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The Sabellariidae of Japan[1)]

By

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(*With 11 Text-figures*)

The Japanese Sabellariidae have hitherto been represented only by the two species, *Lygdamis nesiotes* and *Idanthyrsus pennatus*. The former was recorded by Johansson (1922) from the Bonin Islands and the latter by the same author (1927) from the same locality and again by Fauvel (1936) from Tanabe Bay. In the present account there are described four more species, of which one seems to be new to science.

Excepting *Idanthyrsus pennatus*, which is widely distributed in the Indo-Pacific region, the remaining species herein treated are important forms on account of their rather rare occurrence and doubtful affinities to other species. The occurrence in northern Japanese waters of *Idanthyrsus armatus*, hitherto found only off the Pacific and Atlantic coasts of South Amercia, seems to be worthy of note because of the discontinuous distribution. Though closely allied to *Lygdamis indicus*, *Lygdamis giardi* seems to be a valid species in having the first achaetous segment. *Sabellaria Ishikawai* n. sp. is also a remarkable form in lacking any bristles on the second segment. Most of the specimens were collected by dredging, but the new species forming a fragile sandy tube was obtained from a sandy beach.

A list of the Japanese Sabellariidae will be given here, with their localities and distribution appended.

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1) Contribution No. 133 from the Zoological Institute, Faculty of Science, Hokkaido Imperial University, Sapporo, Japan.

Species	New locality	Former known locality	General distribution
Lygdamis giardi (McINTOSH)	Osaka Bay		South Australia; Molucca
*Lygdamis nesiotes** (CHAMBERLIN)		The Bonin Islands	Marshall and Gilbert Islands; Philippines
Idanthyrsus armatus KINBERG	Akkeshi		Southern and western coasts of America; California?
Idanthyrsus pennatus (PETERS)	Shimoda	The Bonin Islands; Tanabé Bay	Marshall Islands; Indian Ocean; Pacific and Atlantic
Sabellaria cementarium MOORE	Akkeshi; Muroran and Furubira		Pacific coasts of America from Alaska to California
Sabellaria Ishikawai nov. sp.	Omuda		

I wish to extend here my hearty thanks to Prof. Tohru Uchida for his kind guidance and also to Dr. D. Miyadi, the late Mr. S. Takahashi, Mr. K. Kato, Mr. H. Ishikawa and Mr. T. Kinoshita for their kindness in placing the material at my disposal.

Description of the species

Key to genera found in Japan

1. Four parathoracic segments ..... *Lygdamis*
   Three parathoracic segments 2
2. Opercular paleae in two rows ..... *Idanthyrsus*
   Opercular paleae in three rows ..... *Sabellaria*

Genus *Lygdamis* KINBERG, 1867

Opercular peduncle elongate. Two concentric rows of paleae. Dorsal hooks. A pair of grooved palpi. Numerous filiform tentacles on the ventral face of the peduncle. Four biramous parathoracic segments with paddle-shaped setae. Falciform dorsal branchiae. In

* indicates the species not included in the present collection.

the abdomen broad dorsal rami with small uncini and ventral setae. A smooth, achaetous caudal lobe.

Outer paleae straight, tapering to a sharp apex. No bristles on the first segment ..... *L. giardi*
Outer paleae bent at the end. Hair bristles on the first segment .... *L. nesiotes*

Lygdamis giardi (McINTOSH)

(Figs. 1-3)

Sabellaria (*Pallasia*) *giardi*: McINTOSH, 1885, p. 421, pl. 47, fig. 7; pl. 26 A, figs. 13–15.
Eupallasia giardi: AUGENER, 1927, p. 236, text-fig. 14.

A fair number of specimens were examined. The largest specimen measures 60 mm and the smallest one 22 mm by 2.7 mm. The caudal lobe is approximately equal in length to the last 13–15 abdominal segments. The opercular peduncle is elongate, bearing two concentric rows of paleae. These paleae arise from the obliquely truncated plane which slopes downward along the dorsal surface from the ventral top. On either side of the peduncle the paleae in the inner row range in number between 16 and 19, and those in the outer row between 37 and 55. The paleae of the outer row are smooth, straight and tapering to a sharp apex, but are not curved near the end as seen in the allied species, *Lygdamis nesiotes*. The paleae of the inner row are also straight, smooth, ending in a bluntly conical apex, and broader and stouter than those of the outer row. Below the outer row of the paleae there occurs a series of 25–30 subulate papillae on each opercular lobe. Of these the last papilla bears a somewhat conspicuous cirrus at the outer base of the dorsal nuchal hook. The

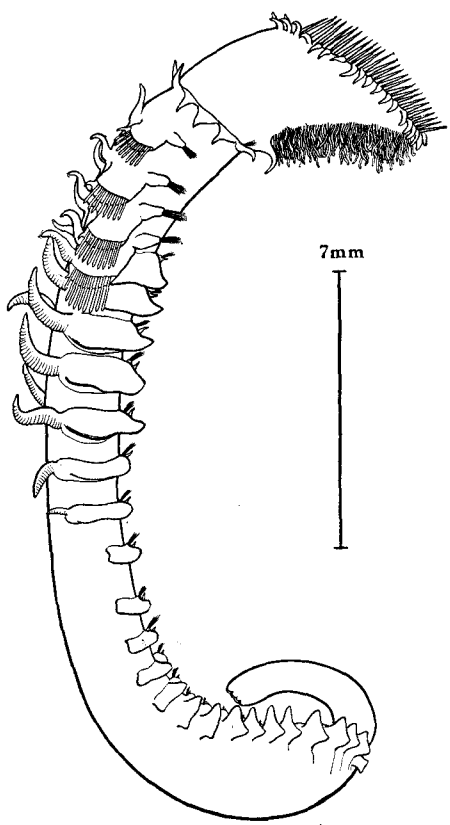

Fig. 1. *Lygdamis giardi* McINTOSH. Entire body.

palpi are thick, strongly grooved and undulated along their lateral margin. On the undersurface of the opercular peduncle numerous filiform tentacles are arranged in transverse rows. The lower margin of the mouth is surmounted by a cushion-like lobe. To either side of the mouth there occurs a well developed, broad, elongate lobe, and from the lateral side of this arises a slender conical cirrus. As already mentioned by McIntosh (1885) and Augener (1927) there is found no seta at the external base of the slender conical lobes as usually found in the allied species. The absence of the setae on the first segment seems to be the most remarkable characteristic of this species. On the dorso-posterior limit of the row of the outer paleae there is a pair of stout dark brown hooks which are strongly bent at the apex. The second segment carries a fascicle of slender, spinous neuropodial setae arising from the basal portion of the ventral cirrus. On each dorso-lateral margin of the segment there occur three elongate triangular lappets adjoining to one another, and cirriform, rather

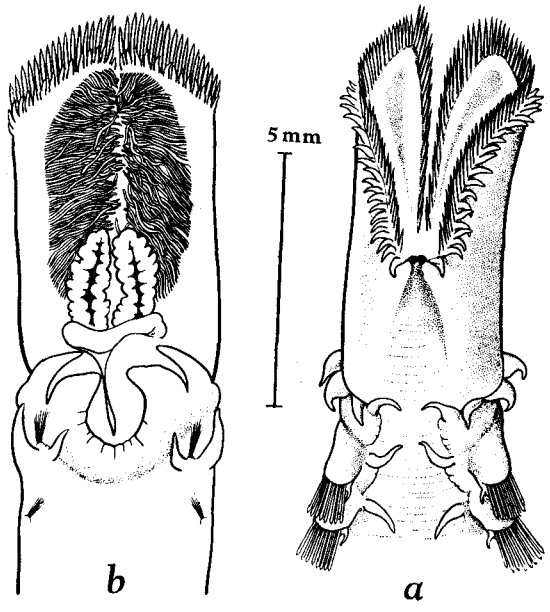

Fig. 2. *Lygdamis giardi* McINTOSH. *a*, Anterior end, dorsal view; *b*, The same, ventral view.

slender, smooth branchiae arise from the upper position of the dorsalmost lappets. These lateral lappets are largely expanded in the basal portion ending in short papillae-like processes. Segments III–VI comprise the so-called parathoracic segments. Each of these segments has well-developed flattened and square dorsal rami with 8–10 stout paddle-shaped bristles and the same number of slender spinous setae. As shown in the figure (Fig. 3, h) the dorsal rami

of the parathoracic segments bear rather stout nail-like cirri projecting from the dorso-posterior border of the flap-like postsetal lobe. These peculiar cirriform processes found in the parathoracic segments seem to be synonymous

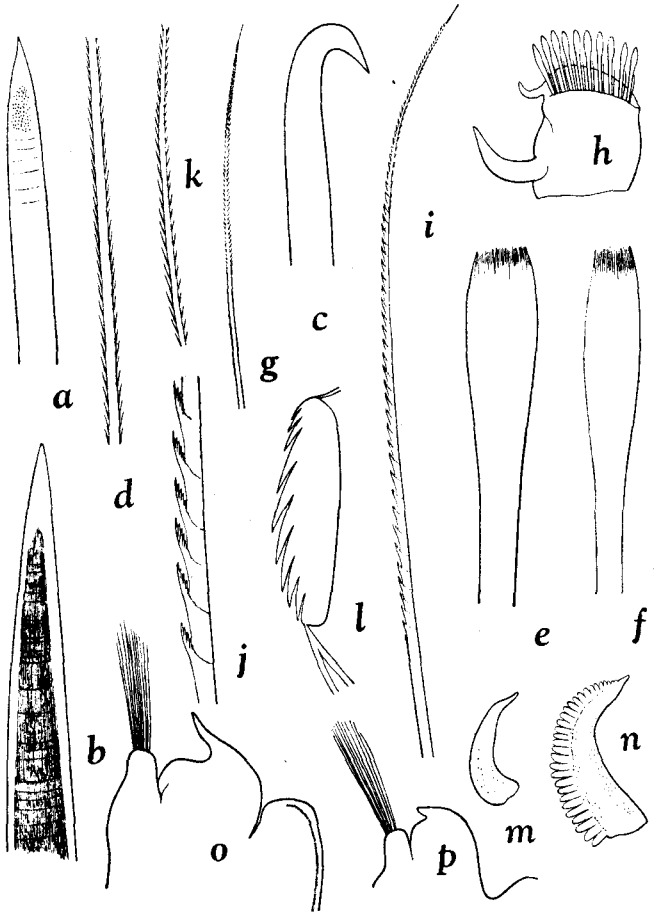

Fig. 3. *Lygdamis giardi* McINTOSH. *a*, Outer opercular palea. ×40; *b*, Inner opercular palea. ×40; *c*, Dorsal nuchal hook. ×10; *d*, Bipinnate seta from the first segment. ×230; *e*, Dorsal parathoracic seta. ×50; *f*, Ventral parathoracic seta. ×120; *g*, Spinous seta accompanying with parathoracic seta; *h*, Parapodium from the second parathoracic segment; *i*, Abdominal seta. ×90; *j*, The same, enlarged portion. ×230; *k*, Abdominal seta. ×230; *l*, Abdominal uncinus. ×230; *m*, Branchia from the fourth segment. ×4; *n*, The same from the third abdominal segment. ×6; *o*, Parapodium from the second abdominal segment. ×10; *p*, The same from the twelfth abdominal segment. ×10.

with those described by Allen for *Pallasia murata* as the 'secondary lobe or cirrus attached to the posterior angle' of the dorsal surface of the notopodial process and also by Fauvel for *Lygdamis indicus* as 'a small dorso-posterior conical lobe' on the parathoracic segment. Neither McIntosh nor Augener alluded to the occurrence of this cirriform appendage on the dorsal postsetal lobe. From the upper basal portion of the dorsal rami arise rather smooth and short branchiae. The slender papillae-like ventral rami are devoid of any cirri. The neuropodial setae are similar in form to those of the notopodial ones, but the former are much more slender and about 3.5 times narrower than the latter. The number of the neuropodial setae is small; about 5–6 in a single ramus.

The 7 anterior abdominal segments bear broad, expanded flap-like dorsal rami, which gradually become small and elongate backwards. On the edge of the dorsal rami are found numerous comb-like uncini with 8–9 teeth in profile. The ventral rami are short, papillae-shaped, bearing well-developed cirri with a broad, expanded base and a slender conical end. The neuropodial setae are divided into two groups by form: one, of delicate slender spinous setae and the other, of thicker, stouter ones as shown in figure 3, j. Abdominal segments 27 or 28 in number. The first five pairs of branchiae situated from the second to the sixth segments (last parathoracic segment) are almost colourless, smooth, rather short, slender and devoid of any marked pectinated frill, while those in the abdomen, deep dark olive brown in colour, are well developed, stout and thick, with the lateral margin subdivided into a number of comb-plates. The branchiae extend as far as the 7th or 8th abdominal segment, and rarely to the 9th segment, but entirely disappear in the posterior 20 or more segments. The shape and the small number of branchiae are marked characteristics of the species. The caudal lobe is smooth. The anus is terminal and bordered with several crenate lobes. The tube is cemented with coarse sand grains and shell fragments.

Collected by Dr. D. Miyadi from various stations by dredging at the depth of 39.3 mm, 43.9 mm, 45.7 m, 64 m, 84.1 m, and 91.4 m. near the mouth of Osaka Bay toward the Kii Channel.

Remarks: The present species was first described by McIntosh (1885) from off Port Jackson, Sydney and afterwards redescribed by Augener from South Australia. Augener separating the species from the genus *Pallasia* (= *Lygdamis*) erected a new genus *Eupallasia*. According to him the species is marked by the shape of the opercular peduncle and by having an achaetous first segment, though he was more or less doubtful of the validity of the last characteristic. Since I can not, however, endorse his view in considering that these characteristics may be sufficient to elevate that species to generic rank, it has been attributed to the present genus. The present species may be distinguishable from other species belonging to the genus by the following points: 1, the absence of setae in the first segment; 2,

the presence of well-developed papillae over the dorsal nuchal hook; 3, small number of dorsal branchiae and the marked morphological difference of branchiae between the thoracic and the abdominal regions; 4, the occurrence of the cirriform appendages on the post-setal lobe of the dorsal rami on the parathoracic segments. Of these characters the first two were originally enumerated by McIntosh, but the remaining two have not yet been pointed out by any previous authors. The present Japanese specimens agree closely with McIntosh's description but are only different in the number of papillae under the outer paleae. Though the present species closely resembles the allied species such as *Lygdamis indicus, Lygdamis murata, L. ehlersi, L. nesiotes* etc., it may, however, be easily separated from them in lacking setae on the first segment.

Lygdamis nesiotes (CHAMBERLIN)

Tetreres nesiotes: CHAMBERLIN, 1919, p. 490, pl. 75, figs. 1–7.
Tetreres treadwelli: HOAGLAND, 1920, p. 627, pl. 72, figs. 14–23.
Tetreres curvata: JOHANSSON, 1922, p. 2, pl. 2, figs. 1–8.
Lygdamis nesiotes: JOHANSSON, 1927, p. 84.

As there was no opportunity for me to examine the present species recorded from the Bonin Islands by Johansson (1922), the following account from Johansson's description of the Japanese specimens is given.

The opercular paleae of the outer row are distinctly curved near the end to the right resp. left hand, while those of the inner row are non-denticulate, straight and much thicker (according to Chamberlin the outer paleae number 25–32 and inner ones 12–16). On the dorsal sides there are two large hooks. The branchial filaments ("tentacles" in the present paper) are arranged in about 10 rows on each side. The palpi, well developed, reach the end of the prostomial lobe. On each side of the hindermost part of the lower lip there are two papillae, the outer of which forms a triangular flap. On the lateral side of the flap is found a bundle of hair-bristles. At the base of the operculer parapodia there is a lateral fold, the edge of which forms three papillae. In front of the first papila there is a bundle of hair-bristles distinctly fringed. Four parathoracic segments. The dorsal parapodia are flat, fin-shaped, and at the edge have oar-blade shaped bristles, which are split or fringed at the end. The ventral parapodia, papilla-shaped, bear a few bristles, which are of the same type as those in the dorsal parapodia but smaller than them. No ventral cirri.

The dorsal parapodia of the abdomen are broad and fin-shaped, bearing numerous comb-like bristles with 6–8 teeth. The ventral parapodia are papilla-shaped like those in the thorax but smaller than them. They are furnished with 2–3 tiny and 3–4 thicker hair-bristles; all of them bear teeth directed

towards the tip. The dorsal cirri are found on the 21 foremost segments. A single specimen examined by Johansson measured 28 mm (without caudal part) by 5 mm across the 3rd segment.

Remarks: The species was first described by Chamberlin (1919) from the Southern Pacific, and later by Johansson (1922) from Japan and Kopepe Bay as a new form, *Tetreres culvata*. Afterwards Johansson (1927) referred it to the present species, which concurs with the present writer's opinion. From the descriptions and figures of the two investigators the species seems to be most closely allied to *Lygdamis indicus*. It appears to the writer that the present species is a mere variety of *L. indicus*, because this is only distinguished by the slight difference of the shape of the outer paleae. *Lygdamis giardi* is also related to the present species as mentioned above, but differs in the shape of the outer paleae, in the absence of setae on the first segment and in the dorsal branchiae. *Tetreres treadwelli* described by Hoagland from the Philippines may also be synonymous with the species as supposed by Johansson.

Genus *Idanthyrsus* KINBERG, 1867

Opercular peduncle elongate, more or less separate, each bearing two rows of golden paleae. A pair of palpi and a median tentacle. Dorsal nuchal hooks present. Numerous filiform tentacles on the ventral side of the opercular peduncles. Three biramous parathoracic segments with paddle-shaped setae. Dorsal falciform branchiae. First and second segments each with a bundle of capillary setae. Dorsal abdominal ramus carrying small uncini and ventral capillary setae. A smooth achaetous caudal lobe.

Outer paleae palm-leaf shaped, bent at the tip ..... *I. pennatus*
Outer paleae stouter, straight with a small number of coarse lateral spines ..... *I. armatus*

Idanthyrsus armatus KINBERG

(Figs. 4-5)

Pallasia sexungula: EHLERS, 1897, p. 125, pl. 8, figs. 194–202.
Pallasia armatus: EHLERS, 1901, p. 195.
Idanthyrsus ornamentatus: CHAMBERLIN, 1919, p. 262, pl. 3, figs. 2–5.
Idanthyrsus armatus: JOHANSSON, 1927, p. 90; MONRO, 1930, p. 117, fig. 73; 1936, p. 172.

Six specimens were examined, of which the largest one measures 22 mm by 4.3 mm for the caudal lobe of 6 mm, and the smallest one 12 mm by 3 mm for the caudal lobe of 4 mm. The opercular peduncle is semi-cylindrical and divergent anteriorly. It bears two rows of paleae, one inner and one outer. The paleae of the inner row number 10–11 in large specimens, but 7–8 in small ones while those of the outer row 25–26 in the large and 18–20 in the small forms. The paleae of the inner row are smooth, rather stout, tapering gradually to an acute apex gently curved. They are marked with fine irregular cross-striations and a median longitudinal marrow with a few straight cross bands. The paleae of the outer row are strong and straight with coarse, rather sparsely borne lateral spines. In general there are 13–15 lateral spines. The basal stem of the paleae is traversed by wavy striations. In the outer characteristic paleae the species may be well distinguished from the allied species, *I. pennatus*, in which the outer opercular paleae are finely plumose and curved terminally. Below the outer row of the paleae there are 9–13 rather short conical papillae on each opercular peduncle. The last posterior papillae form conspicuous well-developed cirri over the dorsal nuchal hook as shown in *Lygdamis giardi*. The palpi are club-shaped and folded. A median straight tentacle occurs between the dorsal portion of the palpi. The filiform tentacles are arranged on the ventral surface of the opercular peduncle in about 8–9 transverse rows. At the upper end of the series of the paleae there are two pairs of strongly bent nuchal hooks with cross striations. The lower lip of the mouth is crenate. On each side of the mouth there is a pair of blunt conical lobes and a triangular cirrus tapering to a subulate tip. At the lateral base of the cirrus is seen a fascicle of rather long bipinnate setae, about 14 in number. On each dorso-lateral side of the second segment three conspicuous cirriform lobes occur. At the bases of the ventral-most cirri there occurs a tuft of about 10 bipinnate setae similar in form to those of the first segment. There are three parathoracic segments which have flattened, broad dorsal rami with a transverse row of 8–9 paddle-shaped setae ending in a brush-like apex, being accompanied by slender spinous setae, and the ventral rami with 10–11 finely bipinnte setae. No ventral cirri.

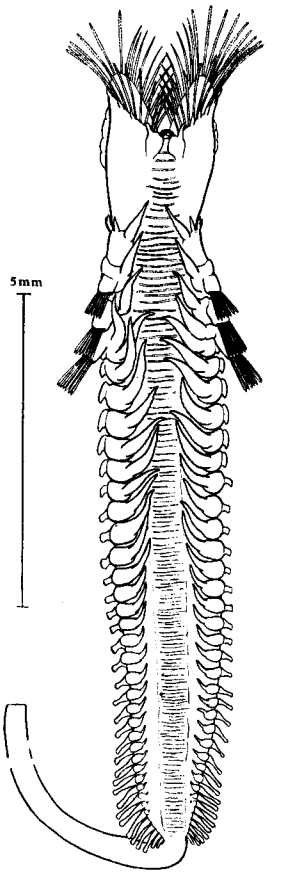

Fig. 4. *Inanthyrsus armatus* KINBERG. Entire body.

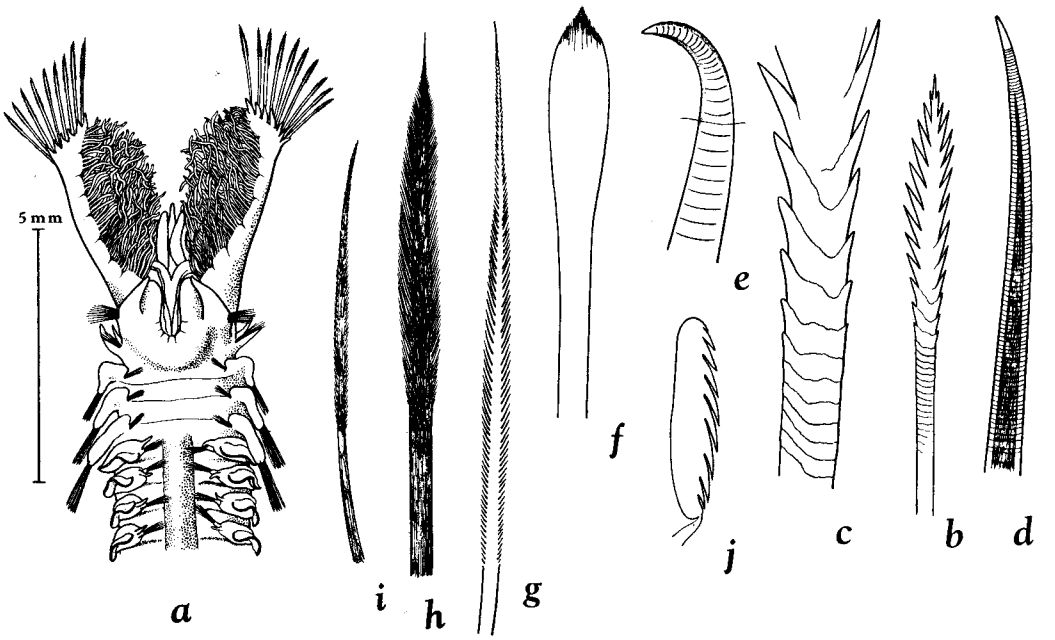

Fig. 5. *Idanthyrsus armatus* KINBERG. *a*, Anterior end, ventral view; *b*, Outer opercular palea. ×40; *c*, The same, enlarged. ×80; *d*, Inner opercular palea; *e*, Dorsal nuchal hook. ×30; *f*, Dorsal parathoracic seta. ×60; *g*, Bipinnate seta from the first segment. ×80; *h*, Ventral parathoracic seta. ×140; *i*, Spinous seta accompanying with parathoracic setae. ×140; *j*, Abdominal uncinus. ×230.

In the abdominal region the dorsal rami are at first broadly flattened, pinnule-like and then they gradually decrease backwards in size to an elongate process. The pectinate uncini of the dorsal rami bear 8–9 teeth in profile. The ventral rami are small pointed papillae bearing a bundle of long barbed capillary setae. Above the rami are found small finger-shaped ventral cirri, of which the first one is longest. The dorsal branchiae, which are well-developed between the 5th and 8th segments, disappear in the last 3–5 abdominal segments. There are 38–43 body segments. The caudal lobe is smooth and achaetous. The anterior body is dark violet with transverse white bands. The opercular paleae are golden yellow, the branchiae green with red blood supply. The tube which is composed of coarse sand grains neatly cemented together, was found attached to the shell of a soft-clam, *Mya* sp.

Collected by dredging at Akkeshi, Hokkaido.

Remarks: The present species is most nearly related to *Idanthyrsus pennatus*, which is different from the present species in the

shape of the opercular paleae. As mentioned above the outer paleae of the species are straight, bearing lateral spines branched rather coarsely and sparsely. Johansson also pointed out that "die gebogenen Zähne der Borste" of the species is "viel leichter und breitzipfelig als bei *pennata*". The present specimens collected from Northern Japan exactly accord with Chamberlin's descriptions and figures given for *Idanthyrsus ornamentatus* obtained from the coast of California. According to him the species, *ornamentatus,* is easily distinguishable from the present species in the form of the parathoracic notopodial setae, but as far as judged from his descriptions and figures, there can be found no essential differences between the two species. Chamberlin's species measuring about 50 mm is as follows. The outer paleae number 36, and the inner ones 11–12. Two pairs of nuchal hooks. The opercular paleae is quite similar in shape to those of Japanese specimens and also to the figures given by Johansson and Monro. The species described by Ehlers has a less number of opercular paleae, the outer ones being 18 and the inner 10, only 5–8 dorsal parathoracic setae, abdominal uncini with 6 teeth, and three pairs of dorsal nuchal hooks. The Japanese polychaetes are the smallest in size among specimens hitherto recorded; only 12–22 mm instead of 40–50 mm. According to Monro the species is very common in the Falkland Island area and appears to extend to the west coast of North America.

Idanthyrsus pennatus (PETERS)

(Figs. 6-7)

Pallasia pennata: WILLEY, 1905, p. 296, pl. 8, figs. 1–2; FAUVEL, 1936, p. 79.
Sabellaria (Pallasia) pennata: AUGENER, 1914, p. 79.

As the species is described in detail by former authors, here only a brief account on Japanese specimens will be given.

The body measures 30–60 mm in length. The outer paleae of opercular peduncle are variable from 19 to 32 in number and those of the inner paleae from 15 to 18. The outer paleae are curved and strongly serrated, while the inner paleae are smooth and more slender than the outer ones. Of eight specimens examined by me six specimens bear a pair of dorsal nuchal hooks and the other are provided with two hooks on the right side and one on the left. Under the outer row of the paleae there occur 10–15 subulate conical papillae on either opercular peduncle. Of these the last papillae are well developed and are placed just outside the dorsal hooks as stated by Willey. The second

segment bears branchiae, two pointed triangular lappets and a few slender setae. Three parathoracic segments. No ventral cirri. The dorsal rami bear wide spatulate setae with lacinate tips, while the ventral rami with the similar setae, which are narrower and smaller than the dorsal ones. In both the dorsal and ventral fascicles the spatulate setae are accompanied by slender limbate setae. In the abdominal region the 7th and 8th neuropodial fascicles are well developed, bearing setae with the fimbriate, slender teeth which are more markedly elongaetd than those of the remaining fascicles (Fig. 7, g). The dorsal uncini bear 8 teeth. The branchiae are best developed between the 7th and 17th segments. Several caudal segments are abranchiate. Abdominal segments

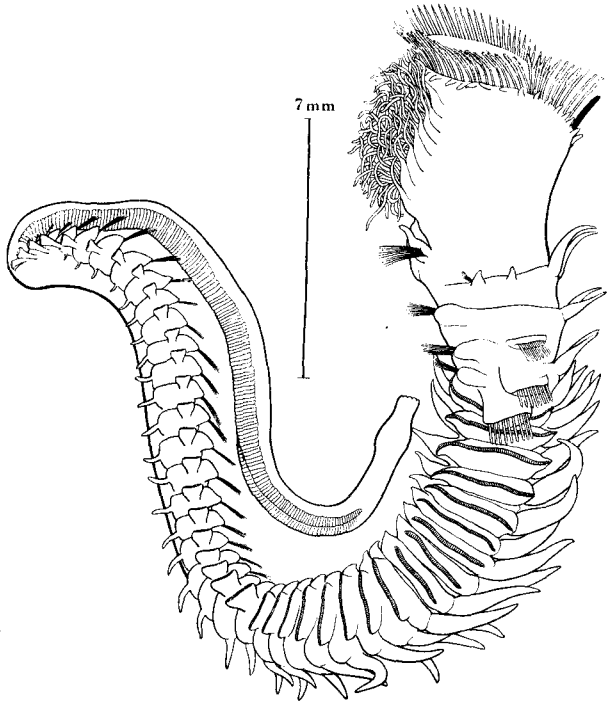

Fig. 6. *Idanthyrsus pennatus* (PETERS). Entire body.

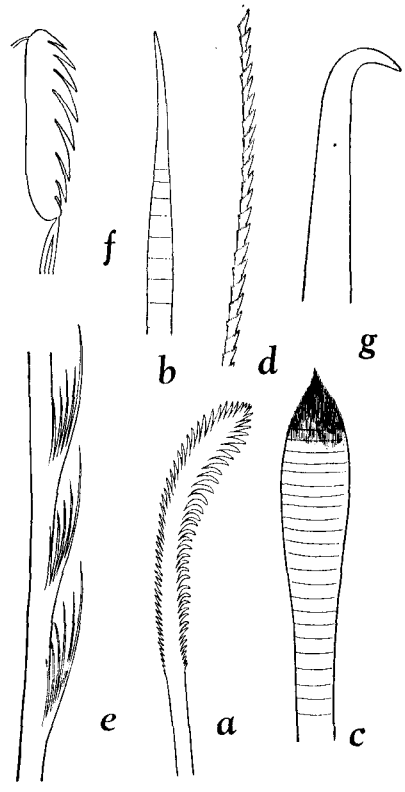

Fig. 7. *Idanthyrsus pennatus* (PETERS). *a*, Outer opercular palea. ×30; *b*, The tip of inner opercular palea. ×6; *c*, Dorsal parathoracic seta. ×60; *d*, Abdominal ventral seta; *e*, The same from the 8th segment. ×170; *f*, Abdominal uncinus. ×170; *g*, Dorsal nuchal hook. ×6.

40–50. The caudal lobe is remarkably long, about half the body length, with dark ventral surface which is limbate along the outer margin.

Collected by the late Mr. Takahashi from the Bonin Islands and by Mr. K. Kato from Shimoda.

Remarks: The species was formerly recorded by Fauvel (1936) from Tanabe Bay. As already mentioned above, the species is closely allied to *Idanthyrsus armatus*, but differs in the form of the outer opercular paleae.

Genus *Sabellaria* LAMARK, 1812

Opercular peduncles more or less fused. Three concentric rows of golden paleae. No dorsal hooks. Two small elongate palpi. Numerous filiform tentacles on the ventral edge of the peduncles. Three biramous parathoracic segments with oar-shaped setae. Dorsal falciform branchiae. In the abdominal region broad dorsal rami with pectinate uncini and ventral capillary setae. Caudal lobe smooth, achaetous.

Inner paleae spoon-shaped, deeply hollowed and less elongate than middle paleae ..... *S. cementarium*
Inner paleae more elongate than middle paleae. No bristles on second segment ..... *S. Ishikawai*

Sabellaria cementarium MOORE

(Figs. 8-9)

Sabellaria cementarium: MOORE, 1906, p. 248, pl. XII, figs. 45–51; TREADWELL, 1914, p. 227; BERKELEY, 1930, p.

A fair number of specimens were examined. The largest specimen measures 54 mm by 7 mm, with caudal lobe, 14 mm and the smallest one 18 mm by 3 mm, with caudal lobe, 3.5 mm. The opercular peduncles are well developed, sloping downwards. The distal end of the opercular lobe is provided with three concentric rows of paleae. On either side of the peduncle the outer paleae are variable in number from 12 to 32, the middle ones from 2 to 12 and the inner ones from 2–13. These paleae vary in number to a great extent according to the size of the worm, e.g., the smallest specimen measuring 18 mm bears only 12 outer, 2 middle and 2 inner paleae on each opercular peduncle. The outer paleae have each a broad paddle-shaped tip fringed with 8–9 blunt spines and a central minutely haired process. This median process of the outer paleae is not smooth as mentioned by Fauvel for the Indian specimens, but is fringed with fine, dense, short hair as in Moore's original description. Near the basal portion of the broad spatulate blade it is twisted as shown in the

accompanying figure (fig. 9, b). The surface of the blade is roughened on account of the presence of numerous fine wavy parallel ridges and the lateral margin bears fine serrations caused by these markings. The middle paleae each bears a slender shaft tapering to an upright spine gently curved. Near the convex distal margin of the apex there occur a few coarse serrations unrecorded. Coarse transverse striae also occur on the surface. The inner paleae are spoon-shaped, each hollowed to a blunt rounded tip. As previously noted by Monro the shape of the inner paleae is characteristic of the species. Just exterior to the outer row of the paleae is found a circle of conical papillae which number 11–12 on either peduncle. A pair of rather slender palpi. The lower lip of the mouth is lobed, cushion-like. Outside of the mouth on each side occurs a pair of well developed, club-shaped lobes. Adjacent to this lobe lies outwardly a pointed conical cirrus and from the outer base of that cirrus arises a small tubercle carrying a tuft of slender setae. The numerous filiform tentacles are arranged in 10–19 transverse rows. The second segment bears three, rarely two, conical cirri on the dorso-lateral border, of which the ventral-most cirrus carries the spinous setae-tuft. The first pair of the branchiae occurs just the dorsal-most cirrus. There are three para-thoracic segments. These segments bear well-developed flattened and square dorsal rami, from the outer edge of which stout 7–13 oar-bladed setae project somewhat bulged in the middle. The ventral neuropodial tori are tongue-like and provided with long, broad and sparsely spinous setae and short, slender, densely spinous ones.

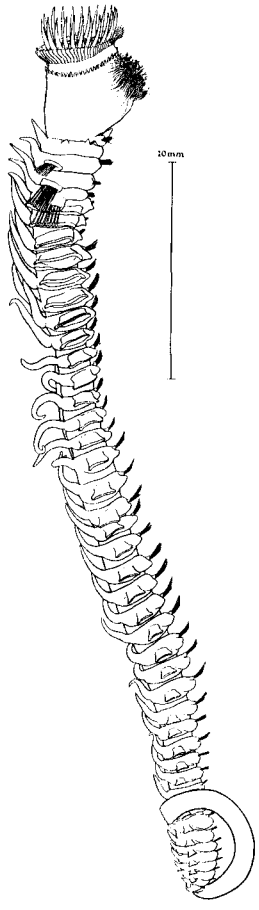

Fig. 8. *Sabellaria cementarium* MOORE. Entire body.

The dorsal rami of the abdominal segments are at first broadly elongate, but gradually become narrow and erected posteriorly. The ventral cirri are set just dorsal to the ventral rami. They are at first cirriform in shape, but are bluntly cone-shaped backwards. The uncini bear 7–8 teeth in profile, which are arranged in double rows in frontal view. The setae of the ventral rami are well developed, with a whorl of the spines. The intervening plate between the dorsal and ventral rami become gradually broad and thick posteriorly. The abdominal segments vary in number between 32 and 45. The branchiae are most developed in the first 5–6 abdominal segments, gradually decrease in size

and finally disappear from the last 2–4 segments. The buccal region is dark violet, especially densely pigmented in the lateral portion of the peduncles. In the abdominal region the dorsal terminal portion of the notopodial rami is studded with round spots as often shown in *Potamilla*.

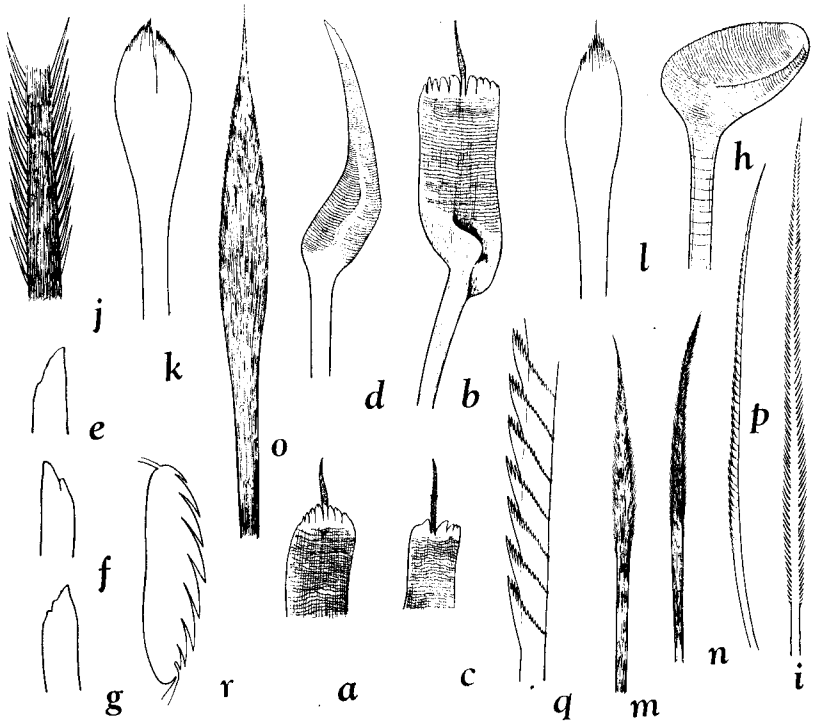

Fig. 9. *Sabellaria cementarium* MOORE. *a*, Tip of outer opercular palea from the largest specimen. ×10; *b*, Outer opercular palea from the median sized specimen. ×10; *c*, Tip of the same from the smallest specimen. ×10; *d*, Middle opercular palea. ×10; *e–g*, Various tips of the same, showing different types of serration. ×30; *h*, Inner opercular palea. ×8; *i*, Bipinnate seta from the first segment. ×80; *j*, The same, enlarged portion; *k*, Dorsal parathoracic seta. ×50; *l*, The same. ×50; *m–o*, Ventral parathoracic setae. ×90; *p*, Ventral abdominal seta. ×50; *q*, The same. 170; *r*, Abdominal uncinus. ×170.

Collected in Akkeshi (17 m); Muroran and Furubira (4–5 m). They form a colonial mass of tubes consisted of coarse sand grains cemented together. The species seems to be found in rather shallow water. Berkeley recorded the species from 10–15 fms, Treadwell from 5–30 fms and Moore from 16–41 fms.

Remarks: The present Japanese specimen exactly agrees with Moore's original description and figures. The species was first reported by Moore from Alaska and Washington. After that the species has been known by several American authors to occur rather commonly along the coasts of the western Pacific from California northwards to Alaska. The present species is most remarkable in the shape of the inner opercular paleae as already pointed out by Monro. The inner paleae of the species is spoon-shaped, deeply concave, and shorter than the middle paleae in length. The occurrence of a few coarse serrations along the distal apex of the middle paleae has not previously been recorded. Fauvel recorded a specimen from the Indian Ocean which was somewhat doubtfully identified with the species. According to him the outer paleae end in a long slender, sharp, smooth spine, and the inner paleae are hollow, elongate and denticulate along the edge, recalling those of *Sabellaria pectinata*. Moreover, he is of the opinion that the hairs of the median process of the outer paleae described by Moore are probably nothing but a marine alga. As mentioned above the Japanese specimens also bear distinct fine hairs, though not so stout and long as in *S. spinulosa*, which can not be assumed as marine algae or other débris. Therefore, I am inclined to regard Fauvel's specimen from the Indian Ocean as probably belonging to some other species because not only the outer paleae but also the inner ones are different from the present species. *Sabellaria spinulosa* is the most closely allied, but is different in the shape of the opercular paleae.

Sabellaria Ishikawai n. sp.

(Figs. 10–11)

Several specimens were examined. These specimens are very small, measuring only 7–12 mm by 1–2 mm. The caudal lobe measures 4–5 mm. The opercular peduncle is rather short and thick. At the distal end of the peduncle are found three concentric rows of paleae. The outer paleae, 21–25 in number on each side, are more or lss paddle-shaped or trowel-shaped, with a broad triangular median plate finely serrated along the outer lateral margin. On either lateral side of this median plate there are 5–8 spikes sloping downwards. The surface of the median flat process is coarsely serrated. The paleae are striated with transverse and longitudinal markings. The middle paleae, in 13–17 pairs, are rather elongate spoon-shaped terminating to a sharp, pointed tip. The inner paleae, in 13–16 pairs, are more or less similar in shape to those of the median ones, but different in the blade which is narrower and more elongate

with more strong curvature than the latter. The blades of both the inner and middle paleae are marked with rigid striations. Along the outer edge of each outer series of paleae occur 23–28 low, conical papillae. Palpi in a pair and rather short. On the undersurface of the peduncle the filiform tentacles occur on the plates transversely arranged. Branchial plates are in about 6 transverse rows. The lower lip of the mouth is lobed. On each side of the mouth there are a blunt cylindrical lobe and a triangular cirrus arising from the base of the former lobe. At the base of the cirrus is a setigerous tubercle with a few short, slender, bipinnate setae. The division between the first and the second segments is quite indistinct. If the first branchiae bearing segment is assumed to be the second segment, the segment bears no bristles and ventral cirri on the ventral surface as shown usually in all other Sabellariid worms, but has only a pair of lateral cirri about equal size with those of the branchia. The characters just mentioned are quite peculiar in the family. Three so-called parathoracic segments. The dorsal rami are square and bear 7–10 rather stout brush setae each with a sharp slender apex. The ventral rami are short, low conical-shaped and bear similar setae to those of the dorsal rami, though more slender. Both the dorsal and ventral brush setae are accompanied by capillarly bipinnate setae. No ventral cirri. In the abdomen only 12–14 segments are seen. The first abdominal dorsal ramus is well-developed, flattened and flap-like, and the next one is about half its size. The rami are gradually narrower and more elongated backwards. They carry pectinate uncini with 5 teeth. The ventral ramus is a small process bearing a bundle of long pectinate setae. The ventral slender cirri occur only on the first segment. The branchiae extend as far as the first 3, or rarely 4, abdominal segments and then disappear entirely from the posterior segments. The caudal lobe is slender and rather smooth. The tube is fragile and consists of minute sand grains cemented together.

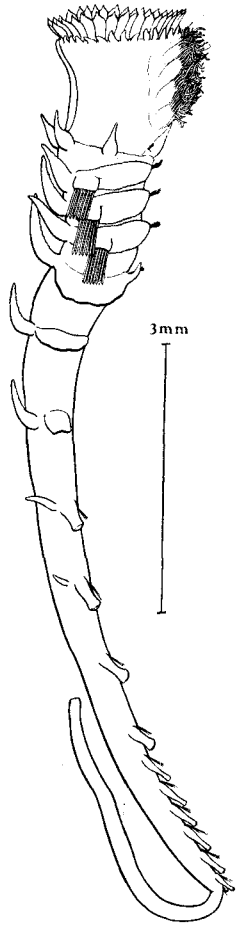

Fig. 10. *Sabellaria Ishikawai* n. sp. Entire body.

Collected by Mr. H. Ishikawa from the littoral sandy bottom from Omuda, Fukuoka Prefecture.

Remarks: The present species, though like *Sabellaria pectinata* var. *intermedia* in small body, small number of branchiae and struc-

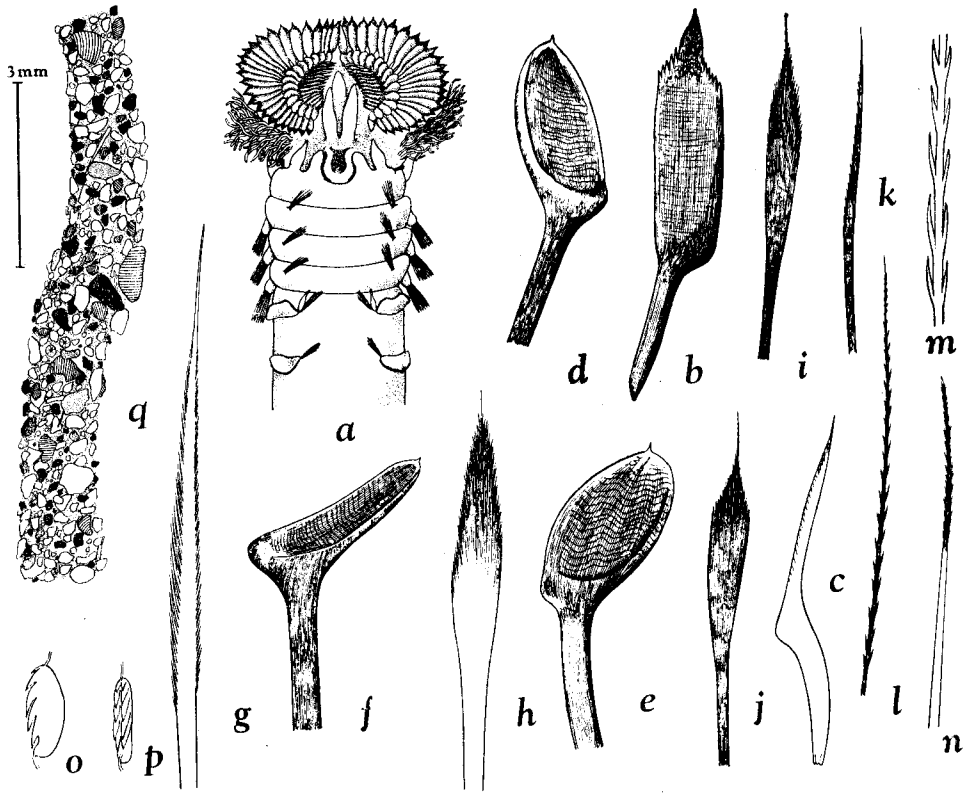

Fig. 11. *Sabellaria Ishikawai* n. sp. *a*, Anterior end, ventral view; *b*, Outer opercular palea. ×50; *c*, The same, lateral view. ×50; *d-e*, Median opercular paleae. ×80; *f*, Inner opercular palea. ×80; *g*, Bipinnate seta from the first segment. ×230; *h*, Dosal parathoracic seta. ×140; *i-k*, Ventral parathoracic setae; *l*, Ventral abdominal seta. ×170; *m*, The same, enlarged portion. ×230; *n*, Spinous seta accompanying with parathoracic setae. ×140; *o-p*, Abdominal uncini. ×250; *q*, A portion of tube.

ture of the tube, is quite different in the feature of the opercular paleae and in other points. The present species is characterised by 1) the absence of bristles on the second segment, 2) the outer paleae, 3) occurrence of the ventral cirri on the first abdominal segment only, 4) small number of branchiae, 5) the small body and 6) the habitat. The features of the species above mentioned are not generally attributed to the genus, but I will tentatively refer the species to *Sabellaria* instead of creating a new genus. In respect to the absence

of the setae on the second segment, the present species stands in contrast to *Lygdamis giardi*, which is devoid of setae in the first segment.

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