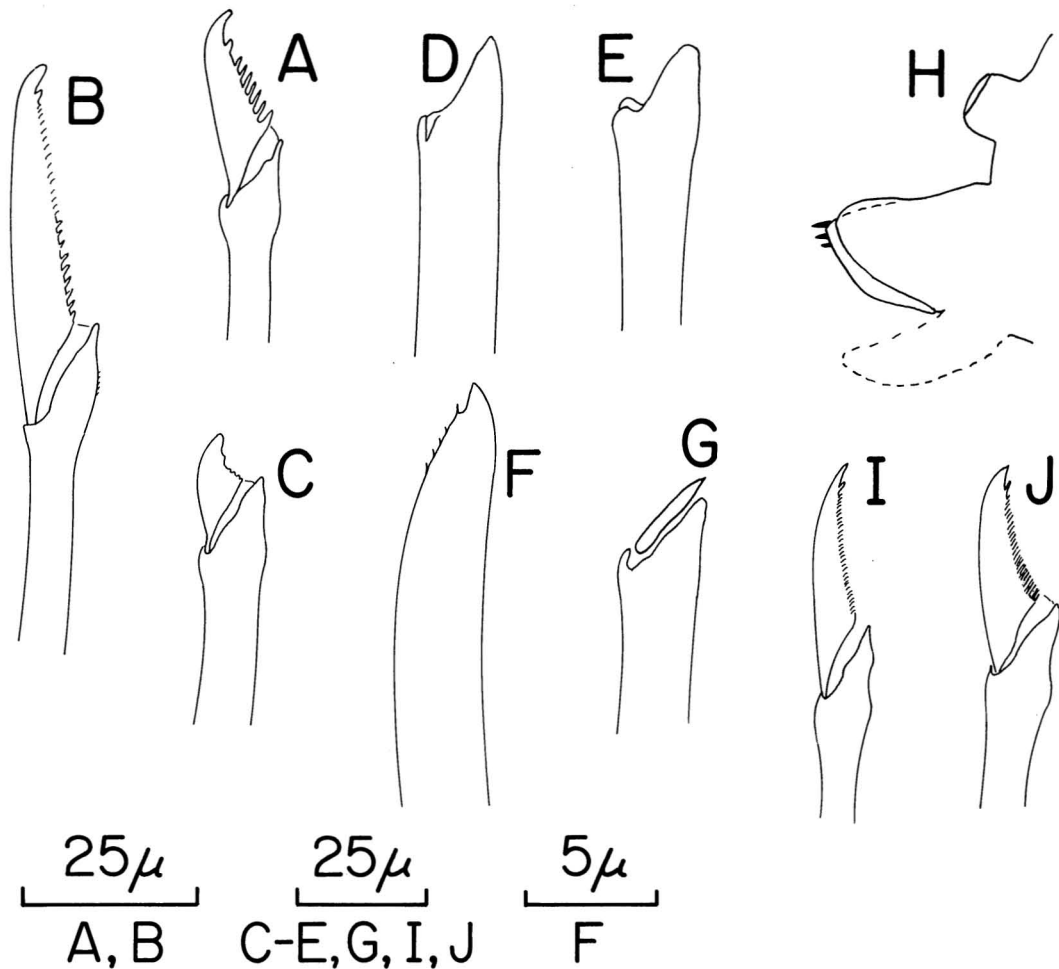


FIG. 8. A-G, *Syllis elongata*. A, C, D, from paratype; B, E, from USNM 35639; F, G, from USNM 35634 (A, B, slightly enlarged; F, greatly enlarged). A, lowermost seta from fifth setiger; B, upper seta from seventh setiger; C-D, upper and lower setae from 47th setiger; E, upper seta from approximately 90th setiger; F, posterior lower simple seta; G, upper compound seta from median parapodium not yet emerged. H-J, *Syllis fasciata*. H, posterior view of 12th parapodium, setae omitted; I-J, compound setae from 12th and 43rd parapodia.

tapered from the bases as stated by Johnson (1901) but are indistinctly spindle-shaped. Their length is approximately three-quarters the width of the body (without parapodia). The compound setae are subbidentate but the subapical teeth are often worn, especially so in median setigers. The anterior 10 to 15 parapodia have about 12 compound setae. The length of their blades varies within feet by a factor of two (Figs. 8A, B). Median and posterior parapodia have three to four ordinary compound setae (Fig. 8C) with short blades; the diameter

of the shaft, below the terminal thickening, is about 12  $\mu$ . In addition, one or two upper setae have shafts nearly 20  $\mu$  in diameter (Fig. 8D). The endings of the shafts are less sculptured than those of the thinner setae; these setae are always without blades. In the paratype, the sockets for the blades are fully formed and the blades seem simply to have broken out, but in other specimens the rounded appearance of the sockets (Fig. 8E) suggests that the setae were not fully developed (see also below). The aciculae number two, three, and five in the seventh,

48th, and 92nd parapodia, respectively, of the paratype. Their endings are irregular, similar to figs. 57*k* and 60*m* by Imajima (1966*c*).

The largest specimen from Gabriola Pass is approximately 75 mm long and has roughly 370 setigers. A complete animal from the Queen Charlotte Islands has approximately 190 setigers and is nearly 30 mm long. Some compound setae of the posterior setigers with thin shafts have blades that are clearly longer than those of the lowermost setae, similarly to those of the anterior parapodia. In the posteriormost segments, single upper needlelike smooth setae and single lower setae occur which are slightly serrated (Fig. 8*F*, 3  $\mu$  diameter); remnants of a subapical tooth or hair can be seen on some of the latter in this as well as specimens from Gabriola Pass. In the latter lot it was observed that the thick upper setae in middle feet are formed in the setal sacks without blades, or may have rudimentary blades (Fig. 8*G*).

#### Remarks

The formation of the thick upper setae of median setigers without blades supports the belief of Hartman (1959, 1968) that the species is to be included in the nominate subgenus of *Syllis*. Similar thick setae occur also in *S. stewarti* Berkeley and Berkeley, and sometimes in *S. adamantea adamantea* (Treadwell). Both species are considered below as members of *Typosyllis* Langerhans.

*Syllis (Typosyllis) adamantea adamantea*  
(Treadwell)

*Trypanosyllis adamanteus* Treadwell, 1914, p. 235.

*Syllis spenceri* Berkeley & Berkeley, 1938, p. 38.  
*Typosyllis adamanteus*.—Imajima and Hartman, 1964, p. 132 (synonymy).

#### Material Examined

Paratypes (three specimens) of *S. spenceri* from Vancouver Island, British Columbia, USNM 32871, were examined.

#### Additions to the Description

Some details of the form of the compound setae may be added to the description of the

species. *S. spenceri* has been considered as a synonym of *S. adamantea adamantea* by Imajima and Hartman (1964). One of the Canadian specimens still shows the color pattern characteristic for *S. adamantea*; one specimen, nearly 30 mm long, carries swimming setae.

The shafts of the subbidentate compound setae of the sixth setiger are of uniform diameter; the length of the blades ranges from about 28 to 34  $\mu$ . In median setigers, upper setae have shafts of about 11  $\mu$  diameter, whereas those of the lower ones are about 8  $\mu$  thick; the upper ones in the pigmented specimen are without blades and have less sculptured ends of shafts than the lower ones and are very similar to those of *S. elongata* (Fig. 8*D*). In the specimen with swimming setae, these thickened setae possess the blades. Posteriorly, all setae are uniform and formed as anteriorly.

*Syllis (Typosyllis) fasciata* Malmgren

Fig. 8*H–J*

*Syllis fasciata* Malmgren, 1867, p. 161.—Pettibone, 1954, p. 254 (in part, see *S. pulchra*).

Not *Syllis fasciata* Fauvel, 1934, p. 304 (—*S. ehlersoides*, *vide* Imajima, 1966*c*).—Berkeley and Berkeley, 1941, p. 29; 1942, p. 190; 1948, p. 74.—?Chlebovitch, 1961, p. 172.—Hartman, 1961, p. 16. (For all except the record by Fauvel, see below and under *S. pulchra* and *Syllis* sp.)

Not *Typosyllis fasciata* Imajima & Hartman, 1964, p. 135.—Imajima, 1966*c*, p. 276 (only in part?). (For both, see under *S. pulchra*.)

#### Material Examined

Two specimens from Foxe Basin, Canada, lat 66°30' N, long 80° W (recorded by Pettibone, 1954), USNM 21834, were examined.

#### Description

This note on Arctic specimens supplements the original description by Malmgren (1867). The larger specimen has about 70 setigers and is approximately 18 mm long; the smaller one is regenerating. Both are well preserved.

An occipital fold is absent. Although the

parapodia are contracted so that the aciculae pierce the epidermis (Fig. 8H), it is clear that the aciculae support the distal part of the feet, i.e., there is no supraacicular lip. This formation was also illustrated by Malmgren (1867, pl. 9, figs. 52C and 52C<sup>1</sup>). The aciculae are needlelike without terminal thickenings. The length of the blades of the compound setae (Figs. 8I, J) varies little within parapodia; on the anterior parapodium examined, the range is approximately 40 to 50  $\mu$ . The blades are shorter posteriorly (Fig. 8J). All blades, unless worn, have small subapical hairs, and the cutting edges are beset by 30 to 35 closely spaced hairs or teeth. Malmgren's figures (pl. 9, fig. 52D) are too small to permit easy recognition of these features.

#### Remarks

Because there is misunderstanding evident in the publications reporting *S. fasciata* from the North Pacific Ocean, I have made an effort to obtain all specimens on which these records were based. None proved to be *S. fasciata*. Because several specimens are no longer available, I cannot state with certainty that *S. fasciata* does not occur in the northeastern Pacific; however, I consider it doubtful.

Among the records not listed below under *S. pulchra* and *Syllis* sp., two animals from Santa Cruz Island, California (Berkeley and Berkeley, 1941, USNM 35651) are neither *S. fasciata* nor the *Syllis* sp. discussed below. They represent a *Syllis* (*Typosyllis*) with long antennae and cirri, without an occipital flap, without supraacicular lips, and with compound setae with blades slightly longer than those in Fig. 9A but similarly serrated and with small subapical teeth. The record by Chlebovitch (1961) is probably not *S. fasciata* because of the very long dorsal cirri of that material.

#### *Syllis* (*Typosyllis*) *pulchra* Berkeley & Berkeley

#### Fig. 9A-H

*Syllis pulchra* Berkeley & Berkeley, 1938, p. 34; 1948, p. 73.—Hartman, 1944, p. 22.—Pettibone, 1967, p. 6.

*Syllis fasciata* Pettibone, 1954, p. 254 (in part).

*Typosyllis fasciata*.—Imajima and Hartman, 1964, p. 135.—Imajima, 1966c, p. 276 (only in part?).

#### Material Examined

The following specimens were examined:

Paratypes, from Newcastle Island, near Nanaimo, British Columbia. USNM 32845, four specimens.

Nanaimo, British Columbia, station float (pelagic), "August, 10 pm" (from label). Collected by E. and C. Berkeley and identified as *S. fasciata*. USNM 35650, two specimens. Unpublished record.

Between Crane and Cliff islands, Washington Sound, San Juan Archipelago, Washington, 31 to 38 m, 25 July 1939. Collected and identified as *S. fasciata* by M. H. Pettibone (1954). USNM 27535, one specimen.

British Columbia, undetermined site, 29 June 1946. Collected by E. F. Ricketts. Identified by E. and C. Berkeley as *S. fasciata*. USNM 45391, one specimen. Unpublished record.

West side of San Juan Island, Washington, approximately lat 48°29' N, long 123°00' W, under intertidal rocks, 22 July 1968. Collected by M. MacGinitie. FHL 1314, one specimen. Unpublished record.

Shirikishinai, Hokkaido, Japan, April 1957. Collected by M. Imajima, identified as *Typosyllis fasciata* (Imajima and Hartman, 1964). AHF 003796, one specimen. New record.

#### Additions to the Description

The "small heavily pigmented papilla" immediately behind the median antenna (Berkeley and Berkeley, 1938, p. 34) is a small but distinct occipital flap. The pharynx extends to the ninth setiger; the proventricle, to the 17th or 18th. The setae of this species have not been figured previously. Contrary to the statements by other workers, the blades of the compound setae are bidentate in some parapodia.

The description following is based only on the paratypes. Anteriorly 12 to 18 setae are found. Their blades have small subapical hairs distinct from the serration of the blades (Fig. 9A); the hairs are very often worn. The length of the blades is uniform within the feet as well as nearly uniform throughout the body. In

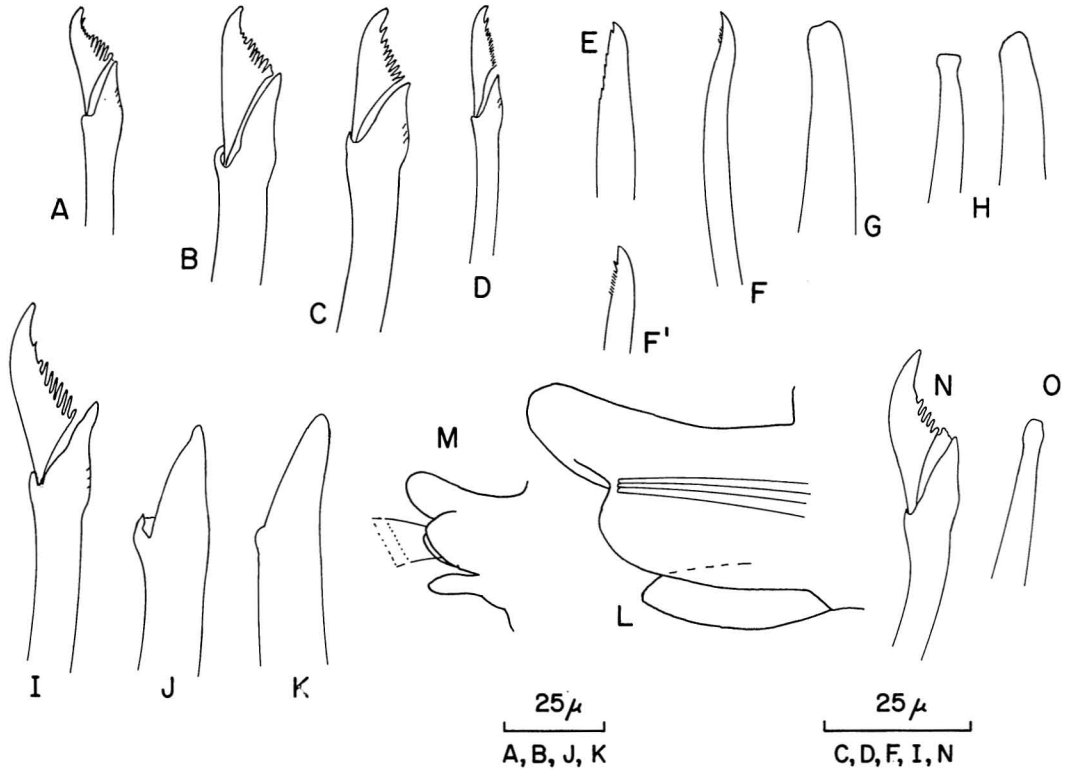


FIG. 9. A-H, *Syllis pulchra*, from paratypes (E, F, G, and H not to scale). A, compound seta from fourth setiger; B, compound seta from 41st setiger; C, same from approximately 80th setiger; D, thin compound seta from 80th setiger; E, upper simple setae from 140th setiger; F, lower simple seta from 80th setiger; F', enlarged tip; G, anterior acicula; H, aciculae from 140th setiger. I-K, *Syllis stewarti*, from holotype. I, compound seta from sixth setiger; J-K, upper setae from 100th and 400th setigers. L-O, *Syllis* sp. (from USNM 35647, figures not to scale). L, anterior view of 15th parapodium, setae omitted; M, 44th parapodium; N, seta from 15th setiger; O, acicula from 15th setiger.

median parapodia, the blades of the here-rather-thick compound setae are without subapical teeth even when they are strongly serrated proximally (Fig. 9B) and are virtually smooth distally. In posterior parapodia (10 to 15 segments before the pygidium; about 140th foot in a relatively small thin specimen; about 80th foot in an animal about twice as broad and somewhat longer), a distinct though small subapical tooth is present in each of the approximately six setae per parapodium (Fig. 9C). In all parapodia, some setae have shafts two-thirds the diameter of the others. Especially in the last-mentioned specimen, however, half of the compound setae in the posterior feet are markedly thinner (Fig. 9D) than the others; the subapical teeth of the blades of these setae are more discrete than in the massive setae. No other differences are apparent in these setae.

Single uppermost simple setae in posterior parapodia (Fig. 9E) have bifid tips (mostly worn) with slight serration below. Each of the last setigers of the larger one of the mentioned specimens also has one lower simple seta with a subapical tooth and serration below (Fig. 9F). In the paratypes, three to four aciculae (Fig. 9G) are present in anterior parapodia, and one to two aciculae (Fig. 9H) in posterior feet.

The specimen from Crane Island is budding following the 69th setiger. The median antenna has about 26 articles but the end may be broken off.

#### Remarks

With the addition of the new characters described above, *S. pulchra* is well differentiated from the North Pacific species of the subgenus

*Typosyllis* with long dorsal cirri (i.e., well over 25 articles) by the uniform length of the blades of setae throughout, the almost unidentate tips of the blades in median parapodia, and the small occipital flap.

A specimen from Shirikishinai, Japan at AHF, assigned by Imajima and Hartman (1964) to *S. fasciata*, has tiny subapical teeth in the anterior compound setae which were not shown in that publication (pl. 33, figs. *l*, *m*). Although I did not check all characters, I believe that there is no obvious difference between this form and *S. pulchra*. Imajima and Hartman (1964) observed in their material 25 to 30 annulations for the unpaired, and 15 to 18 for the paired ones; the latter is close to local material of *S. pulchra*. Imajima (1966c), discussing another record, stated, however, that the antennae have 30 to 35 annulations, so that a second form may be involved.

The range of *S. pulchra* is extended to northern Japan; previously, the species has been known only from the northeastern Pacific Ocean.

*Syllis (Typosyllis) stewarti*  
Berkeley & Berkeley

Fig. 9I-K

*Syllis stewarti* Berkeley & Berkeley, 1942, p. 191; 1948, p. 72.—Pettibone, 1967, p. 6.  
*Typosyllis stewarti*.—Hartman, 1948, p. 22; 1959, p. 235.

*Material Examined*

The holotype, USNM 32899, from British Columbia, was examined.

One specimen from Alitak Bay, Alaska (the record by Hartman, 1948), USNM 21929, was studied.

One specimen, FHL 1310, from San Juan Island, Washington, approximately lat 48°29' N, long 123°06' W, was also examined. This specimen, presumably intertidal, was found in a rocky bay under rocks on 24 July 1968. It was collected by M. MacGinitie and identified by R. Gustus. This is an unpublished record.

*Additions to the Description*

The type is a female with approximately 400 setigers and numerous small eggs. The habitus

of the body is more that of a *Lumbrineris* species than that of a syllid because the dorsal cirri are very small, being "not much longer than the length of the segments" (Berkeley and Berkeley, 1942, p. 191). The proventricle extends from the tenth to the 17th setiger. Only compound setae are present. They number about 10 in the first setigers, and about six near the 100th and 400th setigers. The diameter of the shafts in the first parapodia varies between 8 and 11  $\mu$ ; and the length of the subbidentate blades (Fig. 9I), between 30 and 35  $\mu$ . The upper two or three setae of the median (Fig. 9J) and posterior (Fig. 9K) parapodia are distinctly thicker (14 to 25  $\mu$ ) and have lost their blades. The shafts of the lower setae are 12 to 14  $\mu$  thick and have the same blades as anteriorly; the blades are 35  $\mu$  long near the 400th setiger. The ends of the shafts of the thickest setae are less sculptured than those of intermediate (14  $\mu$ ) diameter. Worn setae as in Fig. 9K occur also near the 100th setiger. Upper or lower simple setae are absent in all specimens. The aciculae, which have tapered or irregular ends, number four, six, five, and five on the sixth, seventh, near the 100th, and near the 400th parapodia. On the last-named foot, a fine pointed notopodial acicula is present but swimming setae are not formed.

*Syllis (Typosyllis) sp.*

Fig. 9L-O

*Syllis fasciata*.—Berkeley and Berkeley, 1942, p. 190 (only in part?); 1948, p. 74 (in part).—?Hartman, 1961, p. 16.

*Material Examined*

A composite sample of five specimens, USMN 35647, was examined. The animals were taken "around roots of eel grass" (from label) in Wreck Bay, British Columbia, on 11 August 1921, and from Dodd's Narrows, with *Dodecaceria* in September 1952. They were identified by E. and C. Berkeley as *S. fasciata*.

Four specimens, USNM 35648, from Newcastle Island, British Columbia, were examined. They were collected by E. and C. Berkeley and identified as *S. fasciata*. One specimen is clearly this species; three other specimens are probably this species.



Two specimens from Dodd's Narrows, British Columbia, were also studied. They were found in a *Dodecaceria* colony and identified by E. and C. Berkeley with hesitation as *S. fasciata*, because "Cirri are shorter (16–22) which may be due to the fact that they are commensal" (from label). The date of collection is not given. The specimens are catalogued as USNM 35649.

#### Description

This species will not be fully characterized here although complete specimens, 10 to 20 mm long, partly in the process of schizogamy, are available. Most specimens seem to have been the basis of the record of *S. fasciata* for the Canadian west coast by Berkeley and Berkeley (1942). As shown by the material from Wreck Bay it has separate palps, lacks an occipital flap, and is best distinguished by its large supraacicular lips (Figs. 9L, M) present at least through median (50) setigers but absent on stolons with swimming setae. Almost all anterior antennae and cirri are lost. A dorsal cirrus on the 20th setiger has approximately 40 articles. The median dorsal cirri are fairly thin and are one-half to three-quarters as long as the body is wide (without feet), the longest having somewhat fewer than 30 articles. Almost 12 compound setae are present per parapodium; they have short unidentate blades of uniform length (Fig. 9N). The compound setae of a female stolon are of the same form. Those of posteriormost feet of an immature specimen have the same outline and size but a few more teeth on the cutting edges. In addition, single, simple, dorsal, needlelike setae are present in these parapodia which have the same diameter as the shafts of the compound setae. Three to four blunt aciculae (Fig. 9O) are found in anterior and median parapodia. There is no special dorsal color pattern. The other records agree except as noted below.

#### Remarks

The species is most easily distinguished from *S. fasciata* by its compound setae and the supraacicular lip.

A dried-up sample from Tomales Head, California, from masses of sponges and Bryozoa (9

June 1941, labelled as *Syllis fasciata*, AHF n 2974) contained large specimens with setae with short, strongly serrated blades and small subapical teeth, which could possibly be the present species; the smaller specimens have setae with strongly bidentate blades and do not belong to either *S. fasciata* or the species discussed here. It may be noted that the Californian records of *S. fasciata* by Hartman (1961) are explicitly based on the diagnosis by Berkeley and Berkeley (1948) which states that the species has an occipital fold and, therefore, may be neither the form described above nor *S. fasciata*.

### NEPHTYIDAE

#### *Nephtys assignis* Hartman

#### Fig. 10A–C

*Nephtys assignis* Hartman, 1950, p. 112; 1968, p. 573.—Banse and Hobson, 1968, p. 17.  
*Nephtys discors*.—Pettibone, 1954, p. 270 (in part).—Imajima, 1961, p. 89.

#### Material Examined

The following specimens were examined:

Holotype, from type locality, Santa Catalina Channel, off California. AHF Poly. 0458.

Deer Harbor, Orcas Island, Washington, 10 July 1935. USNM 29355, one specimen.

Off Point Gibson, Fox Island, southern Puget Sound, Washington, mud, 2 August 1938. USNM 29356, one specimen.

Off Canoe Island, San Juan Archipelago, Washington, 7 July 1938. USNM 29357, one specimen.

Between McNeil and Fox islands, southern Puget Sound, Washington, mud, 125 m, 23 June 1939. USNM 29358, one specimen. Three of the above four records from Washington waters were reported by Pettibone (1954) as *N. discors* Ehlers.

Southern Puget Sound, station 7 of Lie (1968; cf. Banse and Hobson, 1968). One specimen.

Harney Pass, near Orcas Island, Washington, about lat 48°35.5' N, long 122°55' W, mud, 27 m, July 1967. Collected by H. L. Sanders, one specimen. Unpublished record.

West coast of Kamchatka, lat 54°00' N,

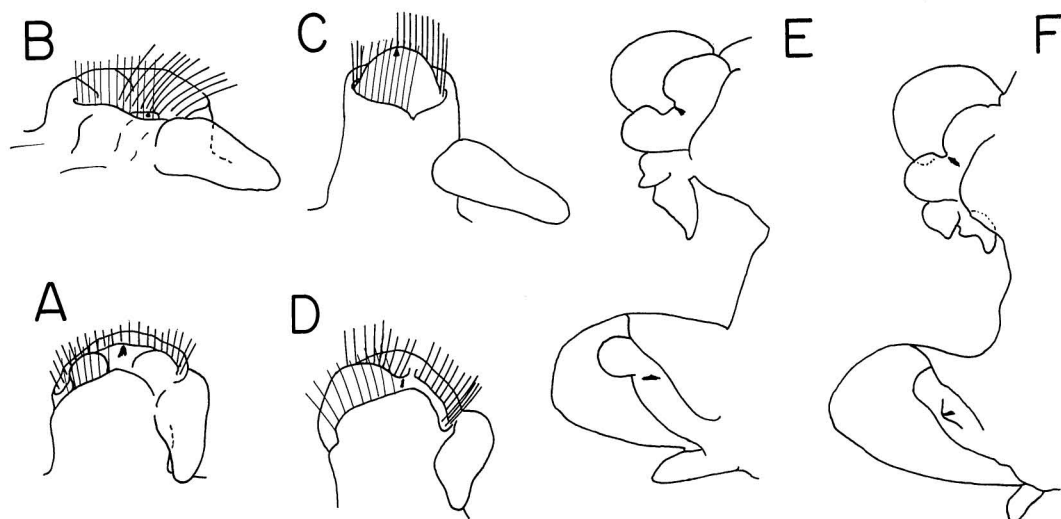


FIG. 10. *A-C*, *Nephtys assignis*. *A*, *D*, from holotype (not to scale; setae schematic, not drawn to full length). *A*, dorsal view of first notopodium of right side; *B*, ventral view of first neuropodium of left side with withdrawn acicular lobe; *C*, dorsal view of first neuropodium of right side, with extended acicular lobe. *D-F*, *Nephtys rickettsi*, from paratype (not to scale). *D*, dorsal view of first notopodium of right side (setae schematic, not drawn to full length); *E*, anterior view of 10th parapodium, setae omitted. *F*, *Nephtys discors*, from holotype. *F*, anterior view of 14th parapodium, setae omitted.

long 155°05' E, 95 m, 1954-1955. Collected and identified as *N. discors* by M. Imajima (cf. Imajima, 1961, and Pettibone, 1963). USNM 33339, one specimen.

#### *Additions to the Description*<sup>3</sup>

The acicular lobe of the notopodium of the first setiger (Fig. 10*A*) has a small lip opposite the insertion of the cirrus. The highest (most dorsal) point of the lobe is the region around the acicula. In fully extended notopodia, the shapes of the acicular lobe and presetal lip (the latter is in dorsal position in this parapodium) are almost triangular. The neuropodium is a ring formed by the fusion of the presetal and postsetal lips around the conical acicular lobe. The shape of the neuropodium varies considerably on the same specimen depending on whether the acicular lobe is withdrawn (Fig. 10*B*) or extended (Fig. 10*C*, as in most material from Puget Sound). The interramal cirri of median parapodia of specimens several centi-

meters long fill much of the space between the notopodia and neuropodia.

#### *Nephtys cornuta franciscana* Clark & Jones

*Nephtys cornuta franciscana* Clark & Jones, 1955, p. 145.—Hartman, 1968, p. 581.

#### *Material Examined*

A total of about 135 specimens (USNM 43638, more than 50 specimens; FHL 1727, 22 specimens) collected from Massacre Bay, Orcas Island, Washington, at approximately lat 48°38.0' N, long 122°59' W, were examined. They were taken from 15 m, in mud, in July 1967. The animals were collected by H. L. Sanders and identified by K. D. Hobson. This is a new record.

Also examined were 11 specimens from Harey Pass, Orcas Island, Washington, at approximately lat 48°35.5' N, long 122°55' W, taken in mud at 27 m. They were collected by H. L. Sanders in July 1967 and identified by K. D. Hobson. This is a new record.

Thirty-six specimens from West Sound, Orcas Island, Washington, at approximately lat

<sup>3</sup> Dr. K. Fauchald drew my attention to the usefulness of the parapodia of the first setiger as a diagnostic character and pointed out the differences between this species and *N. rickettsi* Hartman.

48°36' N, long 122°57' W, were studied. They were found in mud at 40 m during July 1967 by H. L. Sanders and identified by K. D. Hobson. This is a new record.

#### *Additions to the Description*

The animals studied have up to 31 setigers and are up to 7.5 mm long (fairly relaxed). A specimen with developing eggs has 26 setigers and is 5.5 mm long. The specimens are referred to the subspecies on the basis of the small size, the presence of eyes in the third setiger, and of barred preacicular setae in all segments, and the short interramal cirri. These are present from the fifth setiger. However, the preacicular setae are barred for most of their length, contrary to the description by Clark and Jones (1955, fig. 2F).

The proboscis has not been fully described for the nominate subspecies or *N. cornuta franciscana*. In this material it terminates in 18 bifurcated papillae. Approximately 22 rows of four to five papillae each are present on the distal part. In addition, there is a very slender and long unpaired middorsal papilla. Proximally, the surface of the proboscis seems to be smooth as stated also by Hartman (1968).

#### *Remarks*

The subspecies has been previously known from the type locality, San Francisco Bay.

#### *Nephtys discors* Ehlers

##### Fig. 10F

*Nephtys discors* Ehlers, 1868, p. 626.—Hartman, 1938a, p. 9; 1950, p. 96.—Pettibone, 1954, p. 270 (in part); 1963, p. 203 (in part; see for both under *N. assignis* and *N. rickettsi*).

Not *Nephtys discors* Imajima, 1961, p. 89 (see under *N. assignis*).

#### *Material Examined*

Three collections were examined: the holotype (MCZ 700) from Maine; the paratypes (MCZ 700), consisting of approximately 10 specimens, from Eastport, Maine; and one specimen (MCZ 127), presumably from Maine, which is possibly part of the type series.

#### *Additions to the Description*

The very large animal in MCZ 127 has 130 segments. As far as I can recognize it in the specimens, the first notopodium is like that of *N. rickettsi* (Fig. 10D). The acicular lobes of the neuropodia of the first setiger are all withdrawn and appear as in Fig. 10B. For the purpose of comparison with *N. rickettsi*, the 14th parapodium is shown in Fig. 10F. The neuropodial acicular lobes are rounded.

#### *Remarks*

Pettibone's (1954; 1963) geographical range for *N. discors* included the distribution of *N. rickettsi*. Also owing to changes of identification (see under *N. assignis*), the species is presently not known from the North American west coast.

#### *Nephtys rickettsi* Hartman

##### Fig. 10D, E

*Nephtys rickettsi* Hartman, 1938b, p. 153; 1950, p. 97; 1968, p. 593.

*Nephtys discors*.—Pettibone, 1954, p. 270 (in part); 1963, p. 203 (in part).

#### *Material Examined*

The holotype from Cache Bay, Alaska, USNM 20322, as well as the two specimens comprising the paratypes, from Cache Bay, Alaska, AHF Poly. 0457, was examined.

#### *Additions to the Description*

The acicular lobe of the first notopodium (Fig. 10D) has a conspicuous lip on the side opposite the insertion of the cirrus. The lip is the most distal point of the acicular lobe. The neuropodium is formed as in *N. assignis*; the acicular lobes are extended in both specimens. Characteristic for anterior parapodia (in the region of the 10th setiger) is a rounded, liplike expansion of the neuropodial acicular lobe, above the acicula (Fig. 10E). The notopodial acicular lobes are broadly and deeply incised.

#### *Remarks*

Pettibone (1954) placed *N. rickettsi* in the synonymy of *N. discors* Ehlers. From the study of the type material of the latter, I believe that, although the species are indeed very similar, *N.*

*rickettsi* is a separate species. An especially useful diagnostic character is the neuropodial supra-acicular lobe of *N. rickettsi* (Fig. 10E) which is absent in *N. discors* (cf. Fig. 10F).

#### GONIADIDAE

##### *Glycinde picta* Berkeley

Fig. 11

*Glycinde picta* Berkeley, 1927, p. 412.—Pettibone, 1967, p. 8 (synonymy).

##### Material Examined

The holotype, USNM 32870, from British Columbia, was studied.

##### Additions to the Description

The notopodial setae have not been described. They have hooked ends that appear to be smooth (Fig. 11A) in contrast to the Californian *G. polygnatha* Hartman (cf. Hartman, 1950, pl. 8, fig. 4). The ends are surmounted by open hoods with keels on the rear, and teeth on the open sides (Figs. 11A, B). The ends of the shafts of the compound setae studied in the middle region of the body are toothed (Fig. 11C). It could not be made out whether the blades of the compound setae (Fig. 11D) have more than one row of teeth.

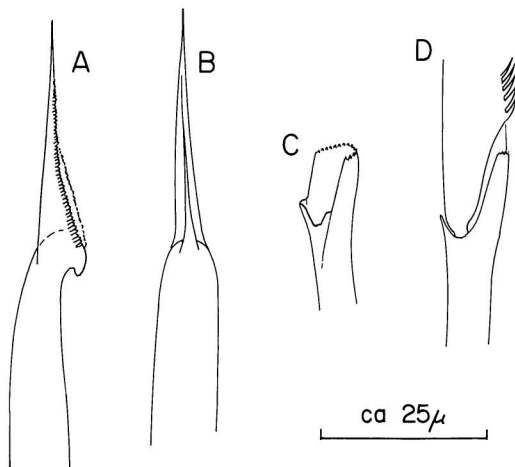


FIG. 11. *Glycinde picta*, from holotype. A-B, end of notoseta in side and rear views, the latter indicating a keel; C, end of shaft of compound seta slightly turned (blade broken out); D, detail of compound seta in side view.

#### APISTOBRANCHIDAE

##### *Apistobranchnus ornatus* Hartman

*Apistobranchnus ornatus* Hartman, 1965b, p. 144.  
—Banse and Hobson, 1968, p. 23.

##### Material Examined

The material of Banse and Hobson, 1968, p. 23 (three specimens) from Puget Sound was examined.

##### Remarks

Contrary to my statement in Banse and Hobson (1968), I find now that at least one, possibly two, of the three specimens in my collection has small ventral neuropodial lobes (cirri) on the first setiger. Hartman (1965b) suggested their absence in her key (Hartman, 1950, p. 144) but not in her text (Hartman, 1950, p. 145). In addition, I note that in the Puget Sound material the neuropodial lamellae on the fifth setiger are quite similar to those on the sixth setiger, and that interrampal cirri are present from setigers one through seven.

This species seems to be best distinguished from the other members of the genus by the notopodia which are present on all anterior segments after the first setiger and the absence of a conspicuous, multilobed ventral extension of the neuropodial lamella on the fourth setiger (refer also to the remark below on the Pacific record of *A. tullbergi* by Ushakov).

##### *Apistobranchnus tullbergi* (Théel)?

*Aricia tullbergi* Théel, 1879, p. 45.  
*Apistobranchnus tullbergi*.—Orrhage, 1962, p. 436.—Pettibone, 1963, p. 295 (in part).

##### Material Examined

One specimen collected in the Strait of Juan de Fuca, lat 48°13.2' N, long 123°57' W, at 153 m, in gravel with mud (grab sample), was examined. The animal was collected by K. D. Hobson.

Eight fragments (three in USNM 40713) from Harney Pass, Orcas Island, Washington, at approximately lat 48°35.5' N, long 122°55' W, were also studied. They were collected by H. L. Sanders from 27 m, on mud, during July 1967.

*Description*

Because of uncertainties in the identification of the species, an extended description is given. The anterior fragments have up to 35 setigers and are up to 0.8 to 0.9 mm wide.

Six of the specimens which could be closely studied have interramal cirri on setigers one to six, and notopodia from setigers two to six. Notopodia are again present in one of these specimens from setiger 11, in one from either setiger 11 or 12, and in four animals from setiger 12; this variability is not size-dependent. Small ventral cirri, i.e., ventral lobes of the neuropodial lamellae (Orrhage, 1962), are present from the first setiger as shown by Hartman (1965*b*, pl. 27, fig. *a*) for *A. typicus* (Webster & Benedict). The neuropodial ventral lamellae on the fourth setiger are usually drawn out into three lobes and the ones on the seventh setiger into at least four lobes in the larger animals.

The setae on the first seven setigers are arranged in a bushy fashion; their number on the seventh setiger is small. From the next segment, they insert more laterally; the neuropodia are nearly cylindrical. From the 12th setiger, a few digitate papillae insert ventrally on the parapodia. By approximately the 30th setiger, the papillae usually are reduced to one per foot so that the parapodia resemble the posterior feet of *A. typicus* Hartman (cf. Hartman, 1965*b*, pl. 27, fig. *g*).

*Remarks*

The identification of the new material as *A. tullbergi* is somewhat doubtful because of the observations by Orrhage (1962) on the size-dependence of the number of notopodia in a very rich North European collection. In 99.5 percent of his specimens that had two or more lobes in the neuropodial lamellae of the seventh setiger, notopodia were present on this setiger. This is clearly not the case here. Likewise, one would not expect from Orrhage's observations that animals with four or more lobes in the lamellae of the seventh setiger would possess four or five intermediate segments without notopodia, as is the case here. The present material is clearly distinct from *A. ornatus* reported by Banse and Hobson (1968) from Puget Sound. These are about twice as wide as the present

animals but have on their fourth setigers neuropodial ventral lamellae like those on the preceding segments (or, as in one foot of one animal out of three in my collection, a bilobed structure).

*A. tullbergi* is not yet known from the northeastern Pacific Ocean. Previously it has been recorded from the North Atlantic Ocean, and possibly from the northwestern Pacific Ocean (cf. Ushakov, 1958). Although Ushakov identified his material as *A. tullbergi*, it is noteworthy that his drawing (Ushakov, 1958, p. 88, fig. 6*A*) does not show a digitate neuropodial lobe on the fourth setiger. This suggests *A. ornatus*.

## SPIONIDAE

*Polydora* Bosc

*Polydora* Bosc, 1802, p. 150.—Hartman, 1959, p. 383 (synonymy).

*Neopygospio* Berkeley & Berkeley, 1954, p. 462.

*Remark*

*Neopygospio laminiifera* Berkeley & Berkeley, of the monotypic genus *Neopygospio*, is shown below to be a species of the subgenus *Pseudopolydora* Czerniavsky (cf. Hartman, 1959, p. 387 for synonymy) of *Polydora*.

*Polydora (Pseudopolydora) kempji japonica*  
Imajima & Hartman

*Polydora (Carazzia) kempji* var. Okuda, 1937, p. 233.

*Neopygospio laminiifera* Berkeley & Berkeley, 1954, p. 462.—Hartman, 1961, p. 380.—Pettibone, 1967, p. 11.

*Pseudopolydora kempji japonica* Imajima & Hartman, 1964, p. 287.

*Material Examined*

I examined the holotype (USNM 32715) of *Neopygospio laminiifera* from British Columbia. Paratypes, three specimens (USNM 32716) from the same locality, were also studied. This is a new record.

Four specimens from a much larger sample from False Bay, San Juan Island, Washington, were examined. They were collected by F. H. Nichols on 12 August 1968 from the lower intertidal region in sand. This is a new record.

## Remarks

Imajima and Hartman (1964) have elevated the variety of Okuda (1937) to a subspecies. Well-preserved specimens from False Bay agree with the description by Okuda except that the number of branchiae is often only about 15 pairs instead of 18 to 21. Also, contrary to Okuda who stated that notosetae on the first setiger are absent but neurosetae are present, I find that the opposite holds for this material. The caruncle seems to reach to the end of the third setiger, rather than into the fourth. The anterior borders of the second to fifth or sixth setigers have lateral stripes of pigment like *P. kempfi californica* Light (1969).

The subspecies is well distinguished from *P. kempfi californica* by the presence of an occipital tentacle, the greater number of neuropodial hooks in median segments, and the shape of the pygidium.

The type series of *Neopygospio laminifera* was checked and found to be this species. On the fifth setiger, the lower notosetae are arranged in the form of a horseshoe. Mr. F. H. Nichols has pointed out to me that the drawing of the pygidial plate by Berkeley and Berkeley (1954, p. 453, fig. 7) is incomplete by omitting the single little cirri on the sides of the dorsal gap of the pygidial plate (cf. Okuda, 1937, fig. 13c).

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