

Report of the Biological Survey of Mutsu Bay.

16. Macrura of Mutsu Bay.¹⁾

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(With Plate XVI and 5 text-figures.)

The Macruran specimens collected by the survey amount to over 400 in number representing 13 genera and 23 species. Among them, one genus, *Paraspirontocaris* and four or probably five species are new to science; i. e., *Paraspirontocaris kishinouyei*, *Spirontocaris minuta*, *Sp. japonica*, *Gebia affinis* and *Pandalus sp.*

By the study of the collection, we can learn many interesting facts, especially from the view point of the geographical distribution. For instance, *Penaeus japonicus* which has not hitherto been known north of Akita-prefecture on the side of the Japan Sea and whose northern limit of distribution on the Pacific side was probably the Cape Inuboe-zaki, is now found to exist even in a fully grown stage so far north in the bay. It is also ascertained that such forms as *Erythropenaeus akayebi* (RATHBUN), *Alpheus japonicus* MIERS, *A. distinguendus* DE MAN, *Latreutes laminirostris* ORTMANN, *Leander serrifer* STIMPSON and *Gebia major* DE HAAN which are all rather southern inhabitants similarly have their existence in the bay. On the other hand, it is interesting that the northern form, *Spirontocaris prionota* which has already been recorded far from California and Behring Sea is again here collected; and concerning the new species, such as *Spirontocaris minuta*, *Sp. japonica* and *Pandalus sp.*, their nearly allied forms have been found from Behring Sea, North America or somewhere else.

Finally, it is with great regret that I call attention to the death of Prof. K. KISHINOUE, who promised to cooperate with me in the present study.

¹⁾Contributions from the Marine Biological Station, Asamushi, Aomori-Ken. No. 55.

Tribe PENAEIDEA.

Family Penaeidae BATE.

Genus PENAEUS BABRICIUS.

1. *Penaeus japonicus* (BATE).

Penaeus canaliculatus var. *japonicus* BATE, 1888, p. 245, Pls. 31, 32, 37.

Penaeus japonicus, DE MAN, 1911 (Siboga), p. 107, (other previous literature);
BALSS, 1914, p. 13.

Japanese name: Kurumayebi.

Loc. Moura. July 19, 1926. 2 males.

Off Gomijima. August 16, 1926. 1 female.

The female specimen is 21 cm. long and 85 gr. in weight.

General Distribution: Indo-pacific region. In Japan, it has been well known from Kiushû, Shikoku and Honshû, but on the coast of the Japan Sea it has not been known north of Akita Prefecture and on the Pacific side never known north of the Cape Inuboe-zaki.

Genus TRACHYPENAEUS ALCOCK.

2. *Trachypenaeus curvirostris* (STIMPSON).

Penaeus curvirostris STIMPSON, 1860, p. 44; DE MAN, 1907, p. 436.

Parapenaeus curvirostris RATHBUN, 1902, p. 38,

Trachypenaeus curvirostris, BALSS, 1914, p. 11.

Japanese name: Saruyebi.

Loc. Off Nonai, August 18, 1925. 1 female.

Futago-ôshima. July 30, 1926. 2 males and 3 females.

Okunai. July 31, 1926. 1 female.

Off Futatsuya. July 24, 1927. 3 females.

General Distribution: Arafura sea. Japan: Kiushû, Shikoku, Honshû, south of Corea.

Genus ERYTHROPENAEUS KISHINOUE.¹⁾3. *Erythropenaeus akayebi* (RATHBUN).

Parapenaeus akayebi RATHBUN, 1902, p. 39.

Japanese name: Akayebi.

¹⁾KISHINOUE, 1929, p. 283.

Loc. Off Tsubakiyama. July 24, 1927. 1 male and 1 female.

General Distribution: Japan: Kiushû, Inland sea. Occurrence in Mutsu Bay is interesting.

Genus CERATOPENAEUS KISHINOUE.¹⁾4. *Ceratopenaeus dalei* (RATHBUN).

Parapenaeus dalei RATHBUN, 1902, p. 42.

Loc. Between Moura and Namiuchi. July 12, 1926. 1 male and 1 female.

Okunai. July 31, 1926. 2 females.

Off Shirasu. August 1, 1926. 1 female.

Off Kawauchi. August 11, 1926. 1 male.

Off Noheji. August 22, 1926. 1 male.

Off Tairadate. July 24, 1927. 1 male and 1 female.

Off Higashiokuyakata. August 10, 1927. 2 males.

General Distribution: It has hitherto been recorded from Moji and Hakodate, Hokkaido.

Tribe EUCYPHIDEA.

Family Alpheidae BATE.

Genus ALPHEUS FABRICIUS.

5. *Alpheus japonicus* MIERS.

Alpheus japonicus MIERS, 1879, p. 53; ORTMANN, 1891, p. 476, pl. 36, Fig. 14.

Japanese name: Tenagateppô-yebi.

Loc. Off Moura. 12-13 fms. Sandy mud. July 20, 1926. 1 egg-bearing female.

Between Moura-kojima and Futagojima. 12.5 fms. Sandy mud. July 21, 1926. 1 male.

On the line between Ôshima Isl. and Aomori, off the Marine Biological Station, Asamushi. 1 egg-bearing female.

On the line between Cape Futagozaki and Ôshima Isl., off Cape Aburamezaki. 27 fms. Sandy mud. July 30, 1926. 1 egg-bearing female.

¹⁾KISHINOUE, 1929, p. 282.

Between Tsuchiya and Moura. August 10, 1925. 2 males and 3 egg-bearing females.

Off Futatsuya. July 24, 1927. 1 male.

General Distribution: Southern Japan: Tokyo Bay, Tanagawa, Yokosuka, Kobe.

6. *Alpheus distinguendus* DE MAN.

Alpheus rapax DE HAAN, 1849, p. 177, Pl. 45, Fig. 2; BATE, 1888, p. 552, Pl. 99, Fig. 1; DE MAN, 1888, p. 284; ORTMANN, 1891, p. 481.

Alpheus distinguendus DE MAN, 1909, p. 155, Pl. 7, Figs. 9-14.

Loc. Off Aomori. 14-15 fms. Bottom mud. June 1, 1926. 1 male.

General Distribution: Japan; China; Mergui-Archipelago.

Family Hippolytidae ORTMANN.

Genus LATREUTES STIMPSON.

7. *Latreutes laminirostris* ORTMANN.

Latreutes laminirostris ORTMANN, 1891, p. 506, Pl. 37, Fig. 5; DE MAN, 1907, p. 422.

Loc. Moura. 5 fms. Sand and sea-weeds. July 20, 1926. 1 male and 1 egg-bearing female.

Ôma Bay. August 18, 1927. 1 male.

General Distribution: Japan: Tanagawa, Inland Sea.

Genus SPIRONTOCARIS BATE.

8. *Spirontocaris prionota* (STIMPSON).

Hippolyte prionota STIMPSON, 1864, p. 153.

Spirontocaris prionota, BALSS, 1914, p. 42; SCHMITT, 1921, p. 52, Text-fig. 28.

Loc. Off Arito. 19 fms. Sandy mud. August 22, 1926. 1 male.

General Distribution: From Behring Sea to Monterey, California; Japan: Aomori.

9. *Spirontocaris pectinifera* (STIMPSON).

Hippolyte pectinifera, STIMPSON, 1860, p. 35.

Spirontocaris pectinifera, BALSS, 1914, p. 42, Text-figs. 23, 24.

Loc. On the line between Futagojima and Cape Hanaguri-zaki,

off Namiuchi. Sandy mud. August 5, 1926. 1 male.

General Distribution: Japan: Hakodate, Dsushi, Negishi near Yokohama.

10. *Spirontocaris mororani* RATHBUN.

(Text-fig. 1).

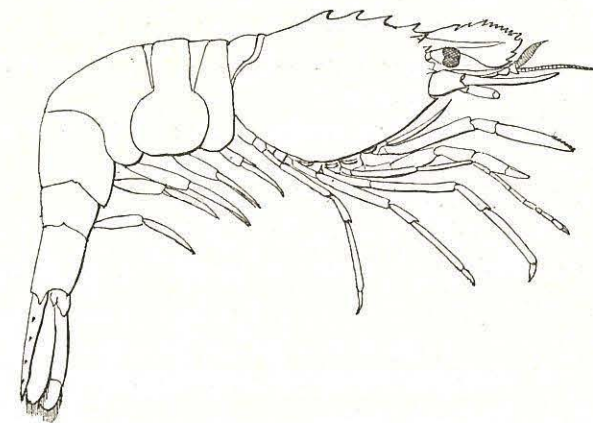
Spirontocaris mororani RATHBUN, 1902, p. 43, Text-fig. 16.

Loc. Between Yunoshima Isl. and Asamushi. 5-6 fms. Sea-weeds. August 19, 1926. 3 males.

About 1500 metres off Jôgasawa. 11 fms. Sea-weeds. August 18, 1926. 1 female.

Off Noheji. 5 fms. Sea-weeds. August 22, 1926. 1 male.

Off Arito. 19 fms. Sea-weeds. August 22, 1926. 1 male.



Text-fig. 1. *Spirontocaris mororani* RATHBUN. (×4).

These specimens are all smaller than the type specimen described by RATHBUN; the largest one from between Yunoshima Isl. and Asamushi is 24.2 mm. long from the tip of the rostrum to the end of the telson.

The rostrum is shorter than that of the type specimen and scarcely longer than one half the length of the rest of the carapace, and its tip is similar in feature to that of *Spir. ochotensis* (BRANDT)*. It

* BRANDT, 1851, p. 120, Pl. 5, Fig. 17.

exceeds a little the distal end of the peduncle of the first antenna. Four prominent teeth are on the dorsal carina of the carapace. Of the two supraorbital spines the anterior is distinctly smaller than the posterior.

General Distribution: Muroran, Hokkaidô.

11. *Spirontocaris pandaloides* (STIMPSON).

Hippolyte pandaloides STIMPSON, 1860, p. 34; DOFLEIN, 1902, p. 637, Pl. 5, Fig. 3.
Spirontocaris pandaloides, DE MAN, 1907, p. 418, Pl. 32, Figs. 47, 48.

Japanese name: Tunonagamoyebi.

Loc. Between Yunoshima Isl. and Asamushi. 5-6 fms. Sea-weeds. April 29, 1926. Numerous specimens of both sexes.

Off the mouth of the Shimizugawa. 17 fms. Sandy mud. July 4, 1926. Many specimens.

Moura. 5 fms. Sea-weeds. July 20, 1926. Many specimens.

About 1500 metres off Sumichigai. 9 fms. Sea-weeds. August 11, 1926. Many specimens.

Off Noheji. 5 fms. Sea-weeds. August 22, 1926. 6 males and 2 females.

Ôma Bay. August 18, 1927. 1 male.

Rostrum with 7-10 teeth above, 9-12 below.

General Distribution: Hakodate to Inland Sea of Japan; Corea Strait.

12. *Spirontocaris geniculata* (STIMPSON).

Hippolyte geniculata STIMPSON, 1860, p. 34; ORTMANN, 1891, p. 503, Pl. 37, Fig. 3.
Spirontocaris geniculata, RATHBUN, 1902, p. 45, Text-fig. 19.
Spirontocaris alcimede DE MAN, 1907, p. 416, Pl. 32, Figs. 42-46.

Japanese name: Kosimagarimoyebi, Kusakosiyebi.

Loc. Between Yunoshima Isl. and Asamushi. 5-6 fms. Sea-weeds. Many specimens of both sexes.

do. August 23, 1927. 2 immatures.

Moura. 5 fms. Sand and sea-weeds. July 20, 1926. 2 males, and 1 immature.

Off Sumichigai. 9 fms. Sea-weeds. August 11, 1926. 6 males and 6 females.

Off Noheji. 5 fms. Sea-weeds. August 22, 1926. 3 males and 1 female.

Off Arito. 19 fms. Sandy mud. August 22, 1926. 1 male.

The coast of Tsuchiya, among sea-weeds. August 23, 1926. 7 males.

The mandible in the specimens here examined, is furnished with a palp in two segments, while in the figure given by ORTMANN the palp seems to be three segmented. Some specimens are armed with a minute branchiostegal tooth on either or on both sides. Rostrum with 5-7 teeth above, 6-7 below. The external maxilliped is provided with a rudimentary epipodite in the present specimens, but in other respects it agrees with the description of *Spirontocaris alcimede* DE MAN.

On the supposition that DE MAN overlooked the epipodite in his *Spirontocaris alcimede* his name becomes a synonym of *S. geniculata* (STIMPSON).

General Distribution: Japan: Hakodate, Muroran, Tanagawa, Tokyo Bay, Inland Sea.

13. *Spirontocaris rectirostris* (STIMPSON).

Hippolyte rectirostris STIMPSON, 1860, p. 33; DOFLEIN, 1902, p. 637, Pl. 3, Fig. 7.
Spirontocaris rectirostris, DE MAN, 1907, p. 411, Pl. 32, Figs. 31-34; BALSS, 1914, p. 43.

Japanese name: Asinagamoyebi.

Loc. Between Yunoshima Isl. and Asamushi. 5-6 fms. Sea-weeds. April 29, 1926. 18 egg-bearing females.

In front of Benten, Yunoshima Isl. January 18, 1927. 11 females.

Off Kanita. July 23, 1927. 1 male and 2 females, of which one bore eggs.

Rostrum with 5-7 teeth above, 3 or 4, very rarely 2, teeth below.

General Distribution: Japan: Hakodate, Aomori, Sagami Bay, Inland Sea, Nagasaki.

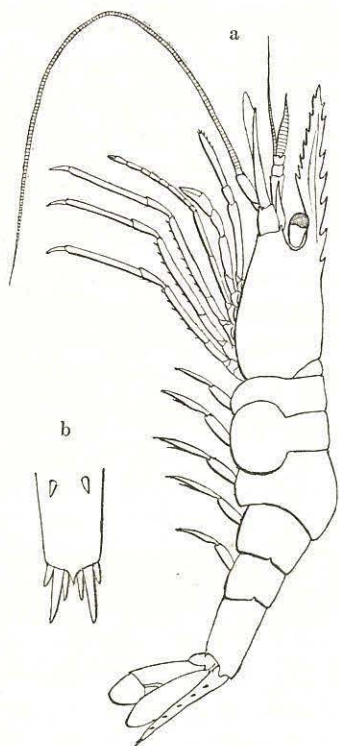
14. *Spirontocaris minuta*, n. sp.

(Text-fig. 2).

Loc. Off Arito. 19 fms. Sandy mud. August 22, 1926. 1 specimen,

probably male.

Closely related to *Spirontocaris decora* RATHBUN¹⁾ from Pacific Coast of North America, but different from this in the longer rostrum and its feature and denticulation; the sixth abdominal is relatively shorter than that of the American species.



Text-fig. 2. *Spirontocaris minuta*, n. sp.
 a. Entire animal, view from left side ($\times 4$).
 b. Terminal half of the telson, dorsal aspect.

fifth it is pointed to a sharp tooth; the sixth segment, which is a

¹⁾RATHBUN, 1902. p. 896.

little longer than twice the length of the fifth, is almost twice as long as broad; its postero-lateral angle terminates in a sharp point. The telson, which is about one and a third times as long as the sixth segment and almost equal in length to the uropods, terminates in a triangular point and three pairs of spinules. Of these spinules, the outer one is the shortest and the middle is the longest, while the inner one is intermediate between the two. The dorsal side of the telson is armed with five pairs of spinules.

The eye-stalk is of moderate size and the distal end of the cornea scarcely reaches to the base of the third tooth on the upper margin of the rostrum. The first pair of antennae exceed the tip of the rostrum with a part of the inner flagellum, while the outer flagellum is shorter and stouter than the inner and does not reach the extremity of the rostrum. In the peduncular segments, the first is the longest and the succeeding two segments are shorter than the first, and each of them is armed with a sharply pointed spine at the external extremity. The stylocerite is terminally pointed and reaches the extremity of the first peduncular segment. In the second pair of antennae the basal segment is terminally produced to a sharp point, and the scaphocerite scarcely attains to the level of the rostral extremity; the flagellum is about as long as the body-length without the rostrum. The external maxilliped is furnished with a rudimentary epipodite, but not with an exopodite. In the pereopods the anterior three pairs are provided with epipodites. The carpus of the second pair is divided into seven articles, in which the second is the shortest and the third is the longest. The posterior three pairs of legs are similar in feature, and their meri and carpi are provided with series of spinules on their posterior borders.

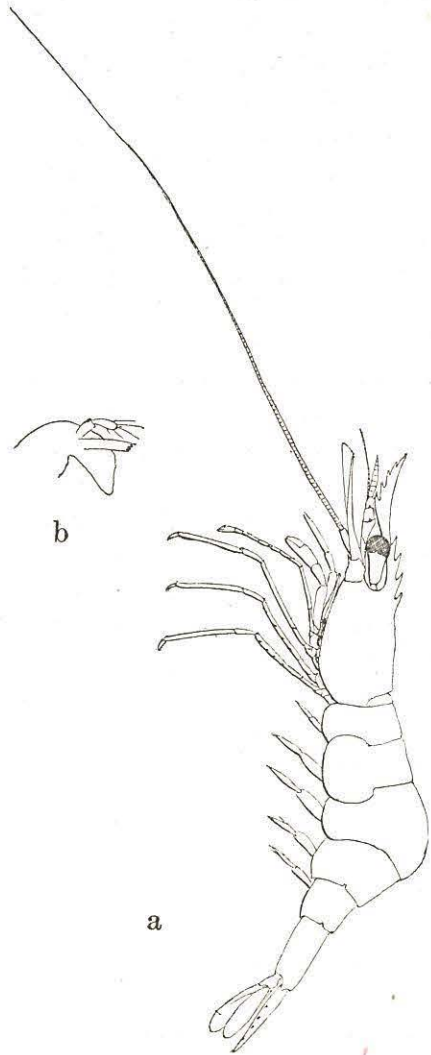
15. *Spirontocaris japonica*, n. sp.

(Text-fig. 3).

Loc. Between Yunoshima Isl. and Asamushi. 5-6 fms. Sea-weeds. April 29, 1926. 4 young specimens.

These specimens are of small size, the largest of which is 19.4 mm. and the smallest 13.5 mm. in total length from the tip of the rostrum to the end of the telson. The rostrum is armed with four teeth above on the proximal half, while the distal half of the rostrum is devoid

of teeth. These four teeth are subequal in size and the posterior one is behind the posterior margin of the orbit. The length of the



Text-fig. 3. *Spirontocaris japonica*, n. sp.
a. Entire animal, view from left side. ($\times 6$).
b. Mandible.

rostrum is variable according to the size of the specimen; in the smallest specimen the rostrum is very slender in shape and reaches scarcely to the tip of the basal segment of the first antenna, while in the largest one it is much deeper than that of the former and reaches far beyond the extremity of the peduncle of the first antenna, attaining to the extremity of the scaphocerite of the second antenna. There is no supraorbital tooth; the outer angle of the orbital margin terminates in a rounded tooth or lobe, and an antennal and a branchiostegal tooth are usually furnished on the anterior portion of the carapace. Of these two teeth the former is larger than the latter; the latter is sometimes obscure. The eye-stalk is rather large and pyriform. The distal end of the eye reaches to the anterior tooth of the upper margin of the rostrum. In the first pair of antennae, the stylocerite is terminally pointed and shorter than the basal segment of the

peduncle, which is very long, especially in smaller specimens. In the peduncular segments the proximate is the longest and the others are much shorter than that; each of the segments of the peduncle is terminally armed with a spinule on the outer border.

The outer maxilliped, reaching to the level of the end of the basal peduncular segment the first antenna or a little beyond it, is furnished with an exopodite and an epipodite. The anterior three pairs of legs are also provided with epipodites. The abdomen, which is smooth surfaced and dorsally rounded, is geniculated at the third segment, where it is unarmed. The sixth abdominal segment is about as long as twice the length of the fifth, and a little shorter than the telson. The pleura of the fourth and the fifth abdominal segments are pointed posteriorly. The telson, which carries four pairs of spinules on the dorsal surface, tapers gradually posteriorly and its posterior margin ends in the middle in a sharp tooth, and of the two spines on either side the outer is a little shorter than the inner.

The species is allied with *Spironto fabricii* (KRÖYER)¹⁾ and *Spironto middendorffii* BRASHNIKOW.²⁾ From the former it differs in the following points. The rostrum is much longer than the length of the rest of the carapace, and most of the teeth on the upper margin of the rostrum are in front of the posterior orbital margin. These differences, in my opinion, are too distinct to attribute to their immaturity. From the latter it differs in the toothing of the rostrum and in the absence of the abdominal armature.

Genus PARASPIRONTOCARIS, n. gen.

The surface of the body is rather uneven and covered with short hairs. The rostrum projects obliquely downwards, and is laterally compressed; a rib on each side is well developed and the upper margin is provided with small teeth, which are rather conical in shape and directed nearly perpendicular to the margin. The supraorbital tooth is strong and the branchiostegal tooth is also well developed, while the antennal is wanting. In the abdominal segments a half of each of the first and the fifth segments is dorsally carinated in the

¹⁾RATHBUN, 1929, p. 15, Text-fig. 15.

²⁾BRASHNIKOW, 1907, p. 165, Figs. 23 a-b.

medial line and the other half is provided with a paired carinae, while in the second, the third and the fourth segments a strong carina is on the medial line. The sixth and the seventh segments are dorsally rounded, but the former projects posteriorly in three points. The latter or the telson is provided with some minute spinules.

The eye-stalk is moderate in size. The first antenna is provided with a well developed stylocerite and bears two flagella, a stout and a slender one. The mandible is divided into two portions and provided with a palp in two segments. The second maxilliped bear a rudimentary mastigobranchia, and the podobranchia is obscurely developed. The external or third maxilliped is four segmented and devoid of the exopodite. The anterior two pairs of the pereopods are chelate, and the carpos of the second is subdivided into seven articles.

The branchial formula is as follows:—

	h	i	k	l	m	n	o
Pleurobranchiae	—	l	l	l	l	l	—
Arthrobranchiae	—	—	—	—	—	—	—
Podobranchiae	r?	—	—	—	—	—	—
Mastigobranchiae	r	r	r	r	r	—	—

The new genus is nearly allied with the genus *Spirontocaris*, but differs in its peculiar shape and the armature of the rostrum, in the paired carinations of the first and the fifth abdominal segments, and in the branchial formula. The spinules of the telson, in this genus, are very obscure under the naked eye.

15. *Paraspirontocaris kishinouyei*, n. sp.

(Pl. XVI, figs. 1-6).

Loc. On the line between Kanita and Yokohama, off Ôshima Isl. July 17, 1927. 1 male.

Off Tairadate. July 24, 1927. 1 male.

The specimens are 27.9 and 22.5 mm. in length, measuring from the tip of the rostrum to the end of the telson. The body is rather stout and covered with short hairs. The carapace including the rostrum is about one and a half times as long as the abdomen, and dorsally carinated in the medial line. This dorsal carina of the carapace is armed with two small tubercles and is slightly notched

above the base of the supraorbital tooth. The rostrum, which projects obliquely downwards, is not only laterally compressed but also provided with a rather strong rib on each side and is a little longer than two thirds the length of the rest of the carapace. On its superior margin it is armed with minute teeth which are rather conical in shape and stand at right angles with the margin. At the base of the rostrum there is a very strong supraorbital tooth on each side, directing forwards and outwards. At the branchiostegal angle the carapace is dilated outwards and forwards to a sharp point, but is devoid of any antennal tooth.

The eyes are moderate in size. The first pair of the antennae exceeds the distal end of the rostrum with a part of the flagella, in which the outer is much thicker than the inner; in the peduncular segments the proximal is longer than the succeeding two segments together. The stylocerite is well developed, almost reaching the middle of the second peduncular segment, and, terminally, obtusely pointed. The distal two peduncular segments are subequal in length and the proximal one is elongated at the distal outer corner to a sharp point. The second antenna is about as long as the body without the rostrum and the telson, and furnished with a well developed scaphocerite which almost reaches the distal end of the flagellum of the first antenna, and its blade exceeds the tip of the outer spine. The mandible is divided into two parts and furnished with a palp in two segments. At the base of the second maxilliped there is a lobe on the outer margin, and this lobe extends downwards to a thin lamella which is evidently a rudimentary mastigobranchia. The upper portion of this lobe is thick and provided with a number of small branching lobes. The lump of these lobes is probably a rudimentary podobranchia. The external maxilliped reaching the distal end of the scaphocerite is four-segmented and devoid of exopodite. And its distal segment is terminally provided with a series of spinules. The first pereopod is stout and chelate; the tip reaches the middle of the terminal segment of the external maxilliped. The second leg, which reaches the distal end of the antennal scale, is slender and bears a small chela; the carpos is subdivided into seven segments, in which the third is the longest of all, the distal one succeeds it in length, and the remaining five segments are much shorter than any of the above

described. The following three pairs of legs are like in feature and as long as or somewhat longer than the second leg. The terminal segment or the dactylus is short and on the posterior margin as well as on the propodus and the murus there is a series of spinules, which vary in number. A rudimentary mastigobranchia is provided on each of the external maxillipeds and the anterior three pairs of legs.

Of the abdominal segments, the first is dorsally armed with two spinular tubercles in pair on the anterior portion, while the posterior half is dorsally carinated in the medial line. The succeeding three abdominal segments are dorsally strongly carinated in the medial line, and these carinae are more or less posteriorly pointed. In the fifth abdominal segment the anterior half is dorsally carinated in the medial line, while the posterior half is dorsally rather flat surfaced, and a pair of obtuse carinae extend backwards to two acute points. The sixth abdominal segment is dorsally rounded, but the posterior margin is produced backwards to an acute point: besides this it is pointed backwards on each side. The lateral plates or the pleura are rounded in the anterior four abdominal segments, while in the fifth and the sixth they are posteriorly pointed. The telson, which is longer than the preceding two segments together and exceeds the tip of the uropod, is armed with two pairs of spinules on the lateral margins and with one or two pairs on the posterior margin.

I examined some specimens of the nearly allied species of both sexes in the collection of Aichi-ken; the specimens in this collection are all larger than the present specimens; one of them is 52 mm. long, and the second abdominal segment of the female is broader than that of the male.

Family **Pandalidae** BATE.

Genus **PANDALUS** LEACH.

17. **Pandalus latirostris** RATHBUN.

Pandalus latirostris RATHBUN, 1902, p. 46, Text-fig. 20, 21.

Loc. Ōma Bay. August 18, 1927. 45 specimens.

The body length, measuring from the tip of the rostrum to the end of the telson, is 119 mm. in the largest and 49 mm. in the smallest.

In the larger specimens, these samples coincide with the description

of RATHBUN in all respects but in the armature of the rostrum. The rostrum is armed with 14 to 18, very rarely 20, above, of which 4 or 5 are on the carapace, and with 9 to 13 teeth on the lower margin. In all but one specimen the rostrum is armed with a subterminal tooth on the upper margin.

The body is nearly naked and smooth, but in the large specimens, there are some areas beset with very short hairs on the gastric region and near the lateral margin of the carapace.

In the smaller specimens, there are some variations in relative dimensions. The rostrum is comparatively longer, and it is one and two-thirds times as long as the carapace; therefore, the carapace, including the rostrum, is longer than the abdomen with the telson. The scaphocerite of the second antenna is also elongated, corresponding to the length of the rostrum, so that the outer maxilliped does not reach to the middle of the scaphocerite. The third pair of legs is long, comparing with the length of the second leg, and it exceeds the distal end of the second leg on the left side by one half the length of the penultimate segment.

The colour is brownish red and marked with longitudinal darker streaks.

General Distribution: Muroran and Tokyo.

18. **Pandalus** sp.

(Pl. XVI, figs. 7-12).

Loc. Ōmashimote. August 18, 1927. 1 specimen, probably male.

The specimen is 20.3 mm. long, measuring from the base of the rostrum to the end of the telson.

The body is naked and its surface is smooth. The carapace without rostrum is about two and one-third times as long as the abdomen including the telson. The blunt medial carina on the dorsal surface of the carapace is produced to the rostrum. The rostrum, though the terminal half is unfortunately missing in the specimen, bears ten movable spines above and four teeth below on the proximal half. Three of the upper spines are behind the posterior orbital margin, and in those on the inferior margin the posterior one is the largest. On the anterior margin of the carapace there are a strong

antennal and a small branchiostegal tooth on each side besides the rostrum.

The first antenna is provided with a small stylocerite, which is terminally rounded, and bears two flagella of the length of about one and a half times the peduncle. The scaphocerite of the second antenna is somewhat shorter than the carapace excluding the rostrum. It is narrow in shape, but broader near the base, gradually tapering to the distal extremity, where the external spine projects far forwards beyond the blade. At the broadest point it is about seven times as long as broad. The flagellum is missing. The mandible is distinctly divided into two processes, the incisor and the molar, and bears a well developed palp, which consists of three segments and almost reaches the extremity of the incisor process. In the segments of this palp the proximal is narrow at the base and the distal is somewhat longer than any of the foregoing segments. The upper lobe of the first maxilla is terminally rounded. In the second maxilla, the laminar exopodite extends backwards into the branchial chamber, and is fringed with long hairs on its posterior extremity as is commonly seen in this genus. The medial lobe or the endopodite, tapering to the extremity, is distally curved inwards. In the remaining three lobes, which correspond to the protopodite, the inner margin of the basal is rather concave, while the anterior two lobes are well developed and their margins are rounded. The first maxilliped is provided with a well developed epipodite which is divided into two lobes, while in the second maxilliped it is smaller than that of the preceding pair, and a small podobranchial plume is attached at the base. The third maxilliped somewhat exceeding the distal end of the antennal scale is five-segmented, and the basal segment is furnished with a rudimentary mastigobranchia. The second segment is very short; the third, terminating in two spinules, is the longest and the basal half is excavated at the dorsal surface. It is as long as two and a half times the length of the fourth and is one and one-fifth times as long as the terminal segment, which terminates in several numbers of spinules. Each of the anterior four pairs of legs is also furnished with a rudimentary mastigobranchia. The first leg is styliform, six segmented, and a little shorter than the third maxilliped. The second pair is chelate, bears the carpos subdivided into more than 50 articles in the left, while

in the right it is divided into about 20 articles. The latter is somewhat longer than the third maxilliped, while the former is much longer than these. The third leg is stout and a little shorter than the second leg of the left; the merus is armed with five spinules on the posterior margin, the carpos with a spine, and the propodos, being a little compressed, is somewhat dilated at the posterior margin, where a number of spinules are provided. In the fourth leg the merus is armed with four spinules on the posterior margin and three on the outer surface. The dactyli of the posterior three pairs of legs are short and armed with a series of spinules on the posterior margins.

The abdomen is laterally compressed and dorsally rounded. The sixth segment is somewhat longer than the preceding two segments together. The telson, which is one and a half times as long as the sixth, is dorsally armed with four pairs of spinules and terminates in three pairs of spinules.

The species is closely allied to *Pandalus montagui tridens* RATHBUN¹⁾ from Alaska, but it seems to be quite different from this in two main points, that is, in the shape of the antennal scale and in that the sixth abdominal segment is stouter. The fact that the antennal scale tapers to its extremity indicates that the species has some affinity to the genus *Notocaris*.

Only a single specimen being found in the collection and the terminal half of its rostrum being missing, it is considered better to reserve the naming of the present species, although it is quite certain that it belongs to *Pandalus*, and it is unable to identify it as any species of the genus hitherto known to science.

Family Crangonidae BATE.

Genus CRANGON FABRICIUS.

19. *Crangon affinis* DE HAAN.

Crangon affinis DE HAAN, 1849, p. 183.

Crangon propinquus STIMPSON, 1860, p. 25; RATHBUN, 1902, p. 42; BRASHNIKOW, 1907, p. 84.

Crangon hakodatei RATHBUN, 1902, p. 42, Text-fig. 15.

Crangon consobrinus DE MAN, 1907, p. 405.

Crangon cassiope DE MAN, 1907, p. 466.

¹⁾ RATHBUN, 1902, p. 901.

Japanese name: Yebizyako.

Loc. Between Yunoshima Isl. and Asamushi. 5-6 fms. Sea-weeds. April 29, 1926. 7 males, 7 egg-bearing females and 2 immatures.

The coast of Namiuchi, Heinai. Sand, gravels and sea-weeds. July 17, 1926. 1 egg-bearing female.

Moura. 5 fms. Sand and sea-weeds. July 23, 1926. 3 egg-bearing females.

On the line between Futago-zaki and Ôshima Isl., off Urata. 24 fms. Sandy mud. July 30, 1926. 1 female with eggs.

On the line between Futago-zaki and Ôshima Isl., off Cape Aburame-zaki. 27 fm. Sandy mud. July 30, 1926. 1 female with eggs.

Off Futatsuya. 31 fms. Sand. July 31, 1926. 1 egg-bearing female.

Moura. 5 fms. Sand, sea-weeds. August 16, 1926. 2 egg-bearing females.

Off Noheji. 5 fms. Sea-weeds. August 22, 1926. 2 egg-bearing females.

Off Yomogita. July 23, 1927. 5 egg-bearing females.

Off Tsubakiyama. July 24, 1927. 1 female with eggs.

On the line between Yokohama and Kanita, off Noheji. July 25, 1927. 1 female with eggs.

On the line between Ôshima Isl. and Aomori, off Itazaki. August 10, 1927. 2 males, 5 egg-bearing females.

Ôma Bay. August 18, 1927. 3 males and 1 egg-bearing female.

The entrance of Fukura Bay. August 19, 1927. 3 young specimens.

Examining numerous specimens, I noticed that the species is quite variable and many intermediate forms between the so-called species *C. propinquus*, *C. hakodatei*, *C. consobrinus* and *C. cassiope* are found. I therefore agree with Prof. H. BLASS (1914), the species stated above are nothing but synonyms of *C. affinis* DE HAAN.

General Distribution: Japan and Corea.

Family **Palaemonidae** BATE.

Genus **LEANDER** DESMAREST.

20. **Leander serrifer** STIMPSON.

Leander serrifer STIMPSON, 1860, p. 41; ORTMANN, 1891, p. 525, Pl. 37, Fig. 17.

Japanese name: Sujiyebimodoki.

Loc. Off Fukikoshi. 22 fms. Sand and gravels. August 23, 1926. 5 egg-bearing females.

Sai Bay. August 17, 1927. 1 female with eggs.

The rostrum is armed with 11 or 12 teeth above, of which 3 or 4 are on the carapace; and 3 or 4 teeth are on the inferior margin of the rostrum.

General Distribution: Hongkong; Amoy; Loochoo Isls.; Japan: Tokyo Bay, Tanagawa.

Tribe **THALASSINIDEA**.

Family **Callianassidae** BATE.

Genus **CALLIANASSA** LEACH.

21. **Callianassa subterranea** (MONTAGU)
var. **japonica** ORTMANN.

Callianassa petalura STIMPSON, 1860, p. 23.

Callianassa subterranea japonica ORTMANN, 1892, p. 56, Pl. 1, Fig. 10 a; DOFLEIN, 1902, p. 644; BALSS, 1914, p. 91.

Japanese name: Sunamoguri.

Loc. The mouth of the Tanabe River. Mud. August 11, 1926. 2 males and 3 females.

Moura. 5 fms. Sand and sea-weeds. August 26, 1926. 1 female with eggs.

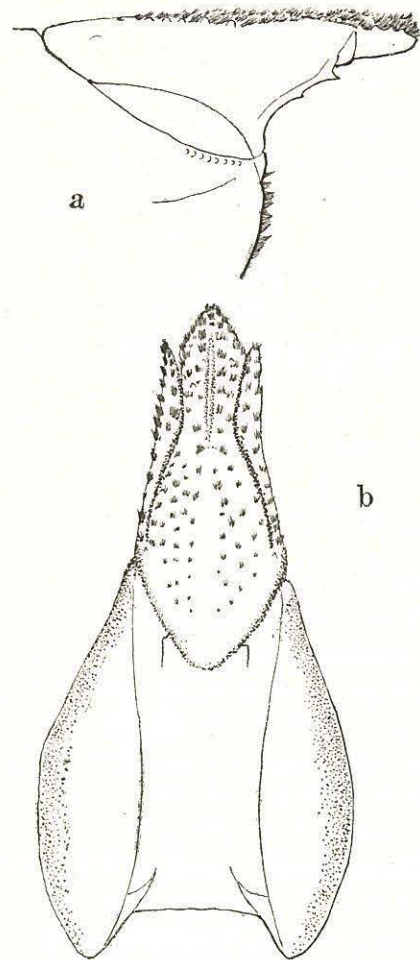
General Distribution: Japan: Tokyo Bay, Simoda, Bingo; Hakodate.

Genus **GEBIA** LEACH.

22. **Gebia major** DE HAAN.

(Text-fig. 4).

Gebia major DE HAAN, 1849, p. 165, Pl. 35, Fig. 7; MIERS, 1879, p. 52; ORTMANN, 1892, p. 54, Pl. 1, Fig. 7.



Text-fig. 4. *Gebia major* DE HAAN, fully grown specimen.

a. Anterior half of carapace ($\times 2$).

b. Carapace, dorsal aspect ($\times 2$).

G. major, consisting of three anteriorly directed processes, the medial one being larger and longer than that on each side. In the present species, not only is the medial process somewhat narrower and more acutely pointed, but the lateral processes are more apart from the

Japanese name: Anazyako.
Loc. Asadokoro. July 13, 1927. 3 males and 2 females.

General Distribution: Japan: Katsura, Koda Bay, Tokyo Bay, Sagami Bay.

23. *Gebia affinis* n. sp.
(Text-fig. 5).

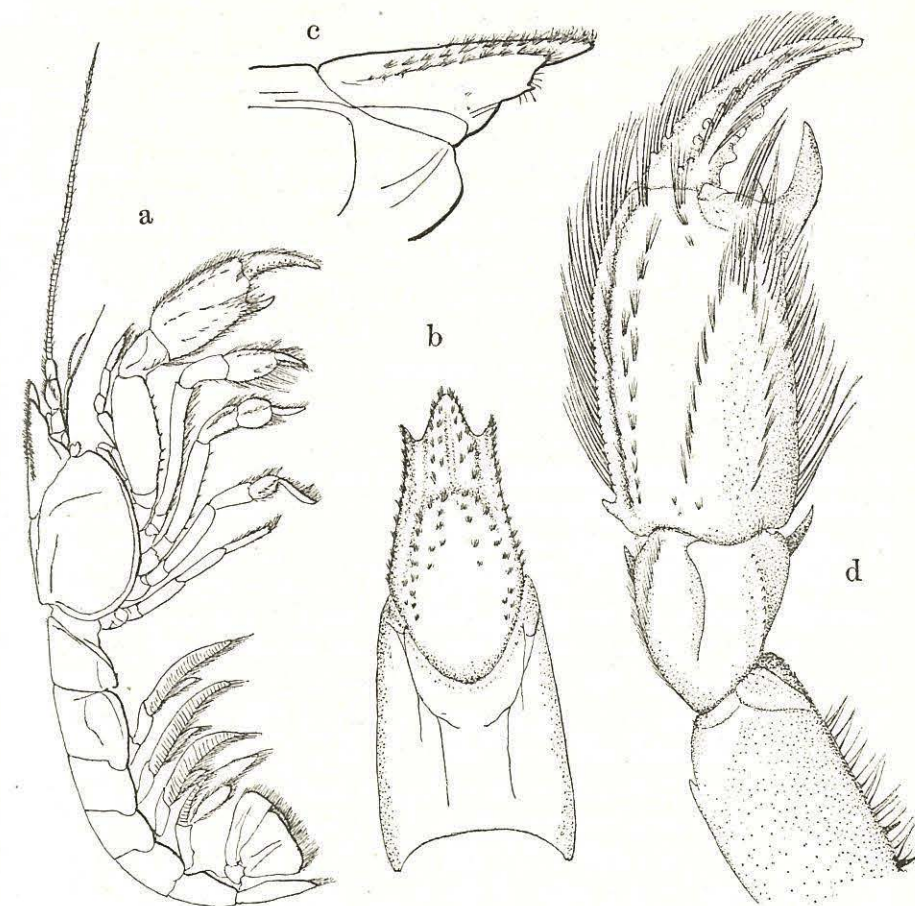
Loc. Asadokoro. July 6, 1926. 2 males.

Nonai. August 15, 1927. 1 young female.

Of the specimens from Asadokoro, one is 42,8 mm. and another 33,5 mm. long from the tip of the rostrum to the end of the telson. I was able to examine one female specimen of this species, which is 45,8 mm. long, collected by Mr. HIROAKI AIKAWA from the coast of Haneda near Tokyo.

The species very closely resembles *G. issaefi* BALSS from Vladivostok and *Gebia major* DE HAAN, but it is distinctly different from these.

The frontal margin of the carapace is similar to that of



Text-fig. 5. *Gebia affinis*, n. sp.

a. Entire animal, view from right side. b. Carapace, dorsal aspect. ($\times 4$).

c. Anterior half of carapace, view from right side. ($\times 4$). d. Terminal half of 1st pereopod, view from outside. ($\times 6$).

medial in the dorsal aspect than those of *G. major*. Viewing it from the lateral side, the medial process shows in profile a line continuous with the upper margin of the carapace, and the lower margin obliquely ascends to acuminate to the tip; while in *G. major* the line of the upper margin is continuous with that of the carapace at first, but descends abruptly downwards at the tip and the lower margin shows

a nearly horizontal line in the smaller specimens. In the full grown specimens, the lower margin is slightly ascended to the extremity, where, however, it is not so acutely pointed as that of the present species.

The pereopod is alike in both sexes and similar in shape to that of *G. issaeffi*. The meros is stouter than that of *G. major* in the specimens of similar size, about two and a third times as wide as long, and its outer surface is smooth and devoid of hairs; while the teeth on the lower margin are sharply pointed. The carpos is armed with a series of small acutely pointed teeth near the upper margin; this series of teeth is more prominent than that found in *G. issaeffi* and the terminal tooth is much stronger than any of the rest. The carpos is armed with two strong teeth on the distal margin, one on the lower margin and stronger than the other which is on the upper margin. The palm of the chela is about twice as wide as long and its surface is nearly smooth and superiorly provided with three obtuse longitudinal carinae which are fringed with series of long hairs. In these carinae the medial one is the most prominent and is guarded with a strong tooth on each of the proximal and the distal ends of the carina. Between this and the outer carina it is longitudinally furrowed. The palma is also provided with two rows of hair bundles on the outer surface; and these two rows meet behind the hinge of the finger, where hairs are scattered in numerous bundles. The lower margin is slightly carinated and furnished with long hairs. The anterior prolongation of the propodos or the plex is armed with a strong triangular tooth at the base of the inner margin. The dactylos or the movable finger is provided with three rows of tubercles, one on each of the upper and lower margins, and another on the outer surface. In the latter the tubercles are prominent, while in the former, except the proximal one or two, they are mostly much less prominent. Beside these, on the upper margin and on each side of the lower margin, hairs are studded in a series, and another series of hairs is just below the said tubercular series on the outer surface. The hairs on the upper margin are prominent and are longest at the base diminishing terminally in length. In other respects the species coincides with *G. major*.

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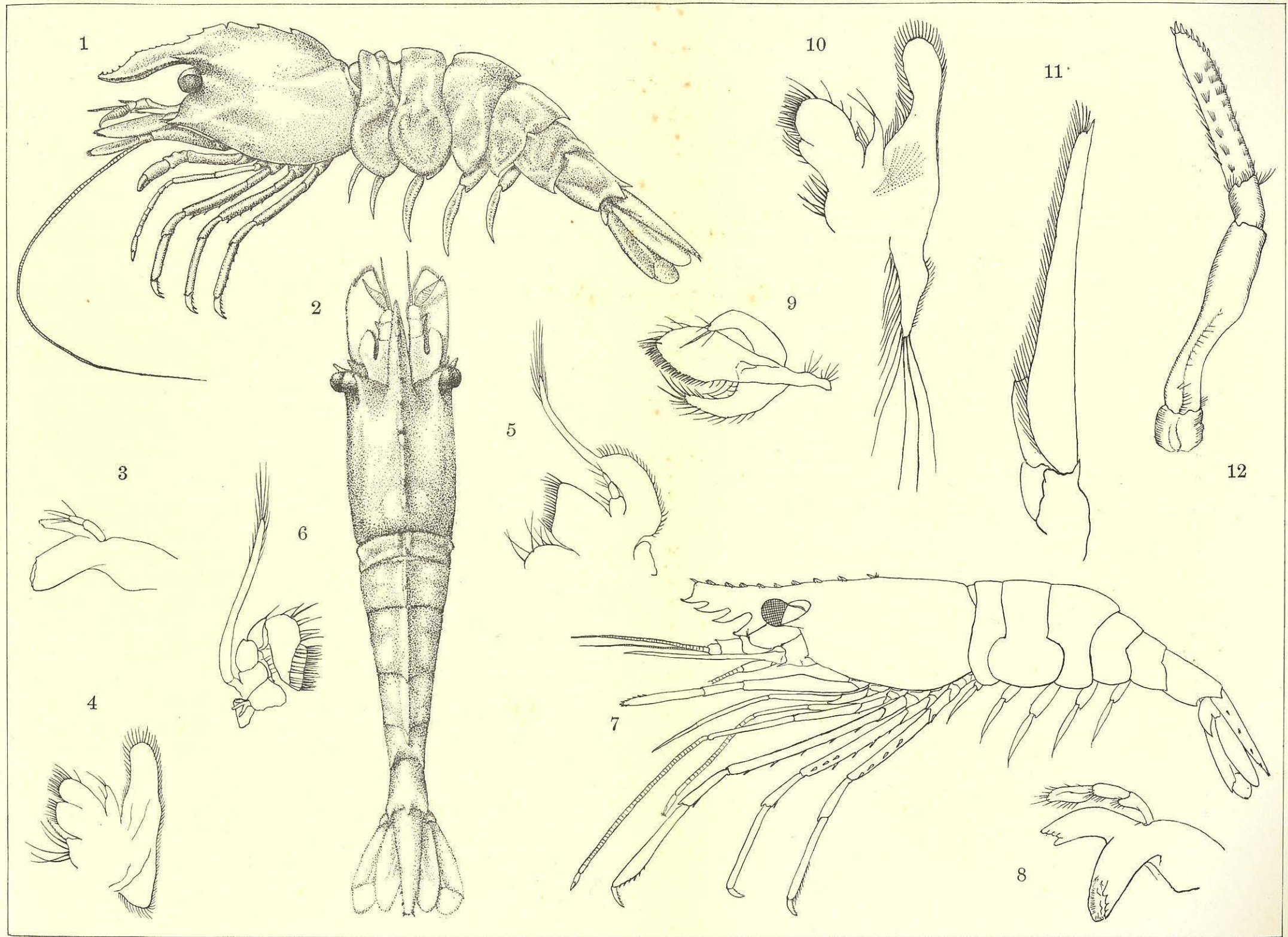
EXPLANATION OF PLATE.

Figs. 1-6. *Paraspirontocaris kishinouyei*, n. gen. n. sp.

- Fig. 1. Entire animal, view from left side. ($\times 5$).
2. " " , dorsal aspect. ($\times 5$).
3. Mandible.
4. 2nd maxilla.
5. 1st maxilliped.
6. 2nd maxilliped.

Figs. 7-12. *Pandalus* sp.

- Fig. 7. Entire animal, view from left side. ($\times 5$).
8. Mandible.
9. 1st maxilla.
10. 2nd maxilla.
11. 2nd antenna of right side, dorsal aspect. ($\times 10$).
12. 3rd maxilliped. ($\times 10$).



Y. YOKOYA del.

Y. YOKOYA: *Macrura* of Mutsu Bay.