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The Fauna of Akkeshi Bay
XX. Nemertini in Hokkaido
(Revised Report)[1]

By

Fumio Iwata

(Akkeshi Marine Biological Station)

(With 9 Text-figures and 1 Table)

Introduction

Up to this time the nemertean fauna of Hokkaido have been studied by three authors, such as Stimpson, Ishizuka and Yamaoka. Of these authors, Stimpson (1857) described for the first time 4 new species, two of which were from Hakodaté, southern Hokkaido. Next Ishizuka (1933) recorded a land-living species found in the city of Sapporo. Yamaoka recorded 13 known and 6 new species collected in the vicinity of Muroran, Akkeshi and Abashiri.

Summing up all existing records, there have been described 24 species from Hokkaido. The writer here add 21 species more, of which 11 are new species, two undetermined, two recorded only in Honsyu, and 6 have been newly entitled to the fauna of Japan. Then, the total species of nemerteans here treated are 45. The localities of the specimens are Nemuro, Akkeshi, Biro, Muroran (the Pacific side), Monbetu (the Okhotsk side), Oshoro and Rishiri Island (the Japan Sea side), during the years 1949, 1951 and 1952.

In preparing this report, I wish to express my cordial thanks to Prof. Tohru Uchida for his constant and kind guidance.

List of species

1. *Tubulanus punctatus* (Takakura)
**2. *Tubulanus ezoensis* Yamaoka
3. *Procephalothrix simulus* Iwata
*4. *Procephalothrix filiformis* (Johnston)
5. *Cephalothrix notabilis* nov. sp.
6. *Lineus bilineatus* Renier
*7. *Lineus spatiosus* nov. sp.
8. *Lineus torquatus* Coe
9. *Lineus alborostratus* Takakura
10. *Lineus fulvus* nov. sp.
11. *Cerebratulus marginatus* Renier
12. *Cerebratulus fasciatus* Stimpson
13. *Micrura bella* (Stimpson)
**14. *Micrura magna* Yamaoka
**15. *Micrura uchidai* Yamaoka
16. *Micrura alaskensis* Coe
17. *Micrura akkeshiensis* Yamaoka
18. *Baseodiscus princeps* (Coe)

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1) Contributions from the Akkeshi Marine Biological Station, No. 64.
Jour. Fac. Sci., Hokkaido Univ., Ser. VI, Zool., 12, 1954.

19. *Emplectonema gracile* (Johnston)
**20. *Nemertellina minuta* Friedrich
21. *Paranemertes peregrina* Coe
22. *Oerstedia venusta* nov. sp.
*23. *Oerstedia dorsalis* (Abildgaard)
24. *Oerstedia polyorbis* nov. sp.
25. *Zygonemertes grandulosa* Yamaoka
26. *Zygonemertes* sp.
**27. *Amphiporus parvus* Yamaoka
28. *Amphiporus depressus* (Stimpson)
*29. *Amphiporus bimaculatus* Coe
30. *Amphiporus punctatulus* Coe
*31. *Amphiporus lactifloreus* (Johnston)
32. *Amphiporus antifuscus* nov. sp.
33. *Amphiporus cervicalis* (Stimpson)
34. *Amphiporus musculus* nov. sp.
35. *Amphiporus regius* nov. sp.
36. *Prostoma graecense* (Böhmig)
37. *Tetrastemma* sp.
38. *Tetrastemma nigrifrons* Coe
39. *Tetrastemma coronatum* (Quatrefages)
40. *Tetrastemma verinigrum* nov. sp.
41. *Tetrastemma yamaokai* nov. sp.
42. *Tetrastemma pinnatum* nov. sp.
43. *Tetrastemma stigmatum* (Stimpson)
*44. *Tetrastemma candidum* (Müller)
45. *Malacobdella japonica* Takakura

* indicates species newly recorded in Japan.

** indicates species not examined by the present writer.

Keys to genera and specics

1. Key to genera

1. With sucking disk at posterior end of body ..... *Malacobdella*
1. Without sucker 2
2. Mouth situated behind brain on ventral side of body 3
2. Mouth situated in front of brain, opening with proboscis in a single terminal pore .. 9
3. Head without lateral cephalic grooves 4
3. Head with lateral cephalic grooves 6
4. Mouth situated immediately behind brain ; nephridia with single pair of large collecting tubules and efferent ducts ..... *Tubulanus*
4. Mouth situated far behind brain ; nephridia with very numerous minute efferent ducts ; body filiform, head sharply pointed 5
5. With inner circular muscles in oesophageal region ..... *Procephalothrix*
5. Without inner circular muscles ..... *Cephalothrix*
6. Head broad and rounded ; with shallow oblique cephalic grooves ..... *Baseodiscus*
6. Head variable in shape ; with deep lateral longitudinal grooves 7
7. Caudal cirrus absent ; proboscis sheath usually much shorter than body .... *Lineus*
7. Caudal cirrus present ; proboscis sheath usually nearly as long as body 8
8. Body rather soft, usually flattened ; lateral margins not thin ; not adapted for swimming ; mouth small and round ..... *Micrura*
8. Body firm and ribbon-like ; much flattened in intestinal region ; with very thin lateral margins and well adapted for swimming ; mouth large and elongated .. *Cerebratulus*
9. Body usually long and slender ; cerebral sense organ small ; proboscis sheath not more than 3/4 as long as body ; proboscis short ; ocelli numerous, occasionally only 2 pairs 10
9. Body usually relatively short and broad ; cerebral sense organs large, situated beside, or in front of brain 13
10. Head with numerous small ocelli 11
10. Head with 4 ocelli 12

11. Head very slender ; proboscis sheath less than half as long as body .... *Emplectonema*
11. Body only moderately slender ; proboscis sheath 3/4 as long as body ; proboscis with usually 6 pouches of accessory stylets ..... *Paranemertes*
12. Body firm, cylindrical ; proboscis sheath usually 2/3 as long as body .... *Oerstedia*
12. Body small and slender ; proboscis sheath 1/3 as long as body ..... *Nemertellina*
13. Intestinal diverticula branched ; intestinal caecum with long anterior branches ; ocelli usually numerous 14
13. Intestinal diverticula unbranched ; intestinal caecum with short anterior branches ; ocelli usually 4 15
14. Ocelli extend posteriorly along lateral nerve cords beyond brain ; basis of central stylet sharply truncated at posterior end ..... *Zygonemertes*
14. Ocelli do not extend posteriorly beyond brain ; basis of central stylet truncate conical or pear shaped and usually rounded at posterior end ..... *Amphiporus*
15. Fresh-water living ..... *Prostoma*
15. Marine ..... *Tetrastemma*

2. Key to species

Genus *Tubulanus* Renier

1. Body blackish brown, chestnut-brown or brownish yellow ; with many white rings and 1 longitudinal dotted line ..... *T. punctatus* p. 5.
1. Anteriorly bright vermilion, being posteriorly chestnut brown ; with many white rings except head ; without longitudinal line ..... *T. ezoensis* p. 6.

Genus *Procephalothrix* Wijnhoff

1. Body usually dark yellow or brownish yellow ; head with a reddish patch ; long and stout ..... *P. simulus* p. 6–7.
1. Body dull yellowish white ; head without marking ; short and slender ; mouth much elevated ..... *P. filiformis* p. 7–8.

Genus *Lineus* Sowerby

1. Body with a conspicuous median dorsal stripe, extending to hind end of body ..... *L. bilineatus* p. 9–10.
1. Without a conspicuous median dorsal stripe 2
2. Body much voluminous, long and broad ; reddish purple without any marking ; dorsal margin of lateral cephalic grooves and dorsal side of frontal margin of head white ..... *L. spatiosus* p. 11–12.
2. Body long and slender ; tip of head white 3
3. Head with a single narrow whitish band on posterior portion ; usually red with numerous irregular minute white flecks on dorsal surface ..... *L. torquatus* p. 12.
3. Body without any other marking 4
4. Body dark brown or blackish violet ; head rather like surpent's head in shape ..... *L. alborostratus* p. 12.
4. Body yellow ; head not demarcated from body ..... *L. fulvus* p. 13.

Genus *Micrura* Ehrenberg

1. With 19 narrow white rings throughout body ; anterior half length of head both above

and below vermilion ; dorsal surface purple, ventral surface white .... *M. bella* p. 14.
1. Without conspicuous transverse ring 2
2. Body anteriorly dark brown and posteriorly pale yellowish green with conspicuous dark brown spots ..... *M. magna* p. 14.
2. Without distinct spot 3
3. Body purple with a broad white transverse ring on posterior portion of head ..... *M. uchidai* p. 14.
3. Without a conspicuous transverse ring 4
4. Body salmon with a narrow flesh coloured stripe on median ventral line ..... *M. alaskensis* p. 14.
4. Body cream-coloured without a stripe on median ventral line ; brain and inner surface of cephalic grooves bright red ..... *M. akkeshiensis* p. 14–15.

Genus *Cerebratulus* Renier

1. Body dull yellowish brown with white lateral margin ..... *C. marginatus* p. 14.
1. Body reddish brown with transverse white narrow rings and a broad ring on head ..... *C. fasciatus* p. 14.

Genus *Oerstedia* Quatrefages

1. Body without conspicuous marking ; brown or light brown with numerous darker dots on dorsal surface ..... *O. venusta* p. 15–16.
1. Body with conspicuous marking 2
2. Colour variable, yellow, yellowish brown or green ; with numerous conspicuous irregular blotches ; dorsal surface with longitudinal stripe flecked with spots .....*O. dorsalis* p. 17.
2. White with many transverse black bands ..... *O. polyorbis* p. 18–19.

Genus *Zygonemertes* Montogomery

1. Ocelli grouped in 4 longitudinal rows ; two anterior rows double and run on lateral sides of head : two posterior rows with 7-8 ocelli in each row situated along lateral nerve cord far behind brain ..... *Z. glandulosa* p. 19.
1. Ocelli consist of 3 groups : anterior one numerous and scattered on head : posterior ones with 3 ocelli along lateral nerve cord far behind brain ..... *Z.* sp. p. 19.

Genus *Amphiporus* Ehrenberg

1. Body whitish ; with 12 proboscidial nerves ; with numerous ocelli on each side of head ..... *A. parvus* p. 19.
1. Body yellow, orange, brown or purplish 2
2. Head with marking 3
2. Head without marking 5
3. Dorsal surface white thickly mottled with pigmented dark brown spots ; 12 or 13 proboscidial nerves ..... *A. punctatulus* p. 22–23.
3. Dorsal surface reddish 4
4. Dorsal surface orange ; head with wreath-like black marking ; 11 proboscidial nerves ..... *A. regius* p. 27–29.
4. Dorsal surface vermilion with 2 conspicuous darker spots on dorsal side of head ;

15 proboscidial nerves ..... *A. bimaculatus* p. 21–22.
5. With 2 pouches of accessory stylets ; ocelli consist of 2 groups on each side of head 6
5. Pouches of accessory stylets more than 3 ; ocelli consist of 2 or 3 rows on each side of head 8
6. With 6 ocelli on each side of head ; 15 proboscidial nerves .... *A. depressus* p. 19–21.
6. Ocelli more than 6 on each side of head ; 14, rarely 15 or 16 proboscidial nerves .. 7
7. Dorsal surface pale orange, yellowish orange or brownish ; usually 14, rarely 15 or 16 proboscidial nerves ..... *A. lactifloreus* p. 23–24.
7. Dorsal surface reddish brown with many darker minute dots and a median dorsal line ; anterior ocelli arranged in a row along antero-lateral margins of head and posterior ocelli grouped ; 14 proboscidial nerves ..... *A. antifuscus* p. 24–25.
8. With 3 or 6 pouches of accessory stylets ; ocelli consist of 2 rows ; opaque white, yellowish white or rose-pink ..... *A. cervicalis* p. 25–26.
8. With 3 pouches of accessory stylets ; ocelli consist of 3 rows ; dull reddish brown tinted to ted on snout ..... *A. musculus* p. 26–27.

Genus *Tetrastemma* Ehrenberg

1. Dorsal surface with conspicuous stripes or marking 2
1. Dorsal surface without stripes or marking 6
2. Dorsal surface pale green with 4 darker stripes of green throughout body .. *T.* sp. p. 30.
2. Dorsal surface of head with shield-shaped, echelon or horse-shoe shaped marking .. 3
3. With large brown marking 4
3. With orange or black marking 5
4. With shield-shaped marking ; dorsal surface of body brown or yellowish white with 2 conspicuous brown longitudinal stripes ..... *T. nigrifrons* p. 30–32.
4. With echelon-shaped marking ; greenish yellow ..... *T. coronatum* p. 32.
5. With shield-shaped or horse-shoe shaped orange marking ; pale yellow ..... *T. yamaokai*. p. 33.
5. With shield-shaped black marking ; pale yellow orange .. *T. verinigrum*.... p. 32–33.
6. Body with narrow swelling of epidermis on lateral sides of body ; dull yellow green ..... *T. pinnatum* p. 34–35.
6. Body without swelling 7
7. Yellow ; usually more than 5 cm long ..... *T. stigmatum* p. 35.
7. Dull yellow, pale yellowish brown, pale green or green ; usually 1–2 cm long ..... *T. candidum* p. 35–36.

Description

1. *Tubulanus punctatus* (Takakura), 1898

Carinella punctata : Takakura, 1898.
Tubulanus nothus : Wheeler, 1934.
Tubulanus punctatus : Yamaoka, 1940.

Habitat. Rather commonly found under stones near the low tide mark.

Distribution. Akkeshi, Muroran, Oshoro, Rishiri Island and Monbetu in Hokkaido ; and Misaki and Seto in Honsyu ; Saldanha Bay (by Wheeler), South Africa.

2. *Tubulanus ezoensis* Yamaoka, 1940

Tubulanus ezoensis : Yamaoka, 1940.

Habitat. Two specimens were found near the low tide mark (by Yamaoka).

Distribution. Akkeshi.

3. *Procephalothrix simulus* Iwata, 1952

(Fig. 1, A)

Cephalothrix linearis : Yamaoka, 1940.

Procephalothrix simulus : Iwata, 1952.

The body is rather long, slender and stout usually about 20–40 cm long and 2 mm wide. The head tapers to a point. The mouth is a short longitudinal slit. The distance between the brain and the mouth is about 1–1.5 time the distance from the tip of the head to the brain in cross section. The body is usually dark yellow tinted light brown, more pinkish anteriorly to the snout of the head, and paler posteriorly to the end of the body. The tip of the head is marked from the succeeding portion by a distinct reddish patch. The opening of the rhynchodaeum is situated at the tip of the head.

Internal structure. The cephalic glands are well developed. The basement membrane is very thick, being about 2–5 times the thickness of the outer circular muscles. The inner circular muscles found in oesophageal region are well developed and thicker than the outer circular muscles. This layer is divided laterally into two thin sheets of muscles, one on either side of the lateral blood lacuna. Dorsally a few of its fibres join the musculature of the proboscis sheath. The longitudinal muscle plate runs posteriorly between the proboscis sheath and the oesophagus. The proboscis sheath is limited to a half of the body. A small amount of parenchyma is found in the oesophageal region. The cephalic blood lacunae are very well developed and extend posteriorly to the posterior portion of stomachic region. The peripheral nerve plexus wraps the body wall under the basement membrane, and the oesophageal nerve plexus surrounds the latero-ventral side of the oesophagus. The oesophageal nerve originated from the ventral commissure of the ganglions runs posteriorly under the rhynchodaeum. At the posterior portion between the ventral commissure of the brain and foregut, it is divided into two branches which pass backward the latero-ventral aspect of the mouth, are connected with a transverse commissure situated a short distance from the posterior end of the mouth, and then gradually diminish into the boundary between the oesophagus and the muscular layer of the body. A median dorsal nerve runs posteriorly under the basement membrane. Gonads are situated immediately on the dorso-lateral side of the lateral blood vessels, the first pair being found in the posterior portion of the oesophagus. As stated by Coe (1930), there are found about 100 nephridia between the back of the brain and the posterior portion of the stomachic region, each of which consists of a multinucleate terminal organ

(nephrostome), with a slender canal leading to a looped convoluted tube connected with the exterior of the body by a slender efferent duct.

Remarks. Though the internal structure of this specimen mainly coincides with that of *P. major* (Coe), the marking of snout, the size of the body, the position of the mouth, and the development of the inner circular muscle layer of the body differ from that of the latter.

Habitat. Rather commonly found under stones or among Laminaria roots near the low tide mark and below.

Distribution. Akkeshi, Muroran, Biro, Nemuro and Oshoro in Hokkaido; and Fukue in Kyusyu.

4. *Procephalothrix filiformis* (Johnston), 1829

(Fig. 1, B and D)

Procephalothrix filiformis : Wijnhoff, 1913.

The body is small, slender and filiform, being about 5 cm long and 0.5 mm wide. The head region between the tip of the head and the mouth is long and cilindrical in form. The mouth is a large eliptical slit and elevated like a sucking disc. The body is dull yellowish white and the interior of the body is found through the integument. The head is dull white and contains the brain, lateral nerves and rhynchodaeum. The proboscis sheath is dull white and the intestine is dull yellow. The opening of the rhynchodaeum is situated in the subterminal portion of the head. The distance between the brain and the mouth is about 4 times the distance between the tip of the head and the brain in cross section.

Internal structure. The cephalic glands are well developed. The basement membrane is thinner than the outer circular muscles. The inner circular muscles found in oesophageal region is very well developed, about 2 times the outer circular muscles in thickness. This layer is divided laterally into two sheets of muscles, one on either side of the lateral blood lacuna. Dorsally the muscle fibres of this sheets do not join the musculature of the proboscis sheath. The longitudinal muscle plates are found between the proboscis sheath and the oesophagus and between the muscular sheets of the inner circular muscle layer and the oesophagus. The cephalic blood lacunae are not well developed. The brain is situated a short distance behind the tip of the head. An oesophageal nerve originated from the anterior portion of the ventral ganglions runs posteriorly under the rhynchodaeum and is divided in front of foregut into two branches which pass the mouth along its outer side of latero-ventral aspect. At a short distance back the mouth these nerves join once again and split into 4 branches which gradually diminish on the boundary between the ventral side of the oesophagus and the inner circular muscle layer. A median dorsal nerve runs posteriorly under the basement membrane. The peripheral nerve plexus and oesophageal nerve plexus not found in my preparation. Parenchyma wanting in preoral region. Gonads are situated at the lateral side of the lateral blood vessels and the first pair is found in the

anterior portion of the oesophagus.

Remarks. These specimens agree with the European species.

Habitat. Two specimens were found under stones on stony beaches near the low tide mark.

Distribution. Daikoku-jima at Akkeshi ; England and Schottland.

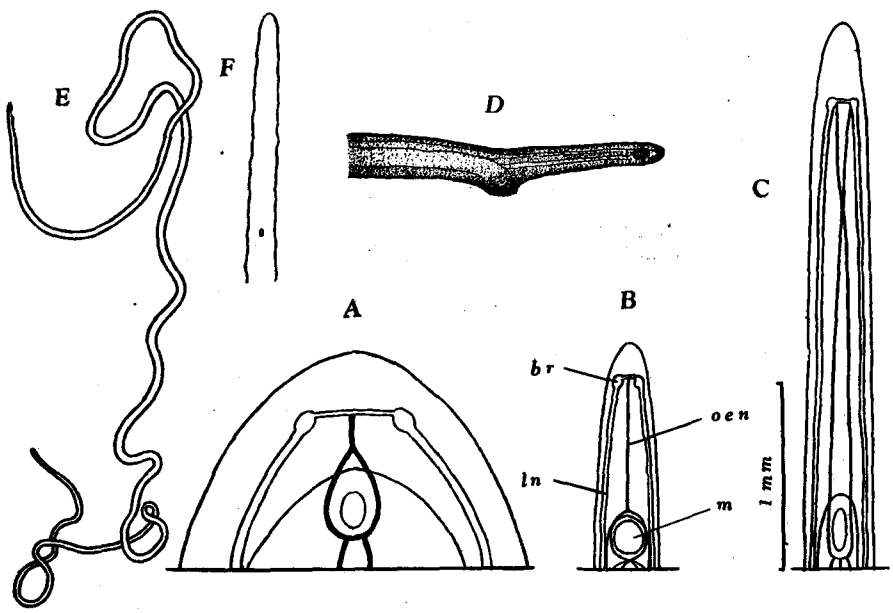

Fig. 1. A–C. Diagram of organs in the anterior portion of the body showing the nervous system in three species (A. *Procephalothrix simulus* Iwata B. *P. filiformis* (Johnstom), C. *Cepholothrix. notabilis* nov. sp.). D. *P. filifomis.* Lateral surface in the anterior portion of the body. E. *C. notabilis.* Dorsal surface of the body. F. *C notabilis* Ventral surface of the body F. *C. notabilis.* Ventral surface in the anterior portion of the body. For abbreviation, see p. 39.

5. *Cephalothrix notabilis* nov. sp.

(Fig. 1. C, E, F)

The body is rather long, slender and filiform, flattened from the dorsal side to the ventral side, and about 20 cm long and 0.5 mm wide. The head tapers to a point. The body is opaque white without any marking. The mouth is a small longitudinal slit. The opening of the rhynchodaeum is situated at the tip of the head. The distance between the brain and the mouth is about 5 times the distance between the brain and the tip of the head in cross section. The body somewhat shows a spiral form in preserved state.

Internal structure. The cephalic glands are present. The rhynchocoel and the proboscis are very slender. The proboscis sheath is posteriorly limited to less than half of the body. The inner circular muscle layer is wanting in oesophageal region. A thin layer of the longitudinal muscle plate runs posteriorly between the proboscis sheath and the gut. The cephalic blood lacunae are well developed, but far smaller in size than those of *Procephalothrix simulus*. The peripheral nerve plexus and oesophageal nerve plexus not observed in my preparation. A pair of the oesophageal nerves is separated from the middle portion of the ventral ganglion, runs posteriorly beneath the rhynchodaeum, and is only once connected each other at the anterior portion between the brain and foregut. In a short distanace backward the mouth a transverse commissure is found between them, and a longitudinal nerve runs posteriorly from its middle portion. Parenchyma is wanting in preoral region. Gonads are situated at the lateral side of the lateral blood vessels and anteriorly found far back the mouth.

Remarks. The main characteristic of this new species lies in the presence of two oesophageal nerves. Though generally similar to those of *C. linearis* (Rathke) and *C. bürgeri* (Wijnhoff), both reported by Wijnhoff (1913), the new species differs from the former in not having the darker colour of the tip of the head and from the latter in not having the yellowish colour of the tip of the head and parenchyma.

Habitat. Two specimens were found under stones on stony beaches near the low tide mark.

Distribution. Akkeshi.

6. *Lineus bilineatus* (Renier), 1804

(Fig. 2, A)

Lineus bilineatus : Bürger, 1895 and 1904 ; Wheeler, 1934 ; Coe, 1940.

Out of several specimens collected, one is large, being about 20 cm long and 3 mm wide, while the others are small, being about 4 cm long and 1 mm wide. The body is anteriorly rounded in outline from above, flattened from the dorsal side to the ventral side, and tapers posteriorly to a blunted end. The head is not demarcated from the succeeding portion of the body. The dorsal surface of the large specimen is anteriorly reddish purple and tinted posteriorly to purplish brown, while that of the small one shows purple, pale yellow orange and milky orange colour. The ventral side is pale yellow orange. A narrow longitudinal stripe, pale yellow orange, runs from the tip of the head to the tip of the tail. In the large specimen it is doubled. A narrow cresent-formed white portion is situated between the anterior border of the head and the dorsal pattern. A pair of three large ocelli arranged in a row are found at the antero-lateral sides of the head from above.

Internal structure. The epithelium is very thin, about a half the thickness

of the circular muscle layer, and contains numerous columnar gland cells. The cephalic glands are voluminous and extend dorsally to in front of the brain, while ventrally to the posterior portion of the brain. The cutis glands are remarkably voluminous and marked off from the outer longitudinal muscle layer, those situated on the dorsal side of one specimen reaching inward the circular muscle layer in oesophageal region. Pigment granules only scattered on the dorsal side of the body extend inward to the circular muscle layer. The connective tissue layer is wanting. The lateral cephalic grooves are short, shallow, and posteriorly reach inward the lateral side of the brain. The cerebral sense organ connected with the posterior end of the dorsal ganglion is large and situated above the lateral nerve. It sends off anteriorly a short narrow canal towards the end of the lateral cephalic grooves and posteriorly extends to the lateral blood lacuna. The dorsal ganglion, larger than the ventral one, is not divided into two lobes at the posterior portion. The mouth is situated far behind the cerebral sense organ in cross section. The proboscis sheath extends posteriorly to the hind end of the body. The proboscis is provided with two thin layer of muscles (outer longitudinal). The muscle cross is not observed in my preparation. A median dorsal nerve is situated just outside the circular muscle layer. The nerve plexus is conspicuous outside the circular muscle layer. The oesophageal nerves originated from the posterior portions of the ventral ganglions run backward along the ventro-lateral sides of the oesophagus. The cephalic blood lacunae situated along the lateral sides of the rhychodaeum are not extensive in size, but enlarged behind the brain. They are connected anteriorly above the rhynchodaeum and posteriorly branch off a dorsal blood vessel running through between the muscular layers of the proboscis sheath. In the back of the brain they are enlarged and then divided into several small lacunae along the lateral sides of the oesophagus. At some distance back the mouth these lacunae of one side of the body are in contact with several canals of nephridia and posteriorly lead into a single large main lacuna with a single main canal of the nephridia. The anterior branching portion of the nephridia is longer than the portion occupied by its posterior canal. The terminal portions of the canals send off a pair of efferent ducts and open externally immediately above the lateral surface of the body. The connective tissue layer of the cutis and the frontal organs are wanting.

Remarks. These specimens are in the characteristics almost same with those reported by Bürger (1895), Coe (1905) and Wheeler (1934), only differing from the latter in having 6 ocelli.

Habiat. Several specimens were obtained among muds in shells collected at about 4 meters depth, and one large specimen was collected under a stone near the low tide mark.

Distribution. Akkeshi in Japan ; the coasts of the north Atlantic Ocean, the Mediterranean Sea ; South Africa ; Alaska and California.

7. *Lineus spatiosus* nov, sp.

(Fig. 2, B)

Body soft, anterior portion narrowed from intestinal region and rounded, posterior part broad and flattened, about 40 cm long and 10 mm wide. The head is somewhat narrow than the succeeding portion of the body and shaped like a rectangle rounded in two corners of a short side of line. The body is reddish purple without any marking. The head is slightly darker than the succeeding portion. The anterior and lateral sides of the dorsal surface of the head are opaque white. Ocelli are not found by the naked eyes from above, but about 25 small ocelli-like spots are arranged in the upper lip of the lateral cephalic groove.

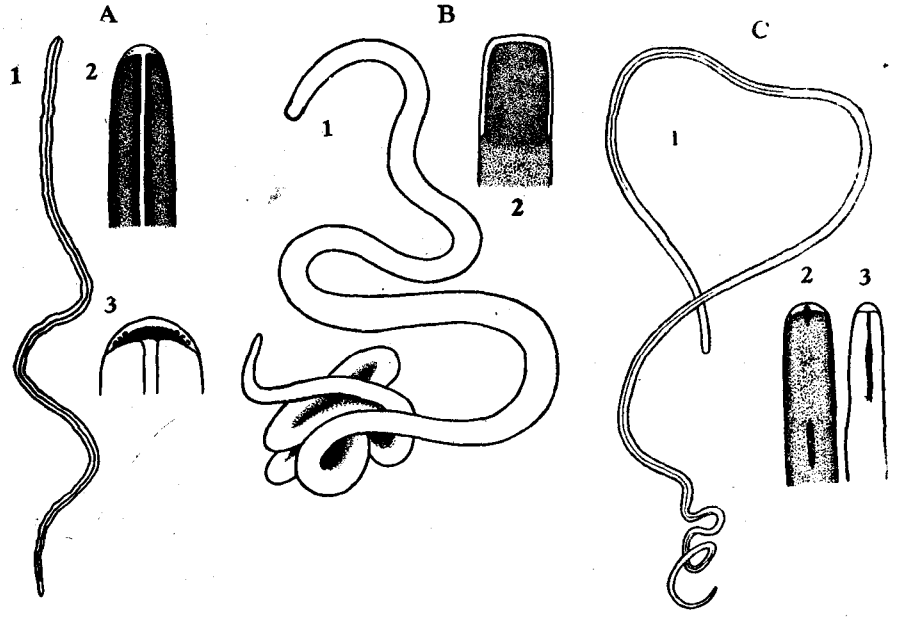

Fig. 2. A. *Lineus bilineatsu* Renier. 1). Dorsal surface. ×2.5. 2). Dorsel surface in the anterior portion of the body. 3). Dorsal surface of the head, showing ocelli and narrow white portion. B. *Lineus spatiosus* nov. sp. 1). Dorsal surface. ×0.5. 2). Dorsal surface of the head, showing white portion on the anterior and lateral sides of the head. C. *Liueus fulvus* nov. sp. 1). Dorsal surface. ×1. 2) Ventral surface in the anterior portion of the body, showing a white band on the tip of the head, proboscis opening and mouth. 3). lateral surface, showing the lateral cephalic groove. For abbreviation, see p. 39.

Internal structure. The epithelium is thin and contains numerous columnar gland cells. Pigment granules stained in dark brown penetrate inward to the cutis layer or to the portion being about 2 times the thickness of the

epithelium. These pigments are only wanting in the marginal portion of the dorsal side of the head. The cutis is not voluminous and does not marked off from the outer longitudinal muscles. The connective tissue layer is entirely wanting. The outer longitudinal muscle layer is very thick and is about 3 times the thickness of the other two muscle layers in oesophageal region. The cephalic glands are well developed, but disappear in front of the brain. The cerebral sense organ is situated laterally to the lateral nerve cord, and extends posteriorly to the blood lacuna, sending off a narrow duct from its posterior portion obliquely towards the posterior end of the lateral cephalic groove which is found in some distance in front of the brain. The dorsal ganglion is larger about 1.5 times than the ventral one and is not divided into two lobes at the posterior portion. The mouth is situated immediately behind the brain. The proboscis is provided with 3 muscular layers (outer longitudinal, circular and inner longitudinal) with two muscle crosses. The lateral cephalic grooves are deep, being about 1/2 time the width of the head. The frontal organs are wanting.

Remarks. The characteristic of this new species lies in the following points of the body ; 1) the purplish colour of the dorsal and ventral surface of the body without any other marking except the marginal portion of the head, 2) the number of ocelli, and 3) the cutis in not having the connective tissue layer. The present worm shows affinity to *L. fuscoviridis* (Takakura, 1898), but differs from the latter in the colour of the body and the marginal portion of the head, ocelli, the wanting of the connective tissue layer of the cutis, the position of the mouth and the cerebral sense organs, and other minor details.

Habitat. One specimen was found under a stone near the low tide mark.

Distribution. Akkeshi.

8. *Lineus torquatus* Coe, 1901

Lineus torquatus : Coe, 1901 and 1905 ; Yamaoka, 1940.

Habitat. Commonly found under stones or among Laminaria roots near the low tide mark.

Distribution. Akkeshi, Nemuro and Biro ; Prince Wiliam Sound, Alaska (by Coe).

9. *Lineus alborostratus* Takakura, 1898

Lineus alborostratus : Takakura, 1898 ; Yamaoka, 1940 ; Iwata, 1951 and 1952.

Habitat. They are rarely found entangling together under stones near the low tide mark.

Distribution. Akkeshi, Nemuro, Biro, Muroran, Monbetu and Rishiri Island in Hokkaido and Yokohama (by Takakura), Onomichi and Fukue (by Iwata) in Honsyu.

10. *Lineus fulvus* nov. sp.

(Fig. 2, C)

The body is rather long and slender, flattened dorso-ventrally, and about 20 cm long and 2 mm wide. The head is not demarcated from the portion immediately following. The lateral cephalic grooves are long, being about 2 times the width of the head. The colour is anteriorly brownish yellow and posteriorly yellow. A white band is clearly found on the tip of the head. A narrow brown-coloured stripe which is probably due to the proboscis sheath is found through integument from outside. About 15 ocelli are found in the antero-lateral portion of the head in cross section.

Internal structure. The epithelium is very thick, containing numerous columnar-shaped gland cells. The outer longitudinal muscle layer is well developed, being about 4 times the thickness of the other two muscular layers in oesophageal region. The cutis glands are not voluminous and marked off from the outer longitudinal muscles. The connective tissue layer is wanting. The frontal organs composed of three narrow canals with numerous long cilia are found in the tip of the head. The cephalic glands are moderately well developed, but extend posteriorly to the anterior portion of the brain. The mouth is situated a short distance behind the cerebral sense organs. The proboscis sheath is limited posteriorly to the anterior portion of the body. The proboscis is short, slender, and provided with a thin outer layer of the circular muscles and a well developed inner layer of the longitudinal muscles, but without muscular cross. The dorsal ganglion branches off upward a small lobe in the posterior portion. The oesophageal nerves with one commissure originate from the posterior portion of the ventral ganglions and run backward along the latero-ventral side of foregut. The cerebral sense organ situated at the dorso-lateral aspect of the lateral nerve is large, extending posteriorly into the lateral blood lacuna. The lateral cephalic grooves are deep, being about 1/2 time the width of the head. Nephridia composed of several ducts in contact with the lateral blood lacuna and sending off four pairs of efferent ducts which open externally above the lateral surface of the body. The cephalic blood lacunae are not extensive, but enlarged in oesophageal region. A dorsal blood vessel originated from the cephalic lacunae runs backward inside the proboscis sheath. Gonads mature in August.

Remarks. The present new species resembles in several characters *L. gilbus* (Bürger, 1895), but mainly differs from the latter in the following points : 1) the outer feature of the head, 2) the frontal organs, 3) nephridia and 4) ocelli. *L. flavescens* (Coe, 1904) is somewhat similar to this worm in outer feature.

Habitat. One specimen was collected among Laminaria root.

Distribution. Rishiri Island.

11. *Cerebratu us marginatus* Renier, 1804

Cerebratulus marginatus : Bürger, 1895 and 1904 ; Coe, 1901, 1905 and 1940 ; Yamaoka, 1940.

Habitat. Commonly found in soft muds between and below the tide marks.

Distribution. Akkeshi, Kushiro and Nemuro in Hokkaido and Misaki in Honsyu ; the Atlantic Ocean (Europe and North America) ; the Mediterranean Sea ; Situka ; Greenland.

12. *Cerebratulus fasciatus* Stimpson, 1857

Cerebratulus fasciatus : Stimpson, 1857 ; Bürger, 1904.

Habitat. This worm was collected by Stimpson in 7.3 m. deep.

Distribution. Hokkaido.

13. *Micrura bella* (Stimpson), 1857

Cerebratulus bellus : Stimpson, 1857.
Micrura festiva : Takakura, 1898.
Lineus striatus : Griffin, 1898.
Micrura bella : Coe, 1901, 1901, 1905 and 1940 : Yamaoka, 1940.

Habitat. The worms are found under stones or among roots of seaweeds near the low tide mark.

Distribution. Muroran and Oshoro in Hokkaido and Misaki and Kushimoto in Honsyu : Alaska.

14. *Micruru magna* Yamaoka, 1940

Micrura magna : Yamaoka, 1940.

Habitat. Only one specimen was found under a stone near the low tide mark (by Yamaoka).

Distribution. Akkeshi.

15. *Micrura uchidai* Yamaoka, 1940

Micrura uchidai : Yamaoka, 1940.

Habitat. One specimen was found under a stone near the low tide mark (by Yamaoka).

Dstribution. Muroran.

16. *Micrura alaskensis* Coe, 1901

Micrura alaskensis : Coe, 1901, 1905 and 1940 ; Yamaoka, 1940.

Habitat. The worms were found under stones near the low tide mark.

Distribution. Akkeshi ; Alaska and California (by Coe).

17. *Micrura akkeshiensis* Yamaoka, 1940

Micrura akkeshiensis : Yamaoka, 1940.

Habitat. Rather commonly found under stones between the tide marks.
Distribution. Akkeshi and Muroran.

18. *Baseodiscus princeps* (Coe), 1901

Taeniosoma princeps : Coe, 1901 and 1905.
Baseodiscus princeps : Coe, 1940.
Baseodiscus curtus : Yamaoka, 1940.

Habitat. Rarely found between or under stones near the low tide mark.
Distribution. Akkeshi ; the coasts of Alaska and Puget Sound (by Coe).

19. *Emplectonema gracile* (Johnston), 1837

Eunemertes gracilis : Bürger, 1895.
Emplectonema gracile : Brüger, 1904 ; Col, 1901, 1905 and 1940 : Friedrich, 1936 ; Yamaoka, 1940.

Habitat. Rarely found on the surface of stones or in the crevices between the tide marks.

Distribution. Akkeshi and Muroran ; England, Germany, France, the Mediterranean Sea and Madeira ; from Victoria, B. C. to Dutch Harbor, Alaska ; San Francisco, U. S. A.

20. *Nemertellina minuta* Friedrich, 1934

Nemertellina minuta : Friedrich, 1934 ; Yamaoka, 1940.

Habitat. One specimen was found in the canal of a sponge (by Yamaoka).
Distribution. Akkeshi ; Kiel, Germany.

21. *Paranemertes peregrina* Coe, 1901

Paranemertes peregrina : Coe, 1901, 1905 and 1940 ; Yamaoka, 1940,.

Habitat. Rather commonly found under stones or among Laminaria roots near and below the low tide mark.

Distribution. Akkeshi, Nemuro, Muroran, Monbetu, Rishiri Island and Oshoro ; from Victoria, B. C. to Unalaska on the Pacific coasts of North America.

22. *Oerstedia venusta* nov. sp.

(Fig. 3)

The body is short, stocky and rounded dorso-ventrally throughout the body, and tapers gradually to both extremities, about 1 cm long and 1 mm wide. The head is not demarcated from the succeeding portion of the body. The colour is brown or light brown with numerous minute darker dots on the dorsal surface. The ventral surface is pale yellowish brown in colour. The head is provided with 4 well developed ocelli. Two pairs of the cephalic grooves running obliquely from the ventral side towards the dorsal side of the body are slightly found on the dorsal surface of the head.

Internal structure. The cephalic glands are voluminous, but never extend beyond the brain. The cerebral sense organs are very small, situated far in front of the brain. The proboscis sheath is provided with 10 distinct nerves. Each of two accessory stylet pouches contains usually two stylets. The basis of the central stylet is oval-shaped and 0.04 mm long. The central stylet is measured 0.027 mm long and is same in length with the accessory stylets. The anterior branches of the intestinal caecum are short, extending forward to the posterior portion of the brain. Gonads mature in August.

Remarks. The outer feature of this specimen differs mainly from species known in this genus.

Habitat. A few specimens were found among roots of seaweeds between the tide marks.

Distribution. Muroran and Rishiri Island.

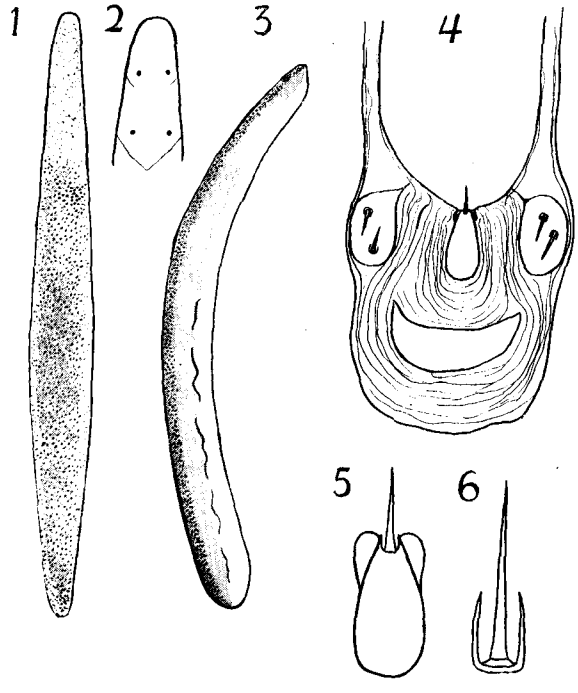

Fig. 3. *Oerstedia venusta* nov. sp. 1). Dorsal surface. ×12 2). Dorsal surface of the head, showing ocelli and cephalic grooves. 3.) Laterel surface. 4). armature. 5). Central stylet and basis. 6). Reserve stylet. For abbreviation, see p. 39.

23. *Oerstedia dorsalis* (Abildgaard), 1806

(Fig. 4, A)

Oerstedia dorsalis: Bürger, 1895 and 1904; Coe, 1940.

The body is short, stout, rounded dorso-ventrally, and about 2–3 cm long and 1–1.5 mm wide. The head is provided with 4 ocelli. The three distinct colour varieties were found from different localities at Akkeshi. All colour varieties are similar in having a longitudinal stripe flecked with many spots and numerous large blotches on the dorsal side of the body. The three varieties are as follows:

Variety *aequalis* (Fig. 4. A, 4) The body is yellow with a paler median dorsal longitudinal stripe which is flecked with 14 dark blue spots throughout the body. Many yellowish brown spots are regularly arranged along the lateral sides of the stripe, and greenish blotches are scattered on the lateral sides of the body.

Variety *albolineata* Bürger, 1895. (Fig. 4. A, 2 and 3) The body is yellowish brown with a stripe flecked with many paired blackish or single blue spots. There were found the specimens without these spots. Numerous dark brown or pale brown blotches are irregularly arranged on the dorsal side of the body.

Variety *viridis* Bürger, 1895. (Fig. 4. A, 1) The body is yellow with a stripe flecked with 8 oval-shaped large green bloches composed of minute dark brown dots in intestinal region, and numerous dark brown dots are sprinkled on the lateral portions of the body.

Internal structure. The cephalic glands are fairly well developed, extending backward beyond the brain. The cerebral sense organs are very small and situated far in front of the brain. The proboscis sheath is limited to 2/3 time the length of the body. The proboscis is provided with 12 distinct nerves. Each of two accessory stylet pouches contains usually a few stylets. The basis of the central stylet is oval-shaped and 0.055 mm long. The accessory stylet is measured 0.032 mm in length. The anterior branches of the intestinal caecum are short, extending forward to the back of the brain. Nephridia consist of a few short and narrow canals situated at the lateral sides of the stomach, and send off a pair of efferent ducts towards the ventro-lateral aspect of the body. Gonads mature in August.

Remarks. Specimens of var. *albolineata* were cut in preparation. The internal organization differs slightly from that reported by Bürger in having 12 proboscidial nerves.

Habitat. This worm is usually found among algae or hydroid *Eudendrium annulatum* Norman near the low tide mark.

Distribution. Akkeshi, Japan; northern coasts of Europe to Madeira; Nova Scotia to southern New England and southward; Puget Sound, Monterey Bay, California, and southward to Ensenada, Mexico.

24. *Oerstedia polyorbis* nov. sp.

(Fig. 4, B)

The body is small, rounded dorso-ventrally and stout, about 5 mm long and 0.5 mm wide. The head is anteriorly rounded in outline from above and is not demarcated from the rest of the body. The colour is white with about 30 transverse bands on the dorsal surface, each of which consists of numerous minute black dots. On the dorsal surface of the head, numerous minute dots are sprinkled roughly without forming distinct bands. The head is provided with 4 well developed ocelli.

Internal structure. The cephalic glands are not well developed and limited

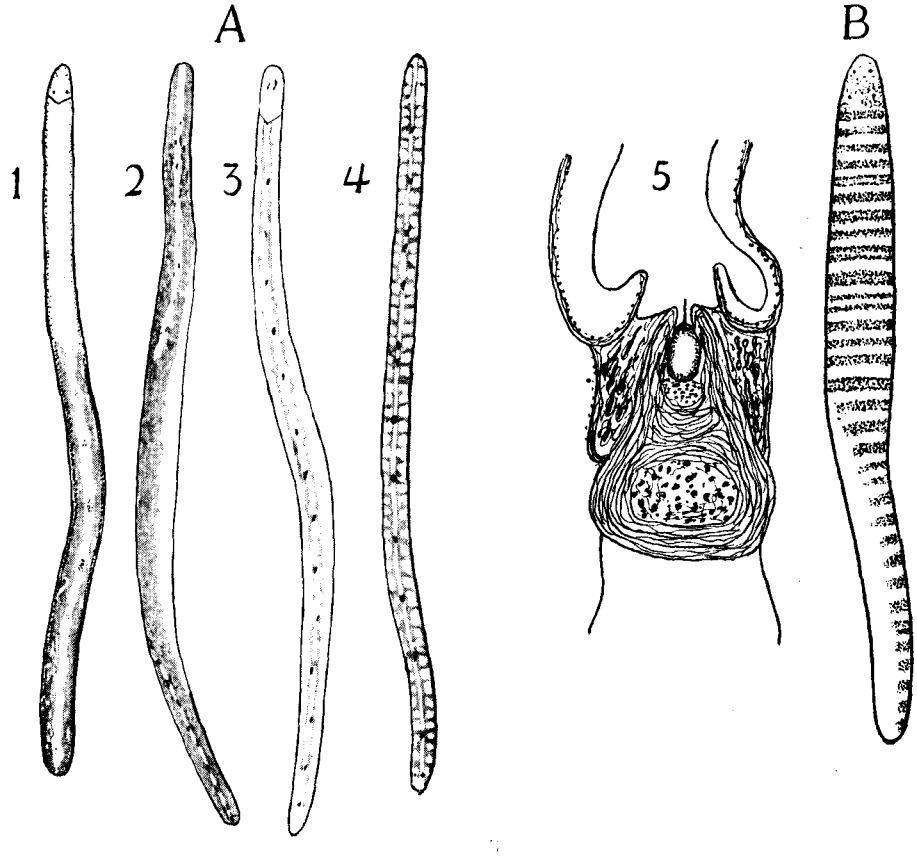

Fig. 4. A. *Oerstedia dorsalis* (Abildgaard). Dorsal surface of the body. 1). Var. *viridis*. ×7. 2). and 3). Var. *albolineata*. ×3. 4). Var. *aequalis*. ×4. 5) armature. B. *Oerstedia polyorbis* nov. sp. Dorsal surface of the body. For abbreviation, see p. 39.

only to the anterior portion of the head. The cerebral sense organs are very small, situated far in front of the brain. The proboscis sheath extends posteriorly to 4/5 the length of the body. The proboscis is provided with 10 nerves and two pouches of the accessory stylets, each of which contains 2 stylets. The basis of the central stylet is oval-shaped and 0.03 mm long. The diverticula of the intestinal caecum are short and reach forward the anterior portion of the brain.

Remarks. The specimen of this new species differs mainly from the other species of this genus in the outer feature of the body.

Habitat. Two specimens were found among hydroid *Eudendrium annulatum* Norman near the low tide mark.

Distribution. Daikoku-jima at Akkeshi.

25. *Zygonemertes glandulosa* Yamaoka, 1940

Zygonemertes glandulosa : Yamaoka, 1940.

Habitat. Several specimens were found under stones near the low tide mark.

Distribution. Akkeshi.

26. *Zygonemertes* sp.

(Fig. 5, A)

The body is short, slender and about 3 cm long and 1 mm wide. The head is demarcated from the rest of the body. The colour of the body is pale blue without any marking. There are three groups of ocelli, of which one is composed of many small ocelli scattered on the dorsal side of the head, while the posterior ones, in a pair, consist of three small ocelli arranged along the lateral side of the body far back of the brain. A short double longitudinal line is found on the middle portion of the dorsal surface of the head.

Remarks. Though the internal structure of the body is not observed, the arrangement of ocelli differs from the species known in this genus.

Habitat. One specimen was found under a stone near the low tide mark.

Distribution. Muroran.

27. *Amphiporus parvus* Yamaoka, 1940

Amphiporus parvus : Yamaoka, 1940.

Habitat. One specimen was found on a sandy beach (by Yamaoka).

Distribution. Akkeshi.

28. *Amphiporus depressus* (Stimpson), 1857

(Fig. 5, C)

Tatanoskia depressa : Stimpson, 1857.

Amphiporus depressus : Bürger, 1904.

The body is rather slender and flabby, eliptical from the ventral side to

the dorsal side in cross section, and about 3 cm long and 1 mm wide. The colour of the body is anteriorly whitish gray and posteriorly light purplish gray owing to the colour of the intestine. The brain is observed through the skin as two dirty yellow spots. The lateral nerve cords and the proboscis sheath are also found from above. Six ocelli are found on each side of the head and roughly divided into two groups of three ocelli arranged parallel to the antero-lateral margin of the head.

Internal structure. The cephalic glands are moderately well developed, extending backward to the brain region. The brain is enormously large in size in cross section. The cerebral sense organs are large and situated a short distance in front of the brain. The proboscis is provided with 12 nerves. The proboscis sheath extends nearly to the hind end of the body. The intestinal caeca do not branch, but are long and reach forwards the back of the brain. The

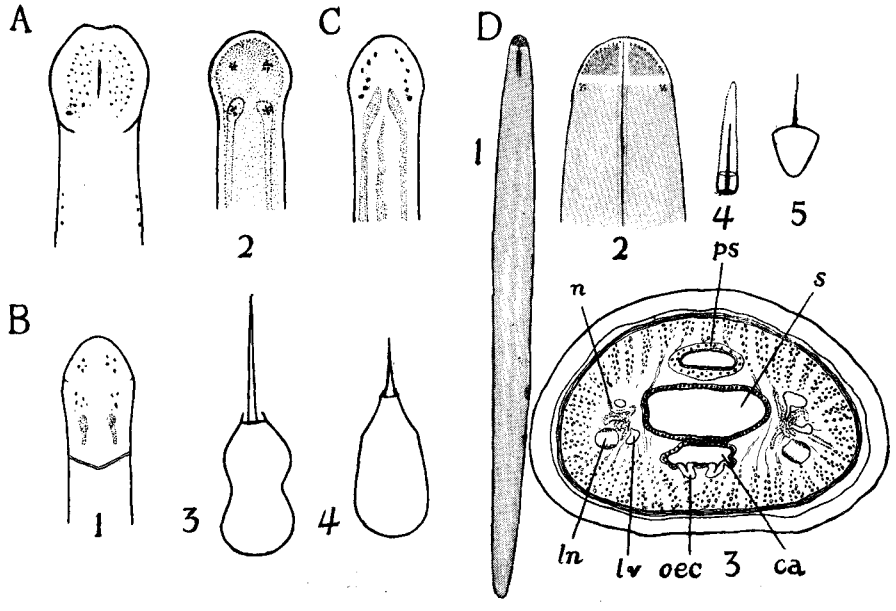

Fig. 5. A. *Zygonemertes* sp. Dorsal surface in the anterior portion of the body, showing the arrangement of ocelli. B. *Amphiporus lactifloreus* (Johnston). 1). and 2). Dorsal surface in the anterior portion of the body. 3). and 4). Central stylet and basis. C. *Amphiporus depressus* (Stimpson). Dorsal surface, showing ocelli and the interior of the body. D. *Amphiporus bimaculatua* Coe, 1). Dorsal surface. ×2.5. 2). Dorsal surface in the anterior portion of the body, showing ocelli, cephalic markings and a median longitudinal line. 3). Transverse section through stomach. 4). Reserve stylet. 5). Central stylet and basis. For abbreviation, see p. 39.

submuscular glands are not well developed, limited for a short distance near the latero-ventral aspect of the brain region. Parenchyma entirely wanting. The intestinal diverticula do not branch as usual as other species of this genus treated in this report. Nephridia situated between the back of the brain and the posterior portion of the stomack, sending off a pair of efferent ducts on the middle portion, opening externally above the latero-ventral surface of the body.

Remarks. The present writer identified this specimen in accordance with the number of ocelli, though the colour of the body differs slightly from the specimen reported by Stimpson. The internal structure of this worm shows considerable affinity to that of genus *Tetrastemma* such as the eliptical form of the body in cross section, the wanting of parenchyma and the unbranched intestinal caeca and intestinal diverticula.

Habitat. One specimen was collected under a stone near the low tide mark.

Distribution. Hakodaté (by Stimpson) and Muroran.

29. *Amphiporus bimaculatus* Coe, 1901

(Fig. 5, D)

Amphiporus bimaculatus : Coe, 1905 and 1940.

The body is rather short and stout, anteriorly convex dorsally and flattened in intestinal region, and tapers gradually to both extremities. The head is anteriorly rounded in outline from above and demarcated from the succeeding portion of the body by a transverse narrow white cephalic grooves and cephalic marking. The body is about 2.5 cm long and 3 mm wide. The colour is equally vermilion on the dorsal surface except the head and the tail which is white. The head is white with two large patterns composed of densely scattered darker spots. A median dorsal longitudinal line runs backward from the tip of the head to the anterior portion of oesophageal region. The ventral surface of the body is white. The head is provided with 3 groups of ocelli, one of which is arranged along the anterior marginal portion of the head, while the others, in a pair, are situated behind the cephalic grooves, containing about 2–3 ocelli.

Internal structure. The cephalic glands are not well developed, reach backward the portion far in front of the brain, and send off anteriorly several ducts along the dorsal side of the rhynchodaeum, opening externally on the tip of the head. The submuscular glands are not also well developed and situated at the lateral aspect of the body in the anterior portion of the oesophageal region. The cerebral sense organs are large and situated at the lateral sides of the brain, extending posteriorly beyond the brain. The proboscis sheath extends nearly to the hind end of the body. The proboscis is provided with 15 distinct nerves. Two pouches of the accessory stylets contain each several stylets. The basis of the central stylet is pear-shaped and about 0.05 mm long. The central stylet is about same the length of the basis. As in American form reported by Coe, the

present specimen has each a caecal appendage to the oesophagus and to the stomach in addition to the highly developed intestinal caecum. The oesophagus branches into two portions, one of which lies directly ventral to the other. The dorsal portion leads by a narrow opening into the long stomach. The ventral canal retains the characteristic lining of the oesophagus and branches posteriorly into two cylindrical diverticula which end blindly. The glandless layer of the anterior portion of the oesophagus extends backward along the ventral side and branches ventrally into two small caeca situated a short distance in front of the oesophageal diverticula. The appendage of the stomach is a protrusion of the canal towards the anterior portion of the body, but seems to be indistinct, if it is fully expanded by the large amount of injected substance. The dorso-ventral muscles are well dlveloped in anal region. Nephridia branching into several canals between the posterior portion of the brain and the stomach, and sending off a pair of the efferent ducts towards the ventro-lateral aspect of the body at the anterior portion.

Remarks. The present specimen differs slightly from American form in colour, the cephalic marking, structure of the oesophagus and length of the central stylet.

Habitat. One specimen was found among Laminaria root collected below the tide mark.

Distribution. Rishiri Island ; the coasts of Alaska, British Columbia, Puget Sound and southward to Ensenada, Mexico.

30. *Amphiporus punctatulus* Coe, 1905

Amphiporus punctatulus : Coe, 1905 and 1940 ; Iwata, 1951 and 1952.

The body is anteriorly narrow and convex dorsally, rather broad and much flattened in intestinal region, and about 2–4 cm long and 2–4 mm wide. The head is sharply pointed in front and demarcated from the succeeding portion of the body by the cephalic grooves. The body is dull white on the dorsal surface and thickly mottled with confluent dark brown blotches and dots which make the ground colour obscure, though these marks are wanting on the ventral surface. Ocelli are numerous and grouped in 3 on the head, of which one is arranged in a row along the marginal portion of the head, while the others, in a pair, are situated in an irregular cluster just behind the cephalic groove, containing about 2–3 ocelli.

Internal structure. The cephalic glands are fairly well developed, but never extend beyond the brain. Parenchyma moderately well developed in oesophageal region. The proboscis sheath reaches the hind end of the body. The proboscis is provided with 12 distinct nerves. The cerebral sense orgnas are remarkably large, situated at the lateral sides of the brain. The submuscular glands are rather well developed. The diverticula of the intestinal caeca extend forward far behind the brain. Nephridia are as usual in the preceding species.

Remarks. The present specimens slightly differ from those collected from Honsyu and America in the following feature of the body ; from the former specimens in having the more dwarf body, the darker colour of the dorsal surface, and 12 proboscidial nerves ; from the latter in not having the remarkable circular muscle fibres surrounding the rectum.

Habitat. A few specimens were obtained among roots of seaweeds.

Distribution. Oshoro and Rishiri Island in Hokkaido and Amakusa, Seto, and Simoda in Honsyu ; Kurile Islands ; Isthmus Cave, Catalina Islands, California, U. S. A.

31. *Amphiporus lactifloreus* (Johnston), 1828

(Fig. 5, B)

Amphiporus lactifloreus : Bürger, 1904 ; Bergendal, 1903 ; Stephenson, 1911 ; Wijnhoff, 1912 ; Friedrich, 1934 and 1936.

The body is rather slender, anterior part being convex dorsally and flattened in intestinal region in cross section, and about 2–4 cm long and 2 mm wide. The head is demarcated from the rest of the body by slightly annular constriction of the body. The head is provided with 2 groups of ocelli on each side of the head, each of which contains usually 4–6 ocelli, but rarely 7 or 8 ocelli. The colour of the body differs slightly in two different localities such as Akkeshi and Muroran as follows : The specimens from the former locality are pale orange, or rarely brownish, tinted posteriorly with pale purple owing to colour of the intestine ; Those from the later are yellowish orange with innumerable minute dots on the dorsal surface of the body and are milky purple in intestinal region. The brain and the lateral nerves are found through the integument from above. They are orange in colour.

Internal structure. The cephalic glands are voluminous, extending posteriorly to the anterior portion of the brain. The submuscular glands are moderately well developed in oesophageal region. The proboscis sheath reaches nearly the hind end of the body. Number of the proboscidial nerves and the shape of the basis of the central stylet differ also in the specimens from above localities as follows : Those from Akkeshi are provided with 14 proboscidial nerves and two pouches of accessory stylets. The basis of the central stylet is pear-shaped and same the width in two protruded portions. The basis is nearly equal in length to the central stylet. ; of three specimens from Muroran one is provided with 16 proboscidial nerves, three pouches of accessory stylet, and the same basis with the above, while the others are provided with 15 nerves, two pouches, and one of these bases is truncated conical in shape, anteriorly sharply pointed, rounded towards the end, and about two times the length of the central stylet, although the other is same in shape with the above.

The basis is measured 0.07–0.09 mm in length. The pouches of the accessory stylets contains 3–6 stylets. Parenchyma well developed between the back of the

brain to the posterior portion of the stomach. The diverticula of the intestinal caeca are long, extending forward far behind the brain. The cerebral sense organs are large, situated a short distance in front of the brain. Nephridia are as usual in the preceding species.

Remarks. The present worm is similar to the European species in following points ; 1) colour, 2) ocelli, 3) number of the proboscidial nerves (14 in number), and 4) the central stylet being equal in length to the pear-shaped basis, two protruded portions of which are same in width.

Habitat. The specimens were rather commonly found under stones between the tide marks at Akkeshi.

Distribution. Akkeshi and Muroran ; widely distributed in European coasts : Helgoland, Kiel Bay, Irland, England, Roscoff, Millport, and Norway.

32. *Amphiporus antifuscus* nov. sp.

(Fig. 6, A)

The body, about 3–5 cm long and 1–1.5 mm wide, is rather narrow, stout, retaining nearly same width throughout the whole length of the body, and tapering to a blunted end in both extremities. In cross section the dorsal side is anteriorly convex dorsally, flattened in intestinal region. The head is not demarcated from the rest of the body and sharply pointed to the tip of the head. The colour is pale brown and reddish brown posteriorly, with minute dots rather sparsely sprinkled on the dorsal surface and with a median longitudinal narrow stripe, dark reddish brown, from the tip of the head to the end of the body. The brain is observed through the skin as two reddish oval-shaped spots situated far back the posterior ocelli. The cephalic groove shaped in V on the dorsal surface of the body, are clearly found from above. The head is provided with 2 groups of ocelli on each side of the head, of which the anterior one is 6 in number and arranged in a row along the antero-lateral margin of the head where the colour is paler than the rest, while the posterior one is composed of several ocelli irregularly arranged.

Internal structure. The cephalic glands are fairly well developed, extending posteriorly far behind the brain. The cerebral sense organs are large and situated a short distance in front of the brain. The submuscular glands are wanting. The proboscis sheath extends posteriorly nearly to the hind end of the body. The proboscis is provided with 14 distinct nerves. Each of two pouches of the accessory stylets contains 3 or 4 stylets. The basis of the central stylet is pear-shaped and 0.09 mm long and 0.05 mm wide in the lower widest portion. The accessory stylet is measured 0.07 mm in length. Parenchyma moderatelly well developed in oesophageal region. The diverticula of the intestinal caeca are long, extending forward far behind the brain. Nephridia are as usual in the preceding species.

Remarks. The present worm differs from *A. lactifloreus* in the external feature of the body, the extension of the cephalic glands, and the shape of the basis

of the central stylet.

Habitat. Several specimens were found among seaweeds near the low tide mark.

Distribution. Akkeshi.

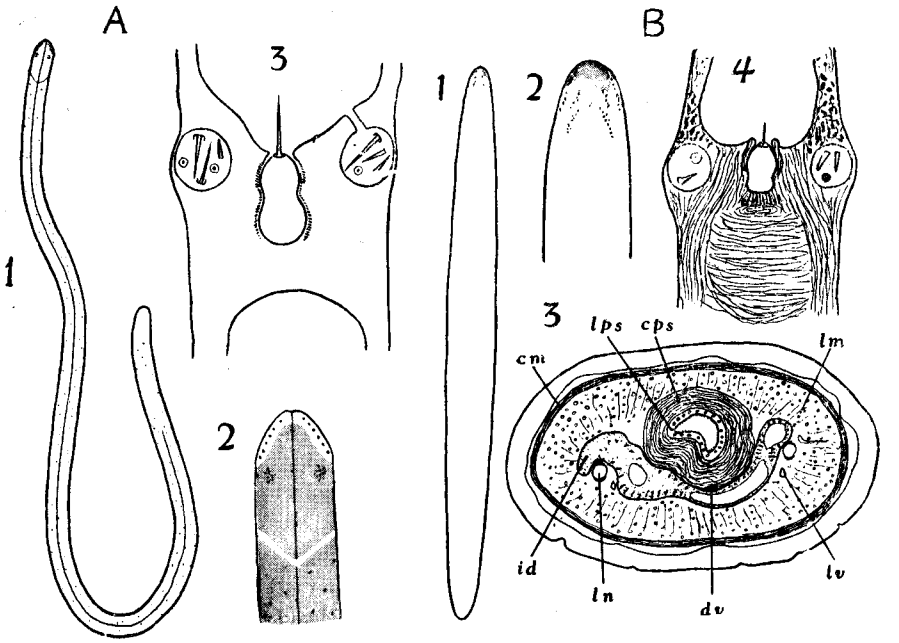

Fig 6. A *Amphiporus antifuscus* nov. sp. 1) Dorsal surface. ×3. 2) Dorsal surface in the anterior portion of the body, showing ocelli, cephalic grooves and a median dorsal stripe. 3). Armature. B. *Amphiporus musculus* nov. sp. 1). Dorsal surface. ×2.5. 2). Dorsal surface in the anterior portion of the body, showing ocelli and red patch on the tip of the head. 3). Transverse section through intestine, showing well developed muscular layers of the body and the proboscis sheath. 4). Armature. For abbreviation, see. p 39.

33. *Amphiporus cervicalis* (Stimpson), 1857

Polina cervicalis : Stimpson, 1857
Amphiporus cervicalis : Bürger, 1904.
Amphiporus formidabilis : Griffin, 1898 ; Coe, 1904, 1905 and 1940 ; Iwata, 1952.

The body is long and slender, rounded, or nearly the same diameter thruoghout the body, and about 10–15 cm long and 2–3 mm wide. The head is somewhat wider than the neck. The colour is opaque white or pale yellowish white throughout the body. Ocelli are about 90 in number and are arranged in two

clusters on each side of the head.

Internal structure. The cephalic glands are not well developed and only extend for a short distance from the tip of the head. A small amount of the submuscular glands is found behind the brain region. The proboscis sheath extends posteriorly to about two-thirds the length of the body. The proboscis is provided with 18 distinct nerves. The lateral pouches of the accessory stylets are usually 3 in number and each of them contains several stylets. The basis of the central stylet is pear-shaped, but flattened in the hind end and much broad in width in the posterior protruded portion. It is measured about 0.17 mm long and 0.12 mm wide. The central stylet and the accessory stylets are about half of the basis in length. The diverticula of the intestinal caeca are long, extending anteriorly to the anterior portion of the brain. The cerebral sense organs are situated far in front of the brain. The dorsal ganglions are nearly same in volume with the ventral ones. Nephridia extend from the back of the brain to the posterior portion of the stomach, and send off 10 or more efferent ducts, opening externally above the latero-ventral surface of the body.

Remarks. The specimens collected from Hokkaido differ slightly from those collected from Honsyu and America in the following features ; those from Honsyu are rose-pink or salmon-coloured and provided with 6 pouches of the accessory stylets, well developed cephalic and submuscular glands, and the intestinal caeca extended anteriorly to the hind end of the brain ; those from America are provided with usually 30 proboscidial nerves, 6 or more pouches of the accessory stylets, very highly developed cephalic and submuscular glands, and the intestinal caeca same in feature with the above.

Habitat. The present specimens are commonly found among mussel beds between the tide marks, but those collected in Honsyu are always found under stones.

Distribution. Muroran and Rishiri Island in Hokkaido and Kominato in Tiba prefecture, Simoda (by Stimpson, and Iwata), Tomioka and Fukue in Honsyu, Japan ; the Pacific coasts of America, Alaska and Aleutian Islands.

34. *Amphiporus musculus* nov. sp.

(Fig. 6, B)

The body is rather short and broad, anteriorly convex from the ventral side to the dorsal side, flattened in intestinal region, and about 2–3 cm long and 2–2.5 mm wide. The head is not demarcated from the rest of the body, tapering abruptly to a blunted end in both extremities. The body is equally dull reddish brown except the tip of the head which becomes red without a clear boundary from the succeeding portion of the head. Ocelli consist of three pairs of groups on each side of the head, each group of which is arranged parallel to the antero-lateral margin of the head and contains about 10–15 ocelli.

Internal structure. The cephalic glands are not well developed, extending

for a short distance from the tip of the head. The inner longitudinal muscle layer is enormously voluminous throughout the body, being about 8 times the thickness of the outer circular muscle layer in oesophageal region. A great deal of this muscles extend forward far beyond the brain. The proboscis sheath extends nearly to the hind end of the body. The proboscis is provided with 14 distinct nerves. Each of three pouches of the accessory stylets contains usually 3 or 4 stylets, being each about 0.03 mm in length. The basis of the central stylet is a transformed pear in shape, anteriorly narrow, and truncated in the hind end, being about 0.06 mm in length. A narrowed portion is situated at the lower portion of the basis, and the upper wider portion is broader than the lower portion. The outer circular muscle layer of the proboscis sheath is very well developed as well as that of the body, being about 3–4 times the thickness of the inner longitudinal muscle layer. The anterior branches of the intestinal caeca extend forward to the middle portion of the dorsal ganglions. The cerebral sense organs are large, situated a short distance in front of the brain. Nephridia extend from the posterior end of the brain to the middle portion of the stomach and send off a pair of efferent ducts in the anterior portion, opening externally above the dorso-lateral surface of the body.

Remarks. The well developed muscular layers of the body and the proboscis sheath are the main characters of this new species. The other characteristic features of the body are in the following points ; 1) colour, 2) ocelli, and 3) the shape of the basis of the central stylet.

Habitat. Several specimens were found among roots of dwarfish seaweeds closely attached to large rocks between the tide marks.

Distribution. Oshoro.

35. *Amphiporus regius* nov. sp.

(Fig. 7)

The body is rather long and broad, anteriorly convex dorsally, flattened in intestinal region in cross section, and about 4 cm long and 2 mm wide. The head is demarcated from the rest of the body by two annular constrictions of the cephalic grooves and the broad head. The colour is orange, with numerous scattered minute white dots on the dorsal surface. The head is orange with a black wreath-like cephalic marking composed of numerous spots and with numerous minute white dots scattered densely in front and back of the marking. The interior of the body, such as the proboscis sheath, proboscis and intestine are observed through the skin from above. Four very well developed large ocelli are arranged in rectangular shape. The anterior pair is situated under the cephalic marking, while the posterior one between the cephalic grooves. Two pairs of the cephalic grooves are situated behind the cephalic marking on the dorsal surface of the body. The posterior pair surrounds the neck, while the anterior pair does not meet dorsally on the middle portion and runs obliquely forward ventrally,

meeting on the subterminal portion of the head.

Internal structure. The cephalic glands are not voluminous, extending backward far in front of the brain. They are divided into three portions of the rhynchodaeum except the ventral side. The cerebral sense organ is voluminous, situated from the portion being a short distance in front of the brain to the anterior portion of the latero-ventral aspect of the brain, and are connected with the ventral ganglion in its latero-ventral aspect through a thick and short nerve fibres. The proboscis sheath extends nearly to the hind end of the body. The proboscis is provided with 11 distinct nerves. Each of two pouches of the accessory stylets contains usually 2–3 stylets. The basis of the central stylet is truncated conical in shape, and about 0.12 mm long. The hind end of the basis is rounded with a short protuberance on the middle portion. The accessory stylets are measured about 0.06 mm in length. The anterior branches of the intestinal caeca extend forward to the posterior portion of the brain. Nephridia extend from the back

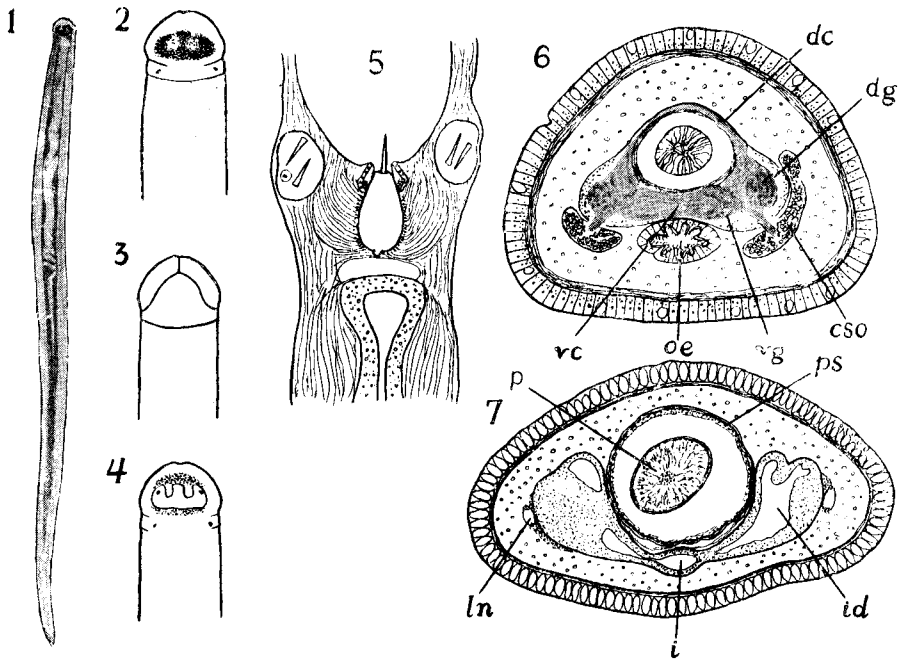

Fig. 7. *Amphiporus regius* nov. sp. 1). Dorsal surface. ×2. 2). Dorsal surface in the anterior portion of the body, showing ocelli, cephalic grooves and cephalic marking 3). Ventral surface, showing cephalic grooves. 4). Dorsal surface, showing white portions above and below the cephalic marking. 5). Armature. 6). Transverse section through the cerebral sense organs. 7). Transverse section through intestine, showing the body flattened and the branches of the intestinal diverticula. For abbreviation, see p. 39.

of the brain to the posterior portion of the stomach and send off a pair of efferent ducts in the anterior portion, opening externally above the latero-ventral surface of the body. Parenchyma is moderately well developed.

Remarks. This new form somewhat resembles *Tetrastemma nimbatum* reported by Bürger (1895) in the outer feature of the body. Although ocelli and cephalic marking show its affinity to *Tetrastemma*, the internal structure of the body such as, the shape of the body in transverse section, prenchyma, the long and branched diverticula of the intestinal caeca, and the branched intestinal diverticula show considerable resembrances to the genus *Amphiporus*.

Habitat. Several specimens were found under stones on a rocky shore near the low tide mark.

Distribution. Muroran.

36. *Prostoma graecense* (Böhmig), 1892

Prostoma grecense : Böhmig, 1898 ; Bürger, 1904 : Ishizuka, 1933.
Prostoma hokkaidoensis : Stiasny-Wijnhoff, 1938.
Prostoma lacstre : Suzuki, 1953.

The body is 10–25 mm long and 0.5–0.7 mm wide. The head is demarcated from the posterior part of the body. The number of eyes is exceedingly variable, but generally seems to be six. In the head region are found a pair of cephalic grooves and ciliated pits which are situated between the first and second pairs of eyes. Frontal organs are situated at the tip of the head. Sensory spines are present at the anterior end of the head, in the anal region, and on the lateral side of the body. Colour of the worm is generally yellow, dirty yellow brown, red-brown or dark-red.

Internal structure. The cephalic glands extend posteriorly to the anterior portion of the brain. The opening of the cerebral sense organs is situated at the latero-ventral side of the body. The diverticula of the intestinal caecum extend forward to the back of the brain or the anterior portion of the brain. The proboscis sheath is limited backward to 2/3 time the length of the body in cross section.

Remarks. Two specimens were examined by the present writer who identified them to *P. graecense* in accordance with the several characters of the body described by Stiasny-Wijnhoff (1938). This form differs slightly from the description of Stiasny-Wijnhoff in the length of the rhynchocoel and the developement of the cephalic glands ; she stated that the former character is long, more than 2/3 time the length of the body and the latter is short in length. Suzuki reported that this form should be indetified with *P. lacstre* (du Plessis, 1893) by the coincidence of the length of the rhynchocoel.

Habitat. The present worms are found in rice-fields and ponds, especially in chalybeate water.

Distribution. Sapporo in Hokkaido, Japan ; Granz.

37. *Tetrastemma* sp.

(Fig. 8, A)

The body is rather short, slender and about 2 cm long and 1 mm wide. The colour of the body is yellowish green with four darker longitudinal stripes, of which two are situated on the lateral sides of the body, running posteriorly from the back of the posterior pair of ocelli to the hind end of the body, while the others situated on the middle portion of the dorsal surface run posteriorly from the lateral side of the posterior pair of ocelli. The head is provided with 4 ocelli arranged in rectangular shape, each of which is situated in a large oval-shaped white portion. A small amount of large bloches, same in colour with the stripes, are scattered on the dorsal surface of the head except the white spots.

Remarks. This worm agrees with *T. quadrilineatum* (Coe, 1904) in having 4 stripes on the dorsal surface of the body, but differs from the latter in colour and the marking of the head.

Habitat. Only one specimen was found among seaweeds.

Distribution. Akkeshi.

38. *Tetrastemma nigrifrons* Coe, 1904

(Fig. 8. B, 1-8)

Tetrastemma nigrifrons : Coe, 1904, 1905 and 1940.
Prostoma nigrifrons : Yamaoka, 1940.

Three distinct varieties agree in internal organization and are similar in having a large brown cephalic marking on the head. Three varieties are as follows : —

Variety *spadix.* (Fig. 1–3) The body is long and slender, 6 cm long and 0.5–1 mm wide. The head is usually like an arrow-head in shape and broader than the rest of the body. Cephalic grooves are found in two pairs on the head. The head is white and has a large brown pattern on the dorsal surface. It is convex on its anterior and posterior margins and concave on both sides. Sometimes it is not demarcated from the rest of the body and has a large shield-shaped cephalic marking. The trunk is deep brown on the dorsal surface and yellowish rose on the ventral surface. A transverse white band is found on the neck.

Variety *bilineatum.* (Fig. 4–7). The sepcimens collected at Oshoro is rather short, slender, about 2–3 cm long and 1 mm wide, while those collected at Akkeshi is long, about 6 cm long and 1 mm wide. The body is yellow or yellowish rose with a oval-shaped brown marking and two brown longitudinal stripes on the dorsal side of the body. These stripes run posteriorly from the back of the neck to the hind end of the body. All the specimens collected at Akkeshi have the stripes which become spotted posteriorly.

Variety *punctata.* (Fig. 8). The body is short, flabby and about 2 cm long

and 1 mm wide. The head is demarcated from the rest of the body. The colour is anteriorly dull orange and brownish gray posteriorly. The head is white with a shield-shaped brown marking. Numerous minute dots of dark brown are scattered on the cephalic marking and the anterior portion of the dorsal surface of the body.

The head is provided with four well developed ocelli.

Internal structure. The epithelium is thick, being anteriorly two times the thickness of the muscular layers of the body. The cephalic glands are massive and rather well developed above the rhychodaeum, extending nearly to the anterior end of the brain. A small amount of the parenchymatous tissue is found inside the body wall in the anterior portion of the body. The proboscis sheath extends nearly to the posterior end of the body. The proboscis is always provided with

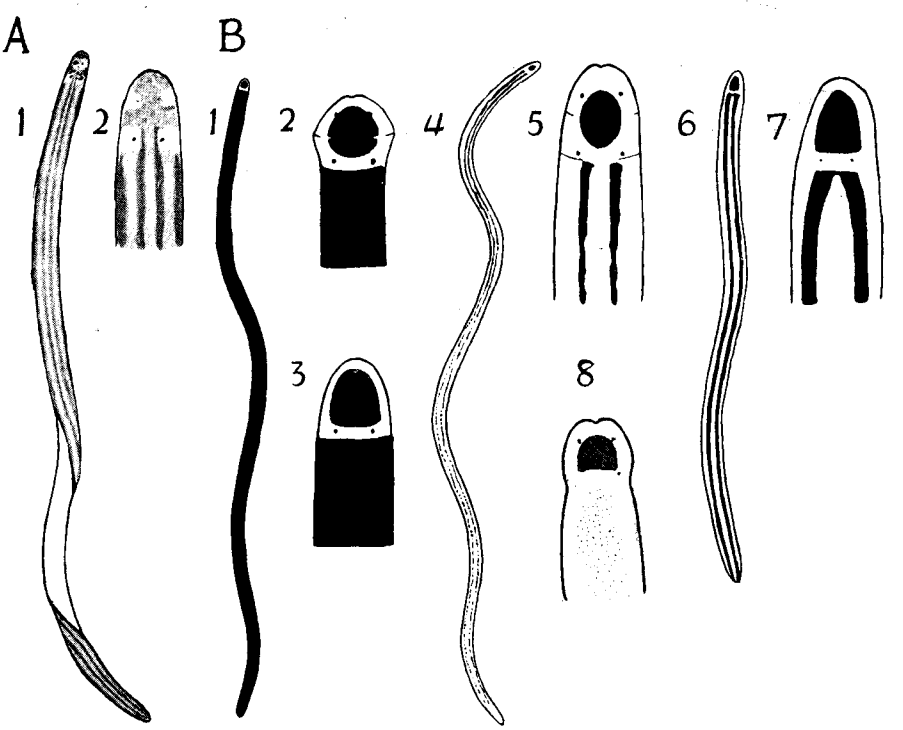

Fig. 8. A. *Tetrastemma* sp. 1). Dorsal surface. ×3. 2). Dorsal surface in the anterior portion of the body. B. *Tetrastemma nigrifrons* Coe. 1). Var. *spadix*. ×1.5. 2) and 3). Dorsal surface in the anterior portion of the body. 4) and 6). Var. *bilineatus*. ×2.5. 5) and 7). Dorsal surface in the anterior portion of the body. 8). Var. *punctata*. Dorsal surface. For abbreviation, see p. 39.

11 distinct nerves. The basis of the central stylet is pear-shaped and the central stylet is a little more than half as long as the basis. Each of two pouches of the accessory stylets is provided with 2–4 stylets. The cerebral sense organs are large, situated a short distance in front of the brain. The diverticula of the intestinal caecum are short, extending near the posterior end of the brain.

Remarks. These specimens differ slightly from the American forms in having always 11 proboscidial nerves.

Habitat. Rather commonly found under stones or among Laminaria roots near the low tide mark or below.

Distribution. Akkeshi, Muroran, Abashiri, Rishiri Island and Oshoro in Hokkaido, Japan ; the coasts from Puget Sound and southoward to Mexico, Salinas Bay, Costa Rica.

39. *Tetrastemma coronatum* (Quatrefages), 1846

Tetrastemma coronatum : Bürger, 1895.

Prostoma coronatum : Bürger, 1940 : Wijnhoff, 1912, Yamaoka, 1940.

Habitat. This material is found on stones or among seaweeds near the low tide mark.

Distribution. Akkeshi and Abashiri ; the north Atlantic Ocean and the Mediterranean Sea.

40. *Tetrastemma verinigrum* nov. sp.

(Fig. 9, A)

The body is small, rounded in cross section throughout the body, about 2–3 cm long and 1 mm wide. The head is not demarcated from the rest of the body. The colour of the body is pale yellow orange with a shield-shaped black marking on the head. Four well developed ocelli are present forming a rectangular shape.

Internal sturcture. The cephalic glands are divided into three portions of the rhynchodaeum except the ventral side and extend posteriorly for a short distance in front of the brain. The epithelium is anteriorly about same the thickness of the muscular layers of the body. The cerebral sense organ is remarkably voluminous, extending from the portion being a short distance in front of the brain to the porsterior end of the brain through its underside. It sends off anteriorly a short and narrow canal, opening externally on the lateral surface of the posterior portion between the tip of the head and the brain. The proboscis sheath extends nearly to the hind end of the body. The proboscis is provided with 10 distinct nerves. The basis of the central stylet is oval-shaped and 0.08 mm long. The accessory stylets are 0.052 mm in length. Each of two pouches of the accessory stylets is provided with three stylets. The anterior diverticula of the intestinal caecum are short, extending forward to the anterior portion of the brain. Nephridia are short in length and extend between the back

of the brain and the anterior portion of the stomach. A pair of efferent ducts are sent off from the anterior portion and open externally on the latero-ventral surface of the body.

Remarks. The present species has the characteristic feature in the cephalic marking and the position of the cerebral sense organs.

Habitat. Several specimens were found in roots of seaweeds between the tide marks.

Distribution. Oshoro.

41. *Tetrastemma yamaokai* nov. sp.

(Fig. 9, B)

The body is small, rounded in cross section throughout the body, about 2–3 cm long and 1 mm wide. The head is not demarcated from the rest of the body. The body is pale yellow or yellow with a large horse shoe-formed or a shield-shaped cephalic marking of reddish orange. The head is provided with 4 well developed ocelli, of which the anterior two are situated on the inner side of the cephalic marking, while the posterior ones on the outer side. They are sometimes so deeply imbeded in the tissue of the head that no any trace is found through the skin from above.

Internal structure. The epithelium is very thin and nearly same time or less than the thickness of the muscular layers of the body. The cephalic glands are not voluminous and divided into two large masses above and below the rhynchodaeum, extending posteriorly to in front of the brain. The proboscis sheath extends nearly to the hind end of the body. The proboscis is provided with 10 distinct nerves. The rhynchocoel is enormously voluminous in cross section throughout the body. Each of two pouches of the accessory stylets is provided with 2–4 stylets. The basis of the central stylet is oval-shaped and 0.07 mm long. The accessory stylets are nearly same in length to the basis. The diverticula of the intestinal caecum are short, extending forward to the posterior portion of the brain. The cerebral sense organs are large, situated at the portion between the front of the brain and the anterior portion on the latero-ventral side of the brain. Nephridia are as usual in the preceding species.

Remarks. The present new species differs from *T. verinigrum* in the following points ; 1) the colour of the cephalic making, 2) the position of the cerebral sense organ, and 3) the length of the stylets and the basis of the central stylet. The specimens in having two white portions, one on the anterior and another on the posterior portion of the cephalic marking, were found at Simoda (by Yamaoka).

Habitat. Several specimens were found among roots of seaweeds between the tide marks.

Distribution. Oshoro in Hokkaido and Simoda in Honsyu.

42. *Tetrastemma pinnatum* nov. sp.

(Fig. 9, C)

The body is very small and slender, rounded in cross section throughout the body, with narrow horizontal fin-like appendages situated on the whole or partial length of the lateral sides of the body. The appendages are posteriorly transformed into several semicircles in shape and become wider in both extremities. They are composed of protrusive epithelium in cross section. The body is about 5 mm long and 0.5 mm wide. The colour of the body is dull yellow green except the head tinted to greenish white. The lateral appendages are pale yellow in colour. The interior of the body, such as the brain, the proboscis and the intestine are found through the skin from above. The brain is found between

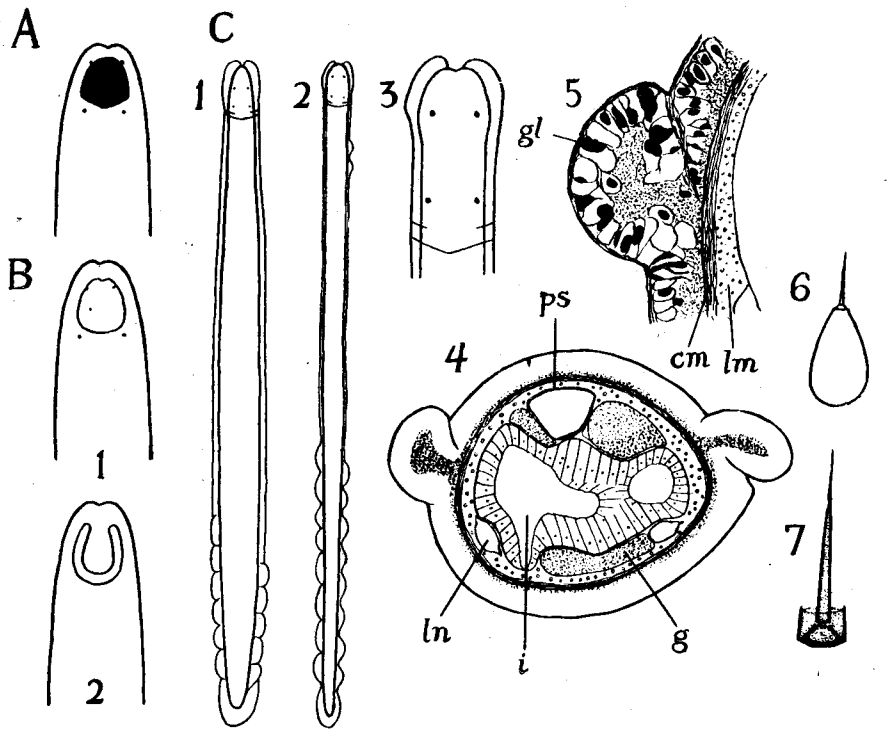

Fig. 9. A. *Tetrastemma verinigrum* nov. sp. Dorsal surface. B. *Tetrastemma yamaokai* nov. sp. 1) and 2). Dorsal surface. C. *Tetrastemma pinnatum* nov. sp. 1) and 2). Dorsal surface. ×20. 3). Dorsal surface in the anterior portion of the head. 4). Transverse section through the intestine, showing leteral swelling of the epithelium. 5). Transverse section, through the lateral swelling of the epithelium. 6). Central stylet and basis. 7). Reserve stylet. For abbreviation, see p. 39

ocelli on the lateral side of the head as a narrow and long rod. The head is provided with 4 well developed ocelli, the distance between the anterior and the posterior being longer than the distance of other species of this genus. Two pairs of the cephalic grooves shaped in V are clearly found on the dorsal surface of the head. The anterior pair is situated behind the ocelli and disappears before meeting on the middle portion of the body, but ventrally runs obliquely forward and meets on the subterminal portion of the head. The posterior pair is situated a short distance from the anterior pair and surrounds the body.

Internal structure. The epithelium is very thick, being about two times the thickness of the muscular layers of the body. The cephalic glands are well developed, but never extend beyond the brain. The cerebral sense organs are large and situated in front of the brain. The short diverticula of the intestinal caecum extend forward for a short distance behind the brain. The proboscis sheath extends to about 3/4 time the length of the body. The proboscis is provided with 10 distinct nerves. Each of two pouches of the accessory stylet contains 5 stylets. The basis of the central stylet is oval-shaped and 0.05 mm long. The accessory stylet is 0.03 mm long. Nephridia are composed of several branched ducts extended for a short distance in the anterior portion of the body, sending off a pair of efferent ducts opeinng externally on the latero-ventral surface of the body.

Remarks. The present species has the characteristic feature in the lateral appendage of the body, and the internal structure, such as ocelli, the cerebral sense organs and the proboscidial nerves, shows characters of genus *Tetrastemma*.

Habitat. Three specimens were found among seaweeds collected from about 4 meters depth.

Distribution. Akkeshi.

43. *Tetrastemma stigmatum* (Stimpson), 1857

Tetrastemma stigmatum : Stimpson, 1857.
Prostoma stigmatum : Bürger, 1904 ; Yamaoka, 1940.

Habitat. This worm is rather commonly found under stones or among seaweeds.

Distribution. Biro, Akkeshi, Abashiri and Hakodaté (by Stimpson).

44. *Tetrastemma candidum* (Müller), 1774

Tetrastemma candidum : Bürger, 1895 ; Wheeler, 1934 ; Coe, 1940.
Prostoma candidum : Bürger, 1904.

The body is rather short and stout, rounded in cross section throughout the body, and about 1 cm long and 0.5–1 mm wide. The colour of the body is white, dull yellow, yellowish brown, pale yellowish green or green without any marking. The head is not demarcated from the rest of the body. Four well developed ocelli are present on the head.

Internal structure. The epithelium is very thick, being about 2–3 times

the thickness of the muscular layers of the body. The cephalic glands are well developed, extending backward beyond the brain. The dorso-ventral muscles are fairly well developed in intestinal region. The cerebral sense organs are large, situated in front of the brain. The oesophagus and the stomach are very short in length and are not voluminous in cross section. The proboscis sheath extends to about 3/4 time the length of the body. The proboscis is provided with 10 distinct nerves. Each of two pouches of the accessory stylets contains several stylets. The basis of the central stylet is cylindrical in shape, anteriorly conical and posteriorly rounded, and 0.096 mm long and 0.048 mm wide. The accessory stylets are about half of the central stylet. The diverticula of the intestinal caecum are short, extending forward far behind the brain.

Remarks. The present worm agrees in outer feature with specimens reported other writers. The internal structure of the body differs from Wheeler's species in the state of the cephalic glands and diverticula of the intestinal caecum.

Habitat. Live among seaweeds near the low tide mark.

Distribution. Akkeshi ; Norway to Mediterranean to Madeira and South Africa ; Labrador to southern New California and Ensenada, Mexico.

45. *Malacobdella japonica* Takakura, 1897

Malacobdella japonica : Takakura, 1896 ; Yamaoka, 1940.

Habitat. The present species lives in the mantle cavity of *Spisula sachalinensis*, which is found in abundance at Akkeshi.

Distribution. Akkeshi in Hokkaido and Shimoda in Honsyu.

Table 1. Distribution of species racorded in this paper

Species \ Localities	Pacific side					Japan Sea side		Okhotsk side				
	Hakodate	Muroran	Biro	Akkeshi	Nemuro	Abashiri	Monbetu	Rishiri	Oshoro	Sapporo	Honsyu	Foreign localities
T. punctatus		*		*			*	*	*		*	
T. ezoensis				*								
P. simulus		*	*	*	*				*		*	
P. filiformis				*								*
C. notabilis				*								
L. bilineatus		*		*								
L. spaticsus				*								*
L. torquatus				*								
L. alborostratus			*	*	*							*
L. fulvus		*	*		*		*	*			*	
C. marginatus								*				
C. fasciata				*	*						*	*
M. bella	?											
M. magna		*							*		*	*
M. uchidai				*								
M. alaskensis				*								
M. akkeshiensis				*								*
B. princeps				*								*
E. gracile		*		*								*
N. minuta				*								*
P. peregrina		*		*	*		*	*	*			*
O. venusta		*						*				
O. dorsalis				*								*
O. polyorbis				*								
Z. grandulosa				*								
Z. sp.		*										
A. parvus				*								
A. depressus	*	*										
A. bimaculatus									*			*
A. punctatulus								*	*		*	*
A. lactifloreus		*		*								*
A. antifuscus				*								
A. cervicalis		*						*			*	*
A. musculus									*			
A. regius		*										
P. graecense										*	*	*
T. sp.				*								
T. nigrifrons		*		*		*		*	*			*
T. coronatum				*		*						*
T. verinigrum									*			
T. yamaokai									*		*	
T. pinnatum				*								
T. stigmatum	*		*	*		*						
T. candidum				*								*
M. japonica				*							*	

Literature

Bergendal, D. 1903. Till kännedomen om de nordiska Nemertinerna. 4. Förteckning öfver vid Sveriges vestkust iakttagnal Nemertiner, Arkiv. Zool., **1**. : 85-156.

Böhmig, L. 1898. Beiträge zur Anatomie und Histologie der Nemertinen. Zeitschr. wiss. Zool., **64**. : 479-564.

Bürger, O. 1895. Die Nemertinen des Golfes von Neapel. Fauna u. Flóra des Golfs von Neapel. Monog. **22**. : 1-743.

———— 1904. Nemertini. Das Tierreich, **20**. : 1-151.

Coe, W. R. 1901. Papers from the Harriman Alaska Expedition. 20, The nemerteans. Proc. Wash. Acad. Sci., **3**. : 1-110.

———— 1904. The nemerteans. Harriman Alaska Exped., **11**. : 1-220.

———— 1905. Nemerteans of the west and northwest coasts of America. Bull. Mus. Comp. Zool., **47**. : 1-319.

———— 1930. Two new species of Nemerteans belonging to the family Cephalothrichidae. Zool. Anz., **94**. : 97-103.

———— 1940. Revision of the nemertean fauna of the Pacific coasts of north, central, and northern south America. Allan Hancock Pacific Exped. **2**, No. 13. : 247-323.

Friedrich, H. 1934. Studien zur Morphologie, Systematik und Oekologie der Nemertinen dor Kieler Bucht : I. Teil : Spezielle Systematik und Oekologie ; II Teil : Allgemeine Morphologie. Arch. Naturgesch. N.F., **4**. : 293-375.

———— 1936. Nemertini. Tierw. Nord- u. Ostsee, Lief. **30**, 4d. : 1-69.

Griffin, B. B. 1898. Description of some marine Nemerteans of Puget Sound and Alaska. Ann. N. York Ac. **11**. : 193-218.

Ishizuka, H. 1933. On a fresh-water Nemertean from Hokkaido. Proc. Imp. Acad. Japan, **4**. : 215-218.

Iwata, F. 1951. Nemerteans in the vicinity of Onomichi. Jour. Fac. Sci. Hokkaido Univ. ser. 6, Zool., **10**, No. 2 : 135-138.

———— 1952. Nemertini from the coasts of Kyusyu. Jour. Fac. Sci. Hokkaido Univ., ser. 6, Zool., **11**, No. 1 : 126-148.

Stephenson, J. 1911. The nemertiens of Millport and its vicinity. Trans. Roy. Soc. Edinbourgh, **48**. : 1-29.

Stiasny-Wijnhoff, G. 1938. Das Genus Prostoma Dugés, Eine Gattung von Süsswasser-Nemertinen. Arch. Néerland. Zool., **3**. : 219-228.

Stimpson. W. 1857. Prodromus descriptionis animalium evertebratorum, quae in Expeditione and Oceanum Pacificum Septemtrionalum, ..., Proc. Acad. Nat. Sci. : 159-165.

Sudzuki, M. 1953. On Japanese Fresh-water Nemerteans (In Japanese). Zool. Mag. (Tokyo), **62**, No. 6. : 212-218.

Takakura, U. 1897. On a new species of *Malacobdella* (*M. japonica*). Annot. Zool. Japon., **1**. : 105-112.

———— 1898. Classification of Nemertini in the vicinity of Misaki (In Japanese). Zool. Mag. (Tokyo), **10**.

Wheeler, J. F. G. 1934. Nemerteans from the South Atlantic and Southern Oceans. Discovery Reports. Chambridge. **9**. : 215-320.

Wijnhoff, G. 1912. List of nemerteans collected in the neighbourhood of Plymouth from May-September, 1910. Jour. Marine Biolog. Assoc. N. S. Plymouth. **9**. : 407-434.

——— 1913. Die Gattung *Cephalothrix*, etc. II, Systematischer Teil. Zool. Jahrb. Abt. Syst. Geog. u. Biol., . **34**: 291-320.
Yamaoka, T. 1940. The Fauna of Akkeshi Bay. IX. Nemertini. Jour. Fac. Sci. Hokkaido Univ. ser. 6. Zool., **7**, No. 3. : 206 258.

Abbreviations used in the explanation of figures 1 to 9

br, brain.
ca, caecal appendage of oesophagus.
cm, circular muscle layer.
cps, circular muscle layer of proboscis sheath.
cso, cerebral sense organ.
dc, dorsal commissure of brain.
dg, dorsal ganglion.
dv, dorsal blood vessel.
g, gonad.
gl, gland cell.
i, intestine.
id, intestinal diverticulum.
lm, longitudinal muscle layer.
ln, lateral nerve.
lps, longitudinal muscle layer of proboscis sheath.
lv, lateral blood vessel.
n, nephridia.
oe, oesophagus.
oec, oesophageal caecum.
oen, oesophageal nerve.
p, proboscis.
ps, proboscis sheath.
s, stomach.
vc, ventral commissure of brain.
vg, ventral ganglion.