Studies on the Crabs of Japan

III. Brachygnatha, OXYRHYNCHA

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[With 22 Plates, 55 Text-figures and 1 Table]

The first* and second† sections of the "Studies on the Crabs of Japan" have been issued from the Tokyo Bunrika Daigaku in the Supplement of the Science Reports, but as the economic causes precluded the possibility of publication in the same series, I have preferred to publish the further sections of the studies in the form of an independent volume.

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Tribe BRACHYURA BORRADAILE.

Subtribe BRACHYGNATHA BORRADAILE.

Superfamily OXYRHYNCHA LATREILLE.

Definition:—Carapace more or less narrowed anteriorly and usually produced to form a rostrum; branchial regions considerably developed but hepatic regions small, so that the carapace appears triangular or pyriform. Orbits usually incomplete. Epistome large, buccal cavity quadrate. Branchiae almost always nine in number on either side. Antennules longitudinally folded.

Key to the families of Oxyrhyncha.

1. Body imperfectly indurated, carapace flat. No orbits. Second segment of antenna slender and fused with epistome but not with front. No hooked hairs. Male genital openings sternal..... HYMENOSOMIDAE.
2. Body almost always well calcified, carapace usually pyriform. Basal (=2nd) segment of antenna considerably developed and usually fused with epistome and often also with front. Orbits more or less incomplete. Chelipeds very often greater than legs and are freely movable. Hooked hairs present. Male genital openings coxal. .....MAJIDAE.
3. Body perfectly calcified, carapace triangular or pentagonal. Basal segment of antenna usually small and not fused with epistome or front. Orbits well developed. Chelipeds not specially movable, usually much stouter than legs. Male gential openings coxal. No hooked hairs..... PARTHENOPIDAE.

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* I. Dromiacea: Sc. Rep. Tokyo Bunrika Daigaku, Sect. B. vol. 3, Suppl. No. 1, 1936, pp. 1–66.

† II. Oxystomata: Sc. Rep. Tokyo Bunrika Daigaku, Sect. B. vol. 3, Suppl. No. 2, 1937, pp. 67–192.

Fam. HYMENOSOMIDAE STIMPSON 1858.

KEMP 1918, pp. 243, 251; TESCH 1918, pp. 3, 5.

The majority of the species of Hymenosomidae, as has been well-known, chiefly inhabit the coasts of New Zealand and Australia, from where, according to TESCH, they radiate toward Indian waters, where rich representatives are comprised, and toward Japan, where the fauna of this family is singularly poor contrary to the other groups of Crustacea, the only known species being six in number distributed among four genera. The revision of this family was put forth by KEMP and TESCH simultaneously in 1918, and a thorough knowledge of this family was published in their works, although there are some points of disagreement between the two authors.

Of the four genera found in Japanese waters, *Rhynchoplax* has often been misunderstood and misled by many authors, but it will be justified in the course of this paper.

Key to the Japanese genera of Hymenosomidae.

I. There is no epistome. The external maxillipeds are slender and incompletely close the buccal cavern, being almost in contact with the bases of the antennules. ..... *Hymenosoma*.
(Genus of South Africa and New Zealand.)

II. Epistome is well defined and usually very long.

A. Dorsal surface of carapace flat or weakly convex, defined by a marginal rim and the regions very often delimited by sharply-cut grooves. Rostrum composed of three teeth or lobes.

1. Abdomen of male composed of six distinct segments. External maxillipeds completely close the buccal cavern.

i. Rostrum composed of three subequal and equidistant lobes ..... *Halicarcinus*.

ii. Of the three rostral lobes or teeth, the median one is by far the longest ..... *Rhynchoplax*.

2. Abdomen of male composed of four pieces, the third to fifth segments being fused together; external maxillipeds very slender and do not close the buccal cavern ..... *Neorhynchoplax* n. g.
(Indian and Chinese genus.)

B. Carapace wafer-like, regions not delimited by grooves. Rostrum simple. External maxillipeds completely close the buccal cavern.

1. Rostrum triangular. Antennules separated by a mere ridge ..... *Trigonoplax*.

2. Rostrum truncate. Antennules separated by a more or less prominent septum. ..... *Elamena*.

Genus *Halicarcinus* WHITE 1846.

STIMPSON 1907, p. 145; KEMP 1918, pp. 246–248; TESCH 1918, p. 9; RATHBUN 1925, p. 561.

This genus usually occurs along the coasts of southern hemisphere, the only species found in the Far East being *H. orientalis* SAKAI; the other Oriental species hitherto referred to this genus, » *H. septentrionalis* » YOKOYA (= *Rhynchoplax coralicola* RATHBUN) and » *H. yangi* » SHEN (= *Rhynchoplax setirostris* STIMPSON) belong in reality to *Rhynchoplax*.

Halicarcinus orientalis SAKAI. Pl. XX, fig. 1.

SAKAI 1932, p. 42, pl. 2, fig. 1, text-fig. 1; 1936, p. 72, pl. 15, fig. 2 (coloured) and text-fig. 29.

The three rostral lobes of this species are subequal in size and are equidistantly disposed, in the intervals of which the antennules are visible in dorsal aspect, so that I think it is a true *Halicarcinus*.

The body and appendages are thickly covered with fine tomentum, the dorsal surface being defined by a marginal rim but with no clean-cut grooves between the regions. There are two obscure teeth on the antero-lateral borders. The antennules are large and approximate, and are visible in the intervals between the rostral lobes as aforementioned. The merus and ischium of the external maxillipeds are equally broad and long, the buccal cavern being completely shut up.

The chelipeds of both sexes are stouter but shorter than the ambulatory legs, the fingers meet throughout their whole length and are finely denticulated, the tips only being naked. The dactylus of the ambulatory legs is armed with a stout tooth (very rarely with two) near the distal extremity of the posterior margin.

Abdomen of both sexes composed of six segments (not of seven, as the telson is generally fused with the penultimate segment).

Material examined:

1 ♂, 1 ♀, Momotori in Ise Bay (holotype).
1 ♂, 1 ♀, Tateyama Bay, May 1928.
2 ♂♂, 1 ♀, Misaki, June 1928.
Many ♂♂ and ♀♀, various stations in the vicinity of Simoda.

Measurements: Male from Simoda, length of carapace 5.5 mm., width of same, 6 mm.

Habitat: Inhabits the shallow beaches, under stones or weeds.

Type locality: Ise Bay, at Momotori (SAKAI).

Distribution: Tokyo Bay, Misaki, Izu Peninsula, Ise Bay.

Genus *Rhynchoplax* STIMPSON.

STIMPSON 1858, p. 109; 1907, p. 147; TESCH 1918, p. 17 (part).
Nec *Rhynchoplax* of KEMP 1918, which may be designated as *Neorhynchoplax* gen. nov.

Historical:

1858: *Rhynchoplax* was created by STIMPSON in 1858 to accommodate the two Oriental species, *R. messor* STIMPSON and *R. setirostris* STIMPSON. No figure of these species was published by the original author and the definition of the genus and species was insufficient in some important respects.

1900: ALCOCK doubtfully united this genus with *Hymenicus* DANA and added two new species from Andamans and India. These two species were afterwards erroneously referred to *Rhynchoplax* by KEMP and also by TESCH. I am of opinion that these belong to my new genus, *Neorhynchoplax*.

1909: RATHBUN added a new species, *R. coralicola* from Singapore, which may be the third species of true *Rhynchoplax*.

1918: KEMP revised the Indian species of this family and defined *Rhynchoplax* mainly on account of the slenderness of the external maxillipeds and also by coalescence of the third to fifth segments of male abdomen. Six new species of his »*Rhynchoplax*» were added from the Indian and Chinese waters. In my opinion, however, these species, together with ALCOCK's two species, form a new distinct genus, which may be designated as *Neorhynchoplax*.

1918: TESCH also discussed STIMPSON's *Rhynchoplax*, and he arrived substantially at the same conclusion as KEMP in referring ALCOCK's two species to *Rhynchoplax*.

1928: YOKOYA rediscovered *Rhynchoplax messor* ST. from Mutsu Bay and the first figure of true *Rhynchoplax* was published. At the same time he described a new species, *Halicarcinus septentrionalis* from Mutsu Bay, but this species is in my opinion synonymous with *R. coralicola* RATHBUN (cf. SAKAI 1934, p. 289).

1930: CHOPRA described two new species including one new subspecies of *Rhynchoplax* from Basra, Cochin and Travancore; I think all these species and subspecies may safely be referred to *Neorhynchoplax* mihi.

1932: SHEN described two new species, viz. *Rhynchoplax sinensis* and *Halicarcinus yangi* from North China, but the former apparently belongs to *Neorhynchoplax* mihi, the latter to the true *Rhynchoplax* and probably is identical with *R. setirostris* STIMPSON.

1934: SAKAI rediscovered *R. setirostris* STIMPSON from Ise Bay and the first figure of this species was published. He also regarded *Hali-*

carcinus septentrionalis YOKOYA as synonymous with *R. coralicola*, and *Halicarcinus yangi* SHEN as synonymous with *R. setirostris* STIMPNSON.

Generic diagnosis: This genus much resembles *Halicarcinus* WHITE, with the carapace triangular in outline; dorsal surface usually flattened and its margin defined by a raised rim but the regions not always defined by clean-cut grooves. The rostrum composed of three lobes, of which the median one is by far the largest and usually upturned, the lateral ones being very small and acuminate. The antero-lateral margin usually armed with tooth or lobule. The epistome well-defined, the antennules large and approximate; the pterygostomian region undulate. The external maxillipeds completely close the buccal cavern and their merus and ischium equally long and broad.

Chelipeds of male very slender and usually longer than the ambulatory legs, but not so stout as those of *Halicarcinus*. All pairs of ambulatory legs are very slender and often filiform, the dactyli strongly curved and armed with a series of denticles.

Abdomen of both sexes composed of six segments (the sixth and the telson being fused together).

So far as I am aware, only three species are comprised in this genus:

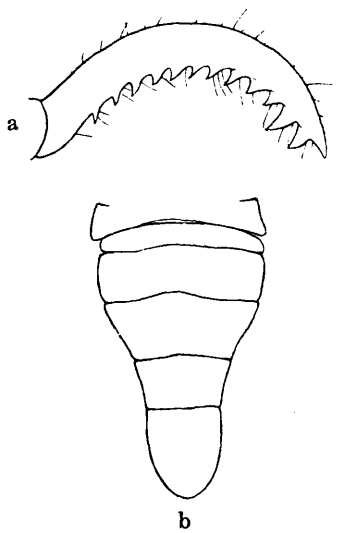
Key to the species of *Rhynchoplax*.

1. There are two lobular teeth on the antero-lateral borders. Fingers of chelipeds of male are uniformly denticulated.
   i. Median rostral lobe broad and spatuliform. Ambulatory legs rather stout, length of the first pair being about twice the width of carapace. ....*R. messor*.
   ii. Median rostral lobe very long and somewhat styliform. Ambulatory legs very slender and thin, the first pair being about four times the width of carapace. .....*R. setirostris*.
2. There is only one tooth on the antero-lateral borders. Fingers of chelipeds of male widely gaping in the middle and armed with a stout tooth near the base. .....*R. coralicola*.

1. *Rhynchoplax messor* STIMPSON. Pl. XX, fig. 2.

STIMPSON (1853) 1907, p. 148; YOKOYA 1928, p. 761, text-fig. 1; SAKAI 1934, p. 289, text-fig. 5a; 1936, p. 70, text-fig. 27.

The body and appendages smooth and naked, the carapace broadly triangular and very slightly longer than broad, its dorsal surface sometimes weakly convex but usually depressed and flat, the regions less markedly defined and not especially delimited by clean-cup grooves as in typical *Halicarcinus*. The rostrum composed of three lobes, of which the median one is broad and spatuliform and is upturned, while the lateral



Text-fig. 1.
Rhynchoplax messor STIMPSON.
a. Dactylus of the 4th ambulatory leg, ×35.
b. Abdomen of male, ×20.

teeth are small and acuminate. The post-ocular tooth also very small. There are two lobular processes on the antero-lateral borders, the anterior of which is smaller than the posterior.

The antennules large and approximate, indistinctly separated by the median septum but with no antennulary fossae. The pterygostomian region markedly undulated.

The chelipeds of male much stouter than the ambulatory legs, the arm and wrist with a few nodules on the upper border, the fingers are thickly fringed with hair on the inner surface. The merus of the ambulatory legs is distally armed with a lobule, while the carpus and propodus are marked with a nodule in the middle of the anterior border, the nodules being furnished with a few hairs. The dactylus is strongly falcated and is finely denticulated on the inner border.

Abdomen of both sexes composed of six pieces, the terminal segment being fused with the penultimate segment.

Material examined:

5 ♂♂, 3 ♀♀, coast of Okinosima, Teteyama Bay, May, 1929.
Many ♂♂ and ♀♀, various stations in the vicinity of Simoda.

Measurements: Male, length of carapace 5 mm., width also 5 mm.

Habitat: Inhabits the under surface of stones or is found clinging to the sea weeds at low water mark.

Type locality: Simoda (STIMPSON).

Distribution: Mutsu Bay (YOKOYA), Tateyama Bay, Enosima, Simoda.

2. *Rhynchoplax setirostris* STIMPSON.

STIMPSON 1858, p. 109; 1907, p. 148; SAKAI 1934, p. 290, text-fig. 5c and 7; 1936, p. 71, text-fig. 28.
Syn: ? *Halicarcinus yangi* SHEN 1932.

The carapace of this species is longitudinally ovate, the dorsal surface having more or less clean-cut grooves, which indistinctly define the regions.

Of the three rostral lobes, the median one is very long and styliform and upturned, its lateral margins being fringed with hairs. The antero-lateral border has two obtuse lobules as in the former species.

Text-fig. .

Rhynchoplax setirostris STIMPSON, dactylus of the 4th ambulatory leg, ×40.

The chelipeds resemble those of the former species, but the ambulatory legs are much more slender and thin, the first pair being about four times the width of the carapace; the dactylus is also very long but scarcely falcated, denticulated along the inner border.

Material examined:

2 ♂♂, between Itô and Hatusima, "Misago", June 1935.
1 ♂, Momotori, Ise Bay, Aug. 1932.

Measurements: Male, length of carapace 5 mm., width of same 4.3 mm.

Habitat: Inhabits muddy or shelly bottoms, depth 50 to 100 metres.

Type locality: Hong Kong (STIMPSON).

Distribution: Sagami Bay, Ise Bay, North China and Hong Kong.

3. *Rhynchoplax coralicola* RATHBUN.

Rhynchoplax coralicola RATHBUN 1909, p. 108; 1910, p. 316, text-fig. 5; TESCH 1918, p. 17 (in key) and 19; SAKAI 1934, p. 289, text-fig. 2.
Syn.: *Halicarcinus septentrionalis* YOKOYA 1928, p. 762, text-fig. 2.

The general outline of carapace of this species resembles that of *R. setirostris* but the median rostral tooth, which is by far the largest of the three rostral teeth, is somewhat acuminate at tip. The antero-lateral borders are armed with only one tooth, which is situated just in front of the base of the chelipeds. The grooves on the dorsal surface of the carapace are almost obliterated.

The chelipeds of male are markedly longer than the ambulatory legs; the palm is nearly twice as long as fingers, which widely gape in the middle, each being armed with a stout tooth near the base. The ambulatory legs are very slender as in *R. setirostris*, but the merus is not armed with the usual terminal lobe, the dactylus not very strongly falcated.

In the female the median rostral lobe is not so large as that of the male; the fingers are also very slender and not armed, gaping.

Material examined:

2 ♂♂, 1 ♀, coast of Okinosima, Tokyo Bay, May, 1928.
Many ♂♂ and ♀♀; coast of Simoda.
1 ♀, Kôtôsyo, Formosa, coll. by the late Mr. ISHI and sent by Mr. U. O. of the Tyôrôkyô Middle School.

Measurements: Male, length of carapace including rostrum 5 mm., width, 3.6 mm.

Habitat: Inhabits the under surface of stones or clings to the sea weeds at low water mark.

Type locality: Singapore (RATHBUN).

Distribution: Mutsu Bay (YOKOYA), Tateyama Bay, Enosima, Simoda, Kôtôsyo and Singapore.

Neorhynchoplax gen. nov.

Many Indian species, formerly referred to *Rhynchoplax* by KEMP, are, as aforementioned, not true *Rhynchoplax* on account of their slender external maxillipeds, which very incompletely close the buccal cavern; and also of their male abdomen, in which the third to fifth segments are fused together. At least the following species may safely be referred to the new genus:

» *Hymenicus* » *krefftii* HESS. 1865 = ? *Neorhynchoplax krefftii* (HESS.).
» *Elamena* » *filholi* DE MAN 1887 = *Neorhynchoplax filholi* (DE MAN).
» *Hymenicus* » *woodmasoni* ALCOCK 1900 = *Neorhynchoplax woodmasoni* (ALCOCK).
» *Hymenicus* » *inachoides* ALCOCK 1900 = *Neorhynchoplax inachoides* (ALCOCK).
» *Rhynchoplax* » *alcocki* KEMP 1918 = *Neorhynchoplax alcocki* (KEMP).
» *Rhyncholax* » *octagonalis* KEMP 1918 = *Neorhynchoplax octagonalis* (KEMP).
» *Rhynchoplax* » *demeloi* KEMP 1918 = *Neorhynchoplax demeloi* (KEMP).
» *Rhynchoplax* » *exiguus* KEMP = *Neorhynchoplax exiguus* (KEMP).
» *Rhynchoplax* » *introversus* KEMP 1918 = *Neorhynchoplax introversus* (KEMP).
» *Rhynchoplax* » *nasalis* KEMP 1918 = *Neorhynchoplax nasalis* (KEMP).
» *Rhynchoplax* » *kempi* CHOPRA 1930 = *Neorhynchoplax kempi* (CHOPRA).
» *Rhynchoplax* » *tuberculata* CHOPRA 1930 = *Neorhynchoplax tuberculata* (CHOPRA).
» *Rhynchoplax* » *tuberculata attenuipes* CHOPRA 1930 = *Neorhynchoplax tuberculata attenuipes* (CHOPRA).
» *Rhynchoplax* » *sinensis* SHEN 1932 = *Neorhynchoplax sinensis* (SHEN).

No species of this genus occurs on the coasts of Japan.

Genus *Elamena* H. M. EDWARDS.

H. M. EDWARDS, H. N. C., 1837, p. 33; ALCOCK 1900, p. 385; KEMP 1918, p. 270; TESCH 1918, p. 19.

Elamena truncata (STIMPSON). Pl. XX, fig. 3.

Trigonoplax truncata STIMPSON 1858, p. 109; 1907, p. 146.
Elamena truncata A. M. EDWARDS 1873, p. 323; HENDERSON 1893, p. 395; ALCOCK 1900, p. 386; BORRADAILE 1900, p. 575; LENZ 1905, p. 367, pl. 48, figs. 15, 15a; BAKER 1906, p. 112; LAURIE 1906, p. 428; KEMP 1918, p. 272, text-fig. 22; TESCH 1918, p. 22, pl. 1, fig. 4; CHOPRA 1930, p. 424; SAKAI 1932, p. 44, text-fig. 2; 1934, p. 292; 1936, p. 72, text-fig. 30.

The carapace orbiculate-pentagonal, the dorsal surface flat and wafer-like, the regions being scarcely defined. The rostrum slightly projecting beyond the general outline of the carapace and is broadly truncate, having its free margin cut quite straight. The antennulae very small and separated by a median longitudinal ridge, which is in some specimens very prominent and visible from dorsal side. The epistome very large, the pterygostomian regions undulated. The external maxillipeds have merus and ischium broad and subequal in length, the buccal cavern being completely closed.

The chelipeds of male a little stouter than the ambulatory legs, the palm weakly swollen and the fingers somewhat excavated within throughout their length. The merus of ambulatory legs bears a terminal lobule and the dactylus is armed with one or two terminal denticles.

Material examined:

1 ♂, Sunosaki, Bôsyû, Mr. NAGANO.
5 ♂♂, 3 ♀♀, various localities in Simoda.
1 ♂, Momotori, Ise Bay, Aug. 1932.
1 ♂, Nagasaki, Mr. I. KANEKO.

Measurements: Male, length of carapace 5.5 mm., width 6.2 mm.

Habitat: Inhabits the weedy or rocky shores, also occurs down to 10 to 20 metres deep.

Type lolcality: Amami Ohsima (STIMPSON).

Distribution: Bôsyû, Simoda, Ise Bay, Nagasaki, Loo Choo. This species shows a wide Indo-Pacific distribution from Japan to Ceylon, New Caledonia and South Australia.

Genus *Trigonoplax* H. M. EDWARDS 1853.

ALCOCK 1900, p. 386; KEMP 1918, p. 274; TESCH 1918, p. 25.

Trigonoplax unguiformis (DE HAAN). Pl. XX, fig. 4.

Ocypode (*Elamene*) *unguiformis* DE HAAN F. J. C. p. 75, pl. 29, fig. 1.
Elamena (*Trigonoplax*) *unguiformis* ALCOCK 1900, p. 387; KEMP 1918, p. 277; CHOPRA 1930, p. 428, text-fig. 16.
Trigonoplax unguiformis DE MAN 1907, p. 396; PARISI 1915, p. 281; TESCH 1918, p. 25; BALSS 1922, p. 37; URITA 1926, p. 35; YOKOYA 1928, p. 760; SAKAI 1934, p. 292; 1936, p. 73, pl. 15, fig. 3 (coloured).

The carapace subpentagonal in outline, the dorsal surface depressed and wafer-like, the posterior margin being weakly concave. The body and appendages almost destitute of hairs. The rostrum is simple and triangular, the upper surface somewhat hollowed. There are no orbital teeth nor spines, the eyes being unprotected. The epistome is very large and almost as long as the external maxillipeds. The antennulae slender and separated by a weak median longitudinal ridge extending on the under surface of the rostrum.

The chelipeds of both sexes are very slender and the fingers very slightly gape and are furnished with minute teeth. The merus of the ambulatory legs is armed with a terminal lobule, the dactylus flattened and sickle-shaped, armed with two minute denticles near the distal end.

Material examined:

2 ♂♂, 1 ♀, Tateyama Bay, May 1928.
5 ♂♂, 3 ♀♀, various stations in Simoda.
1 ♂, 1 ♀, Seto M. B. L., Prof. Yo OKADA and Mr. SHIINO.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male, length of carapace measured from the tip of rostrum 12 mm., width 15 mm.

Habitat: Inhabits various grounds, down to 100 metres.

Type locality: Japan (DE HAAN).

Distribution: Mutsu Bay, Tokyo Bay, Sagami Bay, Izu Peninsula, Ise Bay, Kii Peninsula, Tosa Bay, Nagasaki and Kagosima. The foreign localities are: Andamans, Gulf of Martaban, Singapore, Ternate, etc.

Family MAJIDAE ALCOCK.

ALCOCK 1895, p. 160; RATHBUN 1925, p. 10; BALSS 1929, p. 2.

According to BALSS (1929), the family Majidae is divided into eight subfamilies, which are determined by the comparative development and the shape of the component parts of the orbits—i.e., the preocular spine, supraocular eave, intercalated spine, postocular spine and also by the basal segment of antenna.

Key to the subfamilies of Majidae.

1. Eyes without orbits; eye-stalks slender and long, usually nonretractile or retractile against the sides of the carapace or against the acute postocular tooth that affords no concealment. Basal segment of antenna usually long and slender throughout its whole length. .....INACHINAE
2. Eyes either with orbits or with commencing orbits or if without true orbits, eye-stalks are more or less concealed by preocular or postocular processes or by hollowed supraocular eaves. Basal segment of antenna not extremely slender.

i. Eyes without true orbits, eye-stalks usually extremely long and protected by hollowed supraocular eave or by extremely outstanding horn-like or antler-like pre- or supra-ocular spines. .....OPHTHALMIINAE.

ii. Eyes without true orbits, eye-stalks usually short and protected by the supraocular spine or sunk in the sides of the neck. Basal segment of antenna truncate-triangular. Postocular tooth developed, but it is acuminate and not cupped. .....ACANTHONYCHINAE.

iii. Eyes with commencing orbits, postocular tooth cupped, against which the cornea is retractile. Basal segment of antenna usually not truncate-triangular.

a. There is an intercalated spine .....PISINAE.

b. No intercalated spine .....HYASTENIINAE.

3. Eyes with nearly complete orbits.

i. Orbits are formed by arched supra-ocular eave (the posterior angle of which is produced into a spine), intercalated spine, and postocular cup. Basal segment of antenna not specially expanded and not forming a floor of orbits .....MAJINAE.

ii. Orbits are formed by above mentioned spines and also by expanded basal segment of antenna, which forms the floor of orbit. Pseudorostrum sometimes ventrally deflexed .....MITHRACINAE.

iii. Orbits are tubular, the eyes being completely protected by supraocular eave, postocular cup and the expanded basal segment of antenna; no intercalated spine. Pseudorostrum very often ventrally deflexed. .... MACROCOELOMINAE.

1. Subfam. INACHINAE ALCOCK.

ALCOCK 1895, p. 160; RATHBUN 1925, p. 11; BALSS 1929, p. 3.

Eyes without orbits; the eye-stalks, which are generally long, are either non-retractile or are retractile against the sides of the carapace, or against an acute postocular spine that affords no concealment. The basal segment of the antennae is extremely slender throughout its whole length and is usually long (ALCOCK).

According to BALSS, this subfamily is divided into two groups: MACROCHEIROIDEA and CAMPOSCIOIDEA; the former is characterized by the presence of an intercalated spine, while the latter has none. This discrimination, however, is not natural, because the genus *Camposcia*, from which the name CAMPOSCIOIDEA is induced, has sometimes a rudimentary intercalated spine, and moreover, the genus *Cyrtomaja*, which was placed by BALSS in MACROCHEIROIDEA, comprises some species which have no intercalated spine at all (cf. IHLE and IHLE-LANDENBERG, 1931).

Based upon the development of the component parts of the orbit above mentioned, and also upon the shape of the antennulary septum

and the number of the abdominal segments, I propose to arrange phylogenetically the Japanese genera of the subfamily Inachinae as illustrated below.

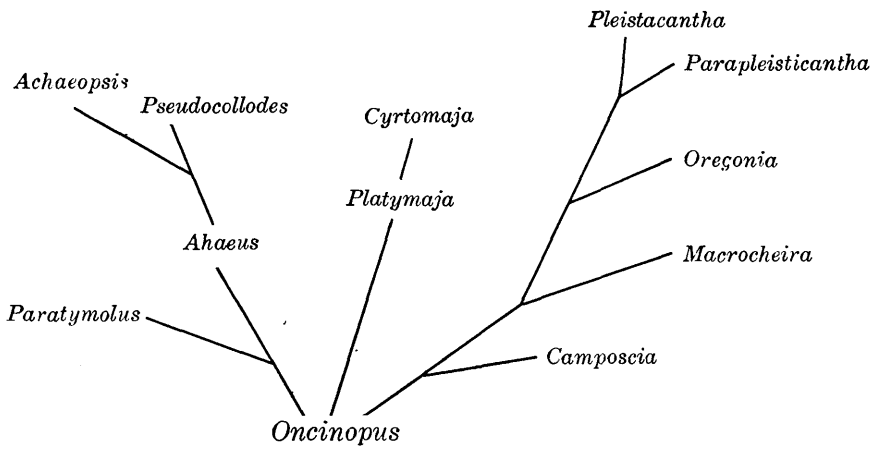
The genus *Oncinopus* seems to be most primitive, because the body and appendages of this genus is ill-calcified, the orbits are not at all protected by spines nor teeth; the basal segment of antenna is very slender, cylindrical and quite movable; there is no antennulary septum or antennulary fossae at all, the antennulae being in contact with each other; the abdomen of both sexes is distinctly seven-segmented, and finally, the last pair of ambulatory legs is subdorsal in position.

From *Oncinopus*, *Paratymolus* and *Achaeus* are probably induced, the former has an imperfectly indurated body and the basal segment of antenna which is movable and cylindrical, and other primitive characters as in *Oncinopus*, but the abdomen of male has the third to fifth segments fused together; while in *Achaeus*, the basal segment of antenna is distally somewhat fused with the ventral surface of the front and the sixth and seventh abdominal segments are fused together. From *Achaeus*, were probably developed *Pseudocollodes* and *Achaeopsis*; the former has no pseudorostral spines but the true rostrum markedly developed, the latter has very prominent pseudorostral spines; in both cases, preocular and postocular spines are developed.

Camposcia, *Macrocheira*, *Oregonia* and *Pleistacantha* are probably descended in the same course from *Oncinopus*; all these genera have seven-segmented abdomen (but in the female of *Pleistacantha*, the sixth and seventh segments are usually immovable although their suture line is distinct) and the true rostrum and pseudorostral spines are extremely prominent, intercalated and postocular spines are present. Of these genera, however, *Camposcia* seems primitive, because it has imperfect antennulary septum, less prominent true rostrum and pseudorostral spines, but the basal segment of antenna is immovable and the green glands imbedded far behind the base of this segment.

Macrocheira is also primitive in having the basal segment of antenna movable, but it has all the component parts of the orbit as in the highly differentiated genera, and above all, the posterior angle of the supraocular eave is produced into a strong spine. *Oregonia* and *Pleistacantha* are descended from *Macrocheira* in the same course.

Platymaja and *Cyrtomaja* are peculiar in its very narrow abdomen of male, which has seven distinct segments as well as the female abdomen, and also in its subcircular carapace; the former genus is apparently primitive, because it has the basal segment of antenna very slender and movable, while in *Cyrtomaja* it is reverse. These two genera probably form a distinct branch in the phylogenetical tree illustrated below:



Key to the Japanese genera of the subfamily Inachinae.

I. Body imperfectly calcified; pseudorostrum obtusely bilobate. No teeth or spines around the eyes, which are non-retractile. Basal segment of antenna cylindrical and quite movable; antennulae in contact with each other, antennulary septum being quite rudimentary or nearly so.

1. Carapace rounded triangular, depressed. Posterior two pairs of ambulatory legs subchelate, last pair being subdorsal in position. Abdomen in both sexes distinctly seven-segmented. .....*Oncinopus.*
2. Carapace slightly convex, antero-lateral borders armed with teeth. Ambulatory legs normal in shape and position. Abdomen of male consists of five pieces. .....*Paratymolus.*

II. Body usually well calcified, carapace typically pyriform. Basal segment of antenna more or less distally fused with the front; antennulae separated by antennulary septum. Sixth and seventh abdominal segment fused together.

1. True rostrum and pseudorostral spines not very prominent. Supraocular eave armed or not armed but postocular spine always absent. ....*Achaeus.*
2. True rostrum very prominent and projecting horizontally forwards, pseudorostral spines obsolete. Postocular spine developed. .....*Pseudocollodes.*
3. True rostrum and pseudorostral spines well developed. Pre- and postocular spines prominent. .....*Achaeopsis.*

III. Carapace of typical Oxyrhyncha shape, being elongate-triangular or pyriform. Abdomen of both sexes distinctly seven-segmented or at least all suture lines distinct.

1. True rostrum and pseudorostral spines obsolete. Antennulary septum very low. No preocular spine; intercalated spine obsolete and postocular spine small. Basal segment of antenna immovable. .....*Camposcia.*
2. A giant species; true rostrum prominent and pseudorostral spines short and curved outwards. Preocular, intercalated and postocular spines all distinct, and moreover, the posterior angle of supraocular eave produced into a spine. ..... *Macrocheira.*

3. True rostrum prominent, pseudorostral spines very often exceedingly long.
   i. Carapace tuberculated, pseudorostral horns not armed, parallel or in contact with each other. Abdomen distinctly seven-segmented. A very long postocular spine, but no more orbital spines. .....*Oregonia.*
   ii. Carapace covered with spines and tubercles. Pseudorostral horns armed with accessory spinules. Preocular, intercalated, and postocular spines all present.
      a. Merus of external maxillipeds has its antero-external angle not markedly produced and its anterior border not distinctly truncate. .... *Pleistacantha.*
      b. Merus of external maxillipeds has its antero-external angle produced and its anterior border truncate. .....Subgen. *Parapleisticantha.*

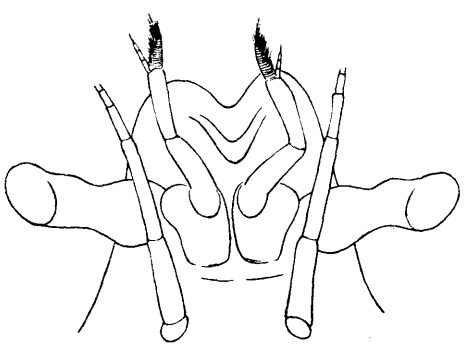
IV. Carapace broadly ovoid or nearly circular. Postocular spine always present but preocular and intercalated spines sometimes present and sometimes not. Abdomen of male very narrow.
   1. Basal segment of antenna freely movable; propodus and dactylus of posterior three pairs of ambulatory legs flattened and blade-like. .....*Platymaja.*
   2. Basal segment of antenna anteriorly fused with the front. Propodus and dactylus of all pairs of legs cylindrical. .....*Cyrtomaja.*

Genus *Oncinopus* DE HAAN.

DE HAAN 1839, F. J. C. p. 87; ALCOCK 1895, p. 182.

Oncinopus aranea DE HAAN. Pl. XXI, fig. 3.

Inachus (*Oncinopus*) *aranea* DE HAAN, F. J. C. p. 100, pl. 29, fig. 2.
Oncinopus aranea ADAMS & WHITE, Samarang Crust., p. 3; MIERS 1884, p. 190; 1886, p. 20; HENDERSON 1893, p. 341; ORTMANN 1893, p. 37; ALCOCK 1895, p. 183; URITA 1926, p. 30; YOKOYA 1933, p. 137; SAKAI 1934, p. 293; 1936, p. 80, pl. 18, fig. 3 (coloured).
Syn.: *Oncinopus neptunus* ADAMS & WHITE 1847.
Oncinopus subpellucidus STIMPSON 1857.
Oncinopus angulatus HASWELL 1879.



Text-fig. 3.
Oncinopus aranea DE HAAN, anterior portion of carapace in ventral aspect, ×12.

The body and appendages ill-calcified, the carapace elongate triangular and the regions moderately defined. The pseudorostrum is broad and flattish, divided into two lobes by a median shallow sinus. There are no orbits, the small slender eye-stalks are non-retractile and are never protected by teeth or spines. The hepatic margins of female are somewhat more produced than those of the male.

The basal segment of antenna is very slender and short, freely movable and it never affords any protection for the eye-stalk; the next (or third) segment is much longer and the following flagellum moderately long (text-fig. 3). There is no antennulary septum, the antennulae being longitudinally folded and in contact with each other. The merus of the external maxillipeds is much narrower than the ischium.

Chelipeds of male are stout, the palm being extremely swollen and the fingers widely gaping, the distal end only being denticulated, forming a cutting edge. The anterior two pairs of ambulatory legs are nearly twice and a half as long as carapace; the merus is cylindrical and distally thickened, the propodus extremely broadened and the dactylus also flattish and sickle-shaped. The carpus, propodus and dactylus are fringed with a row of strongish yellow setae along the anterior and posterior borders. The third and fourth pairs of legs are very slender and comparatively short, the last pair being subdorsal in position. The propodus of these two pairs is very short and forms a chela together with the recurved and denticulated dactylus.

Abdomen of both sexes distinctly seven-segmented.

As described elsewhere, I admit this genus to be the most primitive of all the species of Majidae.

Material examined:

1 ♀, Tateyama Bay, May 1928.
1 ♂, 1 ♀, Misaki M. B. S., Messrs. YERI and YOSHII.
2 ♂♂, 2 ♀♀, Simoda M. B. S., lobster net.
1 ♂, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
1 ♂, Ibusuki Middle School, Kagosima.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 17 mm., width 12 mm.

Habitat: Inhabits the rocky or weedy bottoms, down to 50 metres deep.

Type locality: Japan (DE HAAN).

Distribution: Japan (from Tokyo Bay to Kyûsyû), Philippine, coast of India, Molucca, Arafura Sea, South Australia.

Genus *Paratymolus* MIERS.

MIERS 1879, p. 45; ALCOCK 1895, p. 173; BALSS 1924, p. 24.

Of the seven species comprised in this genus, two are now known from Japanese waters:

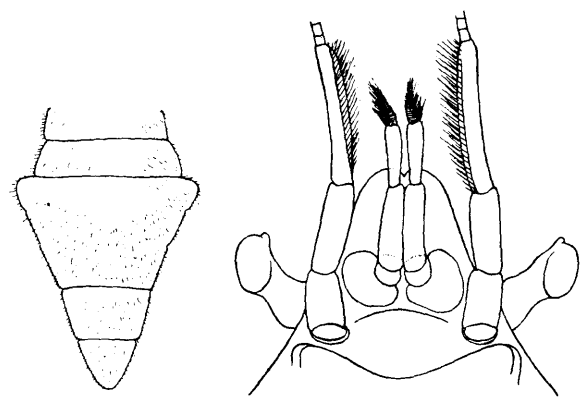
Key to the Japanese species of *Paratymolus*.

1. Carapace elongate pentagonal, dorsal surface uneven and with three tubercles. Supra-ocular eaves unarmed, antero-lateral borders armed with three acuminate spines. ..... *P. pubescens.*
2. Carapace broadly obconical, dorsal surface evenly convex and with no tubercles. Supraocular eaves have a preocular tooth; antero-lateral borders with only two obsolete teeth. ..... *P. sexspinosus.*

1. *Paratymolus pubescens* MIERS. Pl. XXI, fig. 1.

MIERS 1879, p. 45, pl. 2, fig. 6; 1884, p. 261; ORTMANN 1893, p. 35, pl. 3, fig. 2; 1894, p. 38; DOFLEIN 1902, p. 655; RATHBUN 1910, p. 317; BALSS 1924, p. 24; SAKAI 1934, p. 293; 1936, p. 81, pl. 17, fig. 1 (coloured).

The body and appendages imperfectly indurated; the carapace anteriorly narrowed, the regions quite indistinct. There are two small tubercles on the anterior surface of the gastric region and one on the cardiac region. The hepatic margin has two spinules, the anterior being very small and the posterior being very stout and placed at the lateral angle and is followed by another small spinule which is placed in the middle of the branchial margin.



Text-fig. 4.

Paratymolus pubescens MIERS.

a. Anterior portion of carapace in ventral aspect, ×12.
b. Abdomen of male, ×14.

The pseudorostrum somewhat deflexed, the tip being emarginate. The supraocular eaves are sensibly thick but not to the extent as covering the eye-stalks. The basal segment of antenna is very short and freely movable as in *Oncinopus*, the two succeeding segments are fringed with two longitudinal rows of hairs. The antennulae are folded in longitudinal direction, the antennulary septum somewhat developed. The antero-external angle of the buccal cavern is extremely produced and acute.

The arm of the chelipeds swollen in the middle; the wrist has a very long and curved spine at the inner angle, the palm is obtusely carinated above; the fingers not gaping. The ambulatory legs are very slender and regularly decrease in length; the dactylus is straight and longer than propodus, both being fringed with hairs along the posterior border.

The abdomen of male composed of five pieces (the third to fifth segments being fused together); that of female of seven distinct segments.

Material examined:

5 ♂♂, 3 ♀♀, Tateyama Bay, May, 1928.
10 ♂♂, 6 ♀♀, Simoda, various stations in front of the M. B. S.
2 ♂♂, 2 ♀♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 7.5 mm., width 5.5 mm.

Habitat: Inhabits various grounds, 10 to 100 metres deep.

Type locality: Matoya (Miye Prefecture) (MIERS).

Distribution: Tokyo Bay, Sagami Bay, Izu Peninsula, Miye Prefecture, Kagosima, Nagasaki, Thursday Island, Gulf of Siam, Kilwa.

2. *Paratymolus sexspinosus* MIERS. Pl. XXI, fig. 2.

MIERS 1884, p. 261, pl. 27, fig. B; HENDERSON 1893, p. 352; CALMAN 1900, p. 33; SAKAI 1936, p. 81, pl. 17, fig. 3 (coloured).

The carapace is much broader than that of the former species, the dorsal surface evenly convex with no indication of regions nor tubercles. The pseudorostrum is on a much lower plane than the dorsal surface of carapace, the tip being very slightly emarginate.

The anterior angle of the supraocular eave is tuberculiform, beneath which the relatively short eye-stalk is partly concealed. The antero-lateral margin has two teeth, the anterior is obsolete and occurs on the hepatic margin, the posterior is somewhat larger and is placed at the anterior angle of the branchial margin.

The basal segment of antenna is shorter and the merus of the external maxilliped is broader than that of the former species. The wrist of cheliped has a stout spine at the inner angle, the palm is laterally compressed and its outer surface has a longitudinal row of two compressed tubercles, which are confluent with each other; the fingers do not gape. The ambulatory legs are somewhat thicker than those of the former species; carpus, propodus and dactylus are sparingly fringed with hairs along the posterior border.

Material examined: 1 ♀, Simoda, obtained from the coast in front of the M.B.S.

Measurements: Female, length of carapace 10 mm., width 9.5 mm.

Habitat: Rocky, weedy ground, not far from the shore line.

Distribution: Japan, at Simoda; India and Australia.

Genus *Achaeus* LEACH 1815.

ALCOCK 1895, p. 169; BALSS 1929, p. 5.

The general aspect of the body of *Achaeus* much resembles that of *Achaeopsis*, from which it differs in having no postocular spine in front

of the hepatic lobe. Preocular spine present in some species as in *Achaeopsis*, but the pseudorostral spines are almost always obsolete. On account of these diagnoses, three Japanese species which have been referred to *Achaeopsis* are now duly placed in *Achaeus*; furthermore, four new species are added to the Japanese fauna:

Key to the Japanese species of *Achaeus*.

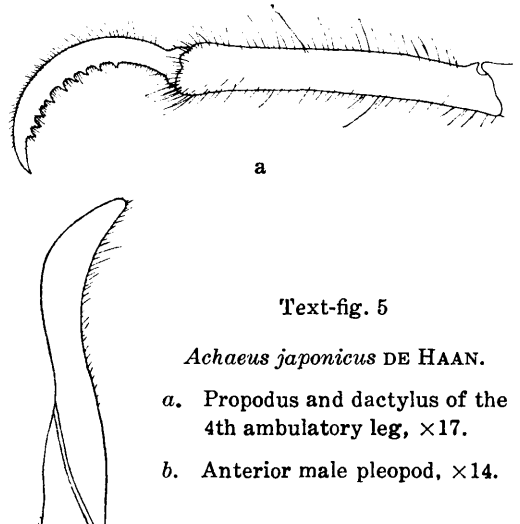
A. Supraocular eave has no distinct preocular spine.
  I. Carapace smooth, neither spinulated nor tuberculated above, excepting three faint cardiac tubercles in one species.
    1. Hepatic lobe not markedly produced, carapace entirely smooth, with no distinct tubercles.
      i. Dactylus of last two pairs of ambulatory legs strongly falcated; first pair of legs longest. ..... *A. japonicus.*
      ii. Dactylus of last two pairs of ambulatory legs not very strongly falcated; second pair of legs longest. ..... *A. robustus.*
    2. Hepatic lobe markedly produced.
      i. Carapace very broad (proportion between length and width being 1.2: 1). Dactylus of last two pairs of legs very strongly falcated and looped. ..... *A. spinifrons* sp. n.
      ii. Carapace relatively long (proportion between length and width being 1.4: 1); cardiac region has three low tubercles. .... *A. trituberculatus.*
  II. Carapace has tubercles on the dorsal surface.
    1. Carapace with a median gastric and a cardiac tubercle. Dactylus of posterior two pairs of ambulatory legs not strongly falcated.
      i. Hepatic lobe broad and armed with two or three tubercles. Terminal segment of male abdomen broad and obtuse. ..... *A. tuberculatus.*
      ii. Hepatic lobe prominent but obtuse, not tuberculated at all. Terminal segment of male abdomen sharply triangular. .... *A. brevidactylus* sp. n.
    2. Carapace with one gastric tubercle, a pair of cardiac tubercles and also two branchial ones. Last two pairs of ambulatory legs have dactylus strongly falcated. ..... *A. spinosus.*
  III. Carapace has prominent spines on the dorsal surface. Dactylus of posterior two pairs of legs sensibly falcated.
    1. Pseudorostrum composed of two lobes, which are more or less divided by a median V-shaped sinus.
      i. There are only two long, flat-topped spines in the median line of carapace, one gastric and the other cardiac. ..... *A. suluensis.*
      ii. There are three spines on the gastric region, one on the cardiac and one on each branchial region. ..... *A. superciliaris.*
    1. Pseudorostral spines very slender and continuous. There are three gastric, one cardiac and one branchial spine. ..... *A. pugnax.*

B. There is a prominent preocular spine; the pseudorostrum composed of two lobes with acuminate tips. Postocular neck is usually distinct.
    1. Neck is extremely long. Branchial region with two spinules. .... *A. elongatus* sp. n.
    2. Neck is stout and not very long. Branchial regions unarmed. .... *A. akanensis* sp. n.

1. *Achaeus japonicus* DE HAAN. Pl. XXII, fig. 1.

DE HAAN 1839, F. J. C. p. 91, pl. 29, fig. 3; BALSS 1924, p. 20 (lit.); URITA 1926, p. 30; YOKOYA 1933, p. 134; SAKAI 1934, p. 293, text-fig. 8; 1936, p. 83, pl. 19, fig. 2 (coloured).

The carapace is rounded triangular; gastric, cardiac and branchial regions are convex and very smooth, each separated by deepish grooves. The pseudorostrum composed of two short lobes, which are separated by a narrow median sinus and their free margins entire or faintly denticulated. Supraocular eaves have neither spinules nor tubercles; the neck extremely short. The hepatic region is little convex in the male, but somewhat more convex in the female. The posterior border is almost straight.



Text-fig. 5

Achaeus japonicus DE HAAN.

a. Propodus and dactylus of the 4th ambulatory leg, ×17.

b. Anterior male pleopod, ×14.

The basal segment of antenna is very slender and minutely granulated, the distal extremity being fused with the lateral ventral surface of the front. The eye-stalks are distally swollen, with a tubercle at the distal end of the anterior border.

Chelipeds of male are very stout; the arm proximally swollen and sparingly granulated on the upper proximal surface, its inner inferior and outer inferior borders with a longitudinal row of hairs; wrist with a few tubercles on the upper proximal surface and its inner border fringed with setae. Palm extremely convex on the outer surface, its superior and inferior borders obtusely carinated and fringed with hairs. Fingers strongly incurved and concave along the cutting edges, which are finely denticulated throughout their whole length and are armed with a stout tooth near the base. Merus and carpus of the ambulatory legs are very sparingly haired, while the propodus and dactylus are densely covered with hair and tomentum, the dactylus being less than half the length of the propodus. Dactylus of the posterior two pairs are markedly falcated.

Material examined:

2 ♂♂, 1 ♀, Tateyama Bay, May 1928.
1 ♂, 1 ♀, Manazuru, "Misago", June 1934.

10 ♂♂, 3 ♀♀, Simoda, obtained in a lobster net.
2 ♂♂, 3 ♀♀, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
5 ♂♂, 6 ♀♀, Wakayama-ken, Mr. S. SAKAGUTI.
1 ♂, 1 ♀, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 2 ♀♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 21.5 mm., width of same 16 mm.

Habitat: Inhabits usually weedy rocky bottoms but sometimes obtained from sandy or muddy bottoms; depth, 20–100 metres.

Type locality: Japan (DE HAAN).

Distribution: From Tokyo Bay to Nagasaki and Kagosima; Japan, endemic.

2. *Achaeus robustus* YOKOYA.

YOKOYA 1933, p. 136, text-fig. 48.

According to YOKOYA, the carapace of this species is a little longer than wide; the gastric, cardiac and branchial regions are convex and unarmed. Pseudorostrum short and bifid, eye-stalks unarmed. Chelipeds resemble those of *A. japonicus*; the first pair of ambulatory legs shorter than the second pair; the third and fourth pairs have the dactylus very slightly falcated.

I have not seen this species myself.

Type locality: Bungo Strait, 106 metres deep (YOKOYA).

Distribution: Known only from the type locality.

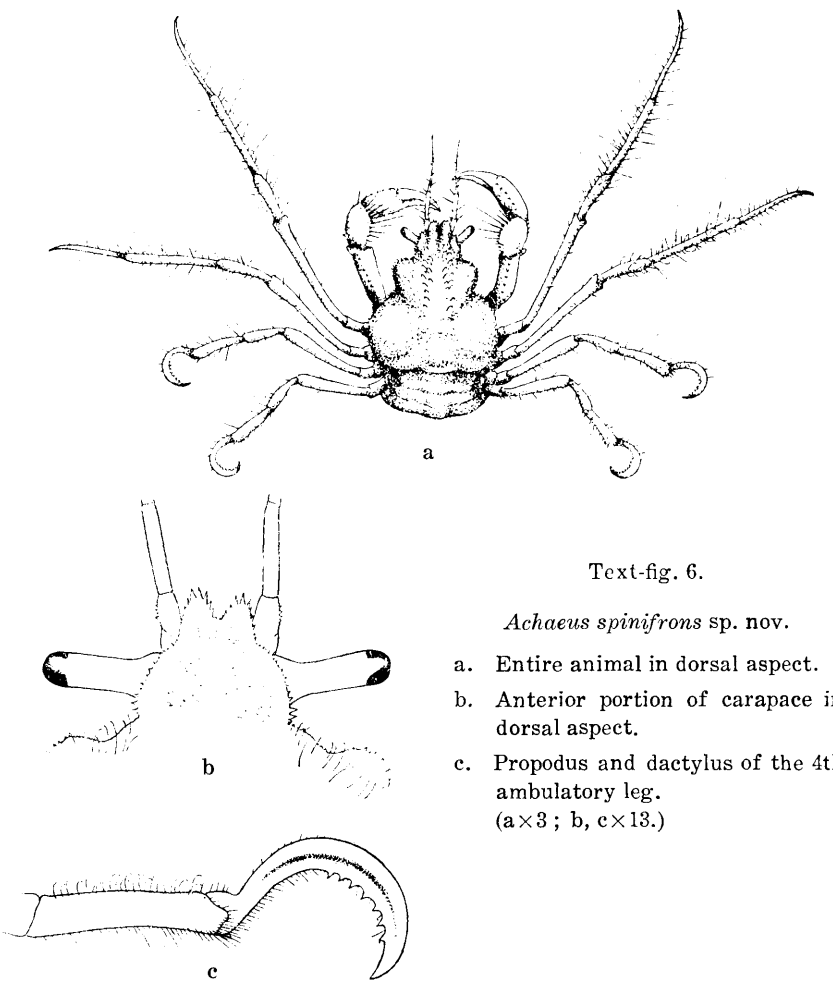
3. *Achaeus spinifrons* sp. nov.

The hepatic and branchial regions of this species are markedly swollen, so that it can easily be distinguished from the female of *A. japonicus*. There are no tubercles nor spines on the dorsal surface of each region. The pseudorostral lobes are divided by a shallow median sinus, the margin of each lobe being spinulated (Text-fig. 6b). The supraocular eaves are minutely spinulated, the hepatic lobes, which are situated immediately behind the eyes, are equally spinulated as also the branchial margins, which are fringed with curled hairs.

The arm of the chelipeds is armed with a row of five or six spinules on the upper border; the inner border of wrist is fringed with long setae, interspersed with a few spinules; the upper and lower borders of palm are also armed with a row of several spinules. The fingers are almost as long as the palm. The ambulatory legs are thickly covered with curled hairs, interspersed with long straight ones. Each segment is more or less distally broadened. The last two pairs are subequal in length, their dactylus is very broad and strongly falcated or looped; it is nearly as

long as the propodus in length and its inner border is armed with seven or eight teeth in the distal half (Text-fig. 6c).

The eye-stalks are, unlike those of *A. japonicus*, very long and slender throughout the whole length, and the cornea not swollen and not tuberculated.



Text-fig. 6.

Achaeus spinifrons sp. nov.

a. Entire animal in dorsal aspect.
b. Anterior portion of carapace in dorsal aspect.
c. Propodus and dactylus of the 4th ambulatory leg.
(a×3 ; b, c×13.)

This species probably related to *A. villosus* RATHBUN 1916, from which the new species is distinguished by the spinulated rostral lobes, by the slender eye-stalks and the rather smooth chelipeds which have no curled hairs and lastly by the much strongly looped dactylus of the posterior two pairs of ambulatory legs.

From *A. japonicus*, it is distinguished by the short rostral lobes, by the very markedly produced hepatic lobes, by the very slender eye-stalks and also by the comparatively short propodus of the last two pairs of legs.

Material examined:

1 ♀, holotype, ovigerous, Nagasaki, Mr. I. KANEKO.
1 ♀, ovigerous, between Ito and Hatusima, "Misago", June, 1934.
1 ♀, coast of Wakayama, Mr. S. SAKAGUTI.

Measurements: Length of carapace 6.3 mm., width 5.5 mm.
Habitat: Same as that of *A. japonicus*.

4. *Achaeus trituberculatus* RATHBUN.

RATHBUN 1894, p. 47.

According to RATHBUN, the carapace of this species is narrower than that of *A. japonicus*, being not constricted behind the orbital region; the gastric and branchial regions are smooth, cardiac region mounted with three tubercles, posterior one of which is placed in the median line. The hepatic regions are broad and obtusely produced; the pseudorostral lobes are spinulated on the free margin and separated by a narrow median V-shaped sinus. Eye-stalks are distally swollen, armed with an acuminate tubercle on the upper side near the cornea. The abdominal segments of male are all narrow, the terminal segment not being wider than the others.

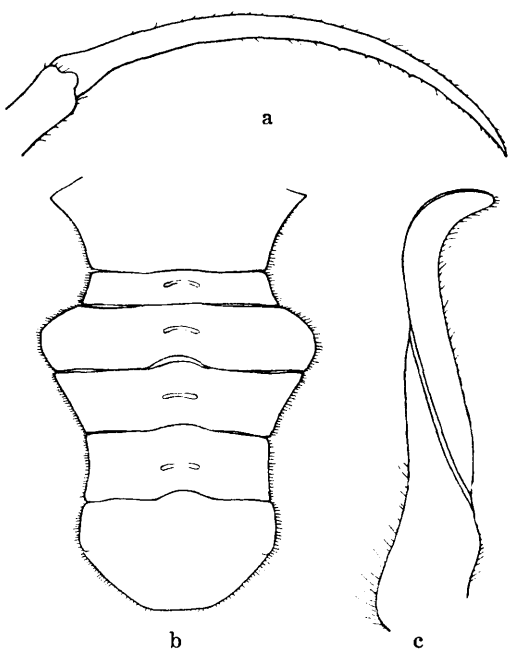
I have not seen specimens which exactly agree with the characters above enumerated, however, a few specimens of *A. japonicus* before me have three depressed tubercles on the cardiac region as in this species.

Type locality: Kanada Bay (?Tokyo Bay), mud, depth 10 fathoms. (RATHBUN).

5. *Achaeus tuberculatus* MIERS. Pl. XXII, fig. 3.

MIERS 1879, p. 25; ORTMANN 1893, p. 34; RATHBUN 1894, p. 47; PARISI 1915, p. 281; BALSS 1924, p. 20; YOKOYA 1933, p. 135; SAKAI 1934, p. 293; 1936, p. 83, pl. 19, fig. 1 (coloured).

The regions of the carapace are delimited by shallow grooves; the gastric region is mounted with a median tubercle; the cardiac region convex and mounted with a conical tubercle, which is very often bifurcated, having a small tubercle on the posterior slope of this region. The pseudorostrum composed of two small slender lobes, which are usually incurved at tip, leaving a narrow median sinus between them. The postocular constriction distinct but the neck is not very long. The hepatic lobe well developed, the outer margin being divided into two (sometimes three) lobules. There is usually a compressed low tooth in the interval between the supraocular eave and the hepatic lobe, which seems to correspond with the postocular tooth of the genus *Achaeopsis*. A few small tubercles on the lateral surface of the branchial region immediately above the base of



Text-fig. 7.
Achaeus tuberculatus MIERS.
a. Dactylus of the 4th ambulatory leg.
b. Abdomen of male.
c. Anterior male pleopod.
(a×12; b×9; c×21.)

the cheliped. A shallow channel runs along each posterolateral border, and is continuous with the shallow channel running inside the posterior border.

The pterygostomian region is armed with three or four tubercles which are arranged in a curved row, the posterior one or two being larger.

Chelipeds resemble those of *A. japonicus*. The ambulatory legs are very slender and filiform, each segment being sparingly furnished with longish hairs. The dactylus is distinctly more than half the length of the propodus; that of the anterior two pairs is almost straight and very slightly incurved at tip, that of the posterior two pairs is very slightly falcated and its inner border armed with a few denticles.

Abdomen of male has the terminal segment very broad and obtuse, not sharply pointed at the tip. (Text-fig. 7b).

Material Examined:

3 ♂♂, 2 ♀♀, Tateyama Bay, May, 1928.
2 ♂♂, 1 ♀, Manazuru, "Misago", June 1934.
3 ♂♂, 2 ♀♀, Simoda, off the coast of the M. B. S.
3 ♂♂, 2 ♀♀, Momotori in Ise Bay, Aug. 1932.
1 ♂, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
2 ♂♂, 2 ♀♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Tateyama, length of carapace 12 mm., width 9.5 mm.

Habitat: Inhabits the bottoms of mud, muddy-sand or broken shells; depth 30–200 metres.

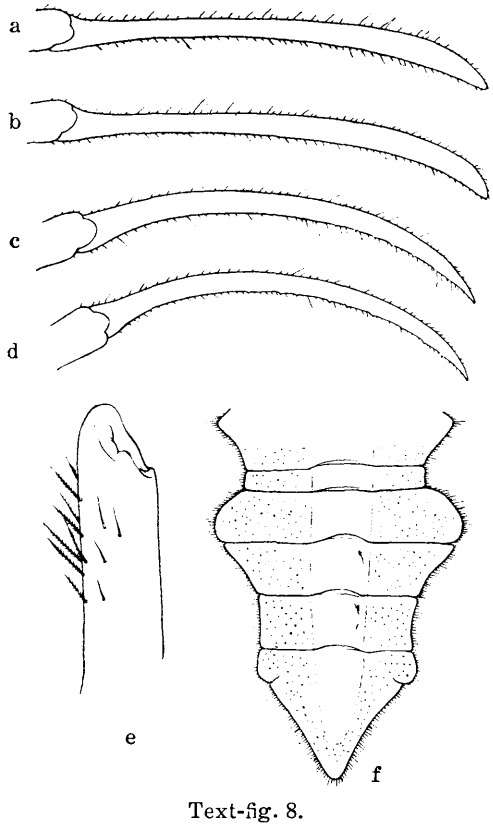
Type locality: Corea Channel (MIERS).

Distribution: Japan, endemic; from Siriyazaki (YOKOYA) to Kyûsyû, also occurs in the Japan Sea northwards to Niigata Bay.

6. *Achaeus brevidactylus* sp. nov. Pl. XXI, fig. 4.

The general aspect of this new species resembles that of *A. tuberculatus*, however, the following account of characters may be enumerated:

1. Carapace broadly triangular and its dorsal surface smooth, having two low tubercles in the median line, one gastric and the other cardiac. The hepatic regions are moderately produced and covered with curled hairs, their apex being indistinctly spinulated. The branchial regions are laterally swollen but somewhat depressed on the dorsal surface, their outer margins are covered with curled hairs and their epimeral ridges, as well as the posterior border, are finely spinulated under the lens.



Text-fig. 8.

Achaeus brevidactylus sp. nov.

a–d. Dactyli of 1st to 4th ambulatory legs.
e. Anterior male pleopod.
f. Abdomen of male.
(a–d×14; e×63; f×12.)

2. The pseudorostrum is very obtuse and marked with a shallow median sinus, the free margins being indistinctly spinulated. The supraocular eaves are armed with a few spinules near the posterior angle. The postocular constriction is distinct but the neck is exceedingly short, the hepatic regions being situated immediately behind the eyes. The eye-stalks are stout and constricted in the middle, armed with a spinule near the cornea, which is not much swollen.

3. The basal (= second) segment of antenna is stout and longer than the fourth segment, still more so than the third segment, and is armed with spinules on the exposed surface.

4. Chelipeds are very stout and swollen; ischium armed with several spinules on the anterior border; arm is proximally swollen and marked with a row of spinules and setae along the upper, outer and lower borders; wrist is rather small and has a row of spinules and setae along the inner border; palm is much swollen on the outer surface, its upper border with an indistinct row of spinules and setae, while its lower border

is almost smooth. The fingers are longer than the palm, their cutting edges meet throughout their whole length and are minutely denticulated, the denticles being almost equal in size but the basal one in both fingers is somewhat larger.

5. The anterior two pairs of ambulatory legs are subequal in length, or more exactly, the second pair is somewhat longer; in both cases the merus is microscopically spinulated along the posterior border and the dactylus almost straight and weakly broadened near the tip (text-fig. 8 a, b). [Hence the specific name *brevidactylus* is given.] The third pair is medium in length, while the last pair is much shorter; in both cases the dactylus is not much shorter than those of the anterior two pairs, and is slender and not much curved, having a few indistinct denticles along the posterior border.

6. The abdomen of the male has the terminal segment (6th plus telson) sharply triangular, and together with the peculiar shaped anterior abdominal appendages (text-fig. 8f), the new species may safely be distinguished from *A. tuberculatus*.

Material examined:

5 ♂♂, 6 ♀♀, Simoda, off Norosi-zaki; one male of which is designated as holotype.

Measurements: Holotype, length of carapace 8 mm., width 6.8 mm., length of cheliped 17 mm., length of first ambulatory leg 25 mm., second leg 26 mm., third leg 18 mm., last leg 14.5 mm.

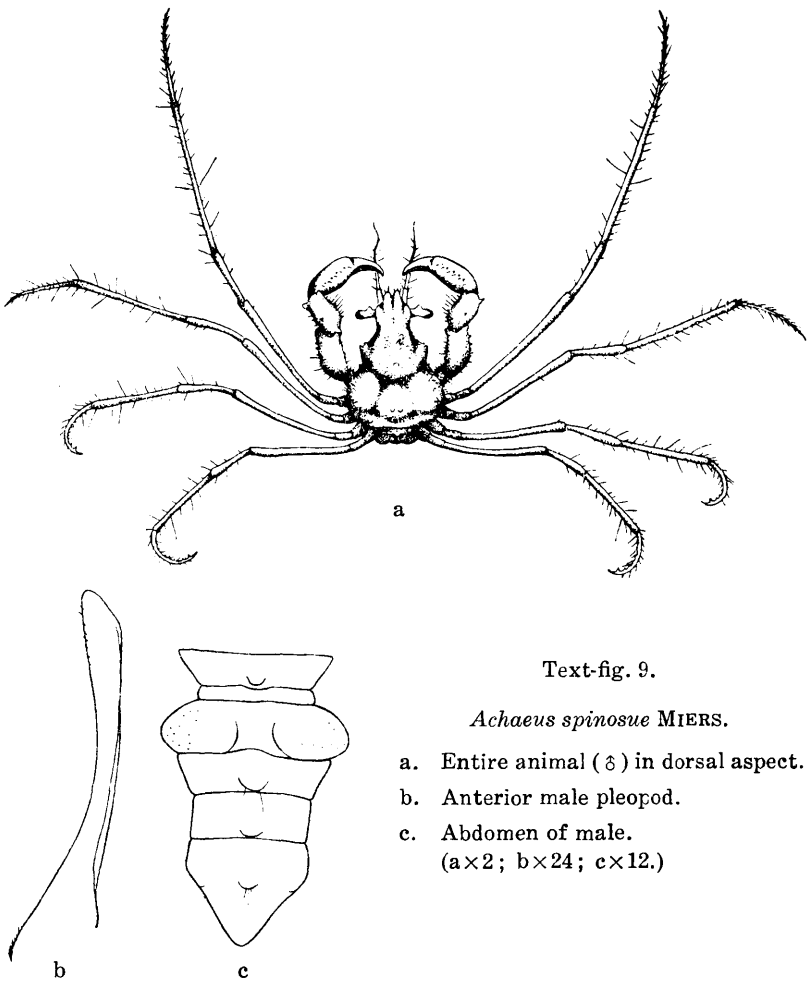
Habitat: Inhabits the bottoms of sandy mud; 30 to 60 metres deep.

7. *Achaeus spinosus* MIERS.

MIERS 1879, p. 25; ALCOCK 1895, p. 171; BORRADAILE 1902, p. 685; YOKOYA 1933, p. 136.

The carapace behind the postocular neck is almost as broad as long, the supraocular eave has a few spinules near the anterior angle. The pseudorostrum composed of two obtuse lobes, which are separated by a median V-shaped sinus. There are two tubercles in the median line of the carapace, one gastric and the other cardiac, the latter being usually bilobate. Of the two branchial tubercles the anterior one is placed near the inner angle of this region and is very small. A rather prominent tubercle, which is not mentioned by the previous authors, is found on either side of the posterior border immediately above the base of the last walking leg. The hepatic region is moderately convex, mounted with two or three small tubercles; beneath the hepatic margin are also a few tubercles, some of which are visible in dorsal aspect.

The eye-stalks are armed with a large tubercle in the middle of the anterior border, the cornea being sensibly swollen. The chelipeds of male are robust; arm proximally swollen, armed with sharp granules along the upper and lower borders; wrist indistinctly granulated, fringed with long setae on the inner border, one tubercle on the upper surface near the base and two found at the distal end of this segment are always prominent.



Text-fig. 9.

Achaeus spinosue MIERS.

a. Entire animal (♂) in dorsal aspect.
b. Anterior male pleopod.
c. Abdomen of male.
(a×2; b×24; c×12.)

The palm is armed with several sharp granules on the upper margin and a few on the outer surface, otherwise this segment is smooth. The fingers gape widely at the base; the movable finger has a large tooth which fills the gap proximally.

All pairs of ambulatory legs are very slender and filiform, the dactylus of the posterior two pairs is strongly falcated and is armed with six or seven sharp spinules.

Of the male abdominal segments, the second is very short and narrow, the third is very broad and long and is swollen on either side, where the surface is minutely granulated. The first, fourth, fifth and sixth segments are respectively armed with a median tubercle; the last segment being obtusely pointed at tip. This species has never been figured till now.

Material examined:

2 ♂♂, 2 ♀♀, Simoda, obtained in a lobster net.
1 ♂, Susaki, near Simoda, obtained in a lobster net.
1 ♂, Sirahama, near Simoda, entangled to sea weed.
1 ♂, coast of Kii Peninsula, Mr. K. OKAMOTO.

Measurements: Male from Simoda, length of carapace 8 mm., width of same 5.8 mm.

Habitat: Inhabits rocky bottoms, among sea weeds; not far from the shore line.

Type locality: Off the coast of Miye-ken (MIERS) (In the list of species of MIERS' original paper (1879, p. 19), the type locality of this species was designated as "Corean Channel" but in the text, it was designated as "Lat. 34° 1′ N, long. 136° 47′ E″.

Distribution: Misaki, Sagami Bay, Izu Peninsula, Kii Peninsula, Nagasaki and Goto Isls. (YOKOYA), Maldives? (BORRADAILE), Persian Gulf (ALCOCK).

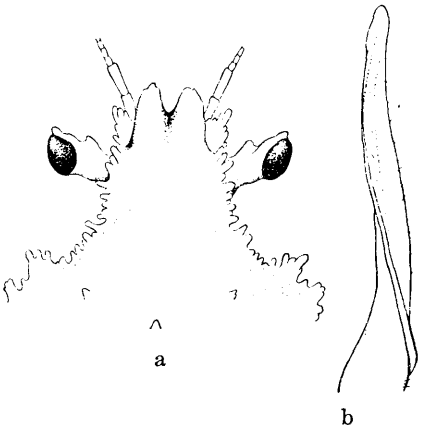
8. *Achaeus superciliaris* (ORTMANN) new combination. Pl. XXI, fig. 5.

Achaeopsis superciliaris ORTMANN 1893, p. 36, pl. 3, fig. 3; Rathbun 1906, p. 877; BALSS 1924, p. 21; SAKAI 1936, p. 79, pl. 17, fig. 2 (coloured).

As BALSS (1924) has already paid attention, this species has no distinct preocular and postocular spines, the margin of the supraocular eave and the neck are armed with numerous knobbed spinules of various sizes, but none of which correspond to the said two sorts of spines; moreover the pseudorostrum is composed of two short lobes instead of slender spines of *Achaeopsis*, so that this species may be advisably referred to *Achaeus* together with its nearest kin, »*Achaeopsis*» *suluensis* RATHBUN.

The carapace is broadly triangular. There are two very long and knobbed spines in the median line, one gastric and the other cardiac, and a small tubercle on the posterior slope of the latter. On either side of the posterior border, just above the base of the last ambulatory legs is a prominent spine, forming with the said cardiac spine a low triangle. The pseudorostral lobes are short and broad, separated by a median V-shaped sinus, and their free margin is armed with a few flat-topped spinules. No distinct preocular or postocular spines, the supraocular eave and the postocular neck are continuous and are armed with numerous

flat-topped spinules of various sizes. The hepatic lobes are prominent and obscurely bilobed, each lobe being serrate. Two knobbed tubercles, one of which is sometimes bifurcated, on the lateral margin of the epibranchial region, the postero-lateral and posterior margins are serrate with fine acuminate spinules.



Text-fig. 10.
Achaeus superciliaris (ORTMANN).
a. Anterior portion of carapace in dorsal aspect.
b. Anterior male pleopod.
(a×10; b×30.)

The basal segment of antenna is very slender and distally somewhat broadened and is armed with knobbed spinules. A stout tubercle on the pterygostomian region.

The chelipeds of male are very stout, each segment being covered with granules; the arm is proximally swollen and its inner inferior and outer inferior borders spinulated, the inner border of wrist and superior border of palm are also spinulated. The merus and propodus of the ambulatory legs are finely spinulated along the posterior border, the anterior border of these segments being microscopically granulated. The posterior three pairs of the ambulatory legs have the dactylus very slightly falcated. The first segment of male abdomen has a median spinule; the other segments have a transverse ridge of granules. In the female abdomen, each segment has an indistinct transverse ridge in the middle line.

Material examined:

3 ♂♂, 2 ♀♀, Misaki, Simosita, Prof. M. YERI.
Numerous ♂♂ and ♀♀, from various stations off Manazuru, Aziro and Ito; "Misago" and "Amagi".

Measurements: Male, length of carapace 9.3 mm., width of same 6.5 mm.

Habitat: Inhabits the sandy, muddy or shelly grounds, depth 50 to 150 metres.

Type locality: Sagami Bay (ORTMANN).

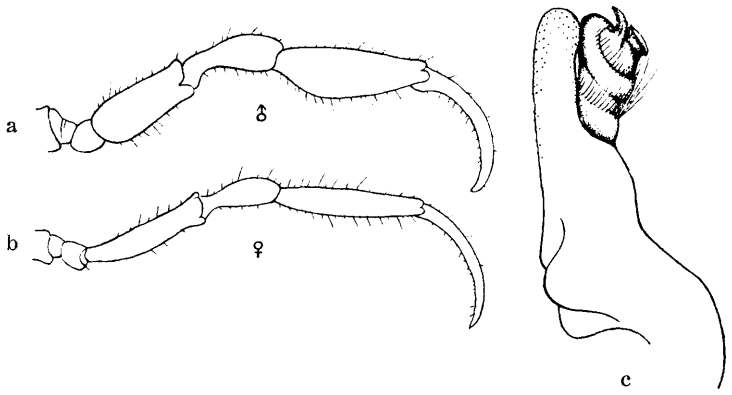
Distribution: Sagami Bay, Izu Peninsula and Hawaii (RATHBUN).

9. *Achaeus suluensis* (RATHBUN), new combination. Pl. XXII, fig. 2.

Achaeopsis suluensis RATHBUN 1916, p. 535; SAKAI 1936, p. 79, pl. 18, fig. 1 (coloured.)

This species much resembles *A. superciliaris* but is distinguished in the following constant characters:—

1. A small species, which has only two flat-topped spines in the median line of the carapace, one gastric and the other cardiac, the latter has another small tubercle on its posterior slope; no other spines on the dorsal surface of the carapace. The pseudorostrum is divided into two short lobes by a median shallow sinus, the margin of which being indistinctly spinulated. The supraocular eave also indistinctly armed with knobbed spinules.



Text-fig. 11.

Achaeus suluensis (RATHBUN).

a. 4th ambulatory leg of male.
b. Same of female.
c. Anterior male pleopod.
(a, b×14; c×35.)

2. The eye-stalk has a tubercle in the middle of the anterior border and also the usual terminal tubercle on this border.

3. In the male, the merus, carpus and propodus of the ambulatory legs are more broadened than those of the female (text-fig. 11).

4. In the male, the first abdominal segment is armed with a flat-topped median spinule, the third segment is very long and broad, swollen on either lateral surface, where occurs a flat-topped spinule; the second, fourth and fifth segments are very short. The anterior abdominal pleopod of male is peculiar in shape as shown in text-fig. 11c. In the female, each abdominal segment has a median spinule, although it is very low and indistinct in the posterior three segments.

Material examined:

3 ♂♂, 5 ♀♀, off Kisami near Simoda, Aug. 1934, " Misago".

Measurements: Male, length of carapace 4.5 mm., width 4 mm.

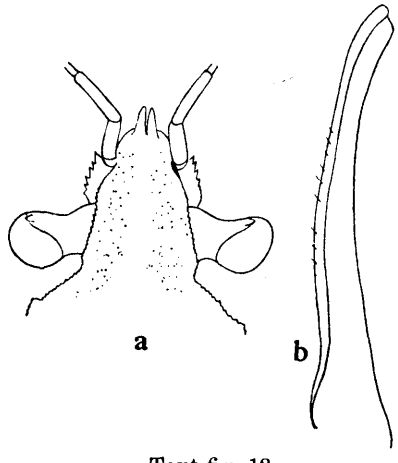
Habitat: Inhabits the bottoms of sandy-mud, 50 metres deep.

Type locality: Tawi Tawi Group, Sulu Archipelago (RATHBUN).
Distribution: Only known from the two localities above mentioned.

10. *Achaeus pugnax* (DE MAN) new combination. Pl. XXIII, fig. 2.

Achaeopsis pugnax DE MAN 1926, p. 7, text-figs. 1 – li.
Achaeus stenorhynchus RATHBUN 1932, p. 29; YOKOYA 1933, p. 136; SAKAI 1936, p. 84, pl. 17, fig. 4 (coloured) and textfig. 34.

Carapace regularly triangular and constricted behind the orbital region and also behind the hepatic lobes, the neck, however, is not very long. The regions are well delimited and their surface scattered with granules. There are two long obtuse spines in the median line, one is gastric and very slender, the other is cardiac and conical. A small tubercle on either side of the gastric region in front of the median one, forming a triangle, base forwards. The hepatic lobes are well convex, margins irregularly tuberculated. The branchial regions are depressed, having some granules on the dorsal surface. There is a compressed tubercle on either postero-lateral border immediately above the base of the last ambulatory leg.



Text-fig. 12.
Achaeus pugnax (DE MAN).
a. Anterior portion of carapace in dorsal aspect.
b. Anterior male pleopod.
(a×12; b×20.)

The pseudorostral spines are very slender and continuous, projecting obliquely upwards. Edge of the supra-ocular eaves and also of the neck is armed with small tubercles or granules, but none of which are so prominent as to represent the preocular or postocular spine, so that I placed this species in *Achaeus* instead of *Achaeopsis* of the original author. Basal segment of antenna is very long and bent upwards in the distal half, having a prominent spine near the middle. The eye-stalks are extremely constricted near the base, the cornea markedly convex and reniform, having a terminal tubercle on the anterior border.

Chelipeds are thickly covered with sharp granules; the arm has its inner inferior and outer inferior borders spinulated, the inner border of wrist and superior border of palm are also armed with acuminate spinules. Fingers not gaping and their cutting edges finely and uniformly denticulated. The first ambulatory legs are more than four times as long as the carapace including pseudorostrum; the dactylus of the posterior two pairs of legs is slightly falcated.

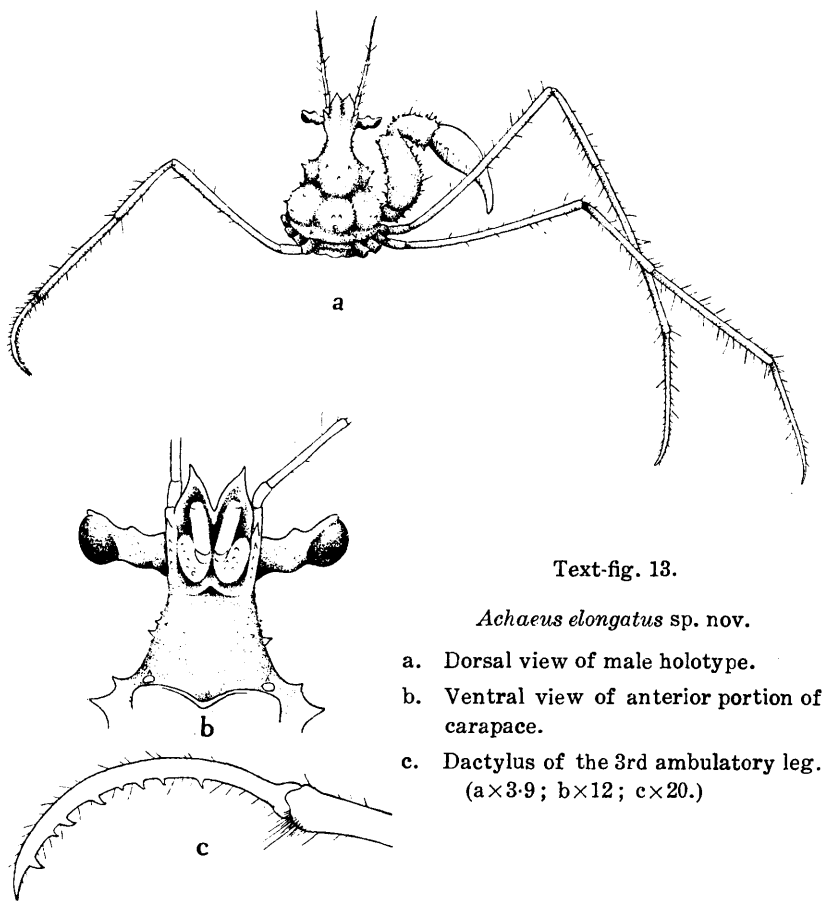
Material examined:

1 ♂, 1 ♀, Misaki, Messrs. YERI and YOSHII.
3 ♂♂, 2 ♀♀, between Ito and Hatusima, "Misago", June 1934.
1 ♂, 1 ♀, Simoda, off the coast of the M. B. S.

Measurements: Male, length of carapace 11 mm., width 8 mm.
Habitat: Muddy or muddy-sand bottoms, 50–150 metres deep.
Type locality: Sagami Bay (MORTENSEN—DE MAN).
Distribution: Japan, endemic; Sagami Bay, Izu Peninsula, Goto Isls. and Kosiki Isls.

11. *Achaeus elongatus* sp. nov.

This new species much resembles the Australian *A. tenuicollis* MIERS 1886, however, the following few points of difference between the two are enumerated, the type specimen of new species being compared with a male



Text-fig. 13.

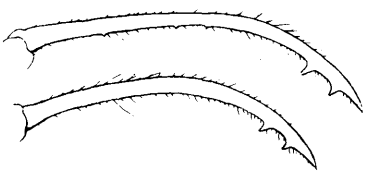
Achaeus elongatus sp. nov.

a. Dorsal view of male holotype.
b. Ventral view of anterior portion of carapace.
c. Dactylus of the 3rd ambulatory leg. (a×3·9; b×12; c×20.)

and a female of *A. tenuicollis,* which were kindly sent to me by the authorities of the Australian Museum at Sydney.

1. The general aspect of the carapace, as well as the pseudorostrum and neck, much resembles that of *A. tenuicollis* but the cardiac region has two widely separated spinules placed side by side instead of a single pointed one, behind which another small tubercle is found on the posterior slope of this region.

2. The fourth segment of antenna is considerably long, the length being about 13 times its width, while in *tenuicollis* it is only about 6 times its width.



Text-fig. 14.

Achaeus tenuicollis MIERS.
Dactyli of 3rd and 4th ambulatory legs of the ♂ from N. S. W., ×12.

3. On either lateral border of the postocular neck, both species have one prominent spine and a few smaller ones, although in MIERS' original paper only one spinule is illustrated.

4. The dactylus of the last two pairs of ambulatory legs is markedly falcated and its inner border has about eight teeth of almost equal size; in *tenuicollis,* however, this segment is only very slightly falcated and is armed with only two large teeth near the distal extremity.

Material examined:

1 ♂, holotype, between Itô and Hatusima, June 1934, "Misago".

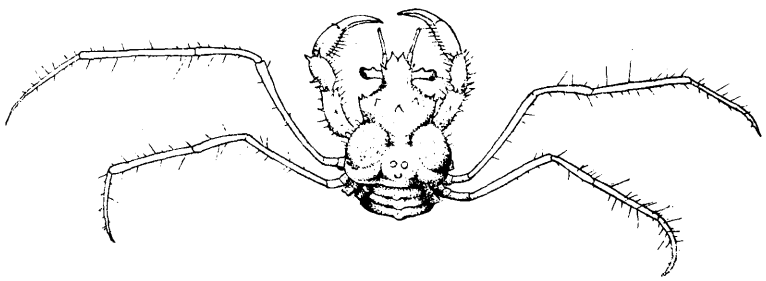
Measurements: Length of carapace including rostrum 5.2 mm., width of same 3.3 mm.

Habitat: Inhabits the bottoms of muddy sand or dead shells, 100 metres deep.

12. *Achaeus akanensis* sp. nov.

An *Achaeus* which has a prominent preocular spine. It is related to *A. elongatus* but differs in having broader carapace and stouter postocular neck. The pseudorostral spines much resemble those of *elongatus* and still more those of *A. tenuicollis.* The three gastric tubercles are subequal in size, two being placed side by side in front of the median posterior one. The cardiac region has three tubercles, one of which is small and placed behind the other two, which are transversely arranged. The hepatic lobes are moderately prominent and are armed with two spinules, both directed obliquely forwards. The branchial regions are, contrary to those of *elongatus* and *tenuicollis,* not tuberculated except a rudimentary one near the inner anterior corner of this region. There is a row of several sharp spinules above the bases of the ambulatory legs, but they are not at all visible from above.

The ischium of the chelipeds is armed with four spinules on the lower border; the arm with three spinules on the upper border and nine or ten on the lower border; the wrist with two proximal and two subdistal spines on the upper surface, the inner border being armed with a few small spinules which are fringed with long setae. The upper and lower borders of the palm are fringed with long setae, interspersed with a few spinules. The fingers are compressed and strongly curved, distinctly longer than the palm, the cutting edges being uniformly denticulated. The dactyli of the third and fourth pairs of the ambulatory legs are fallen off, but they seem to resemble those of *A. elongatus*.



Text-fig. 15.

Achaeus akanensis sp. nov. Dorsal aspect of female holotype, ×3·3.

The female of *Achaeus* has usually broader carapace than the male, but on account of the absence of spinules on the branchial regions and of the thick, short neck, I am convinced that this species is new to science.

Material examined:

1 ♂, holotype, Akane, in front of the Simoda M. B. S., obtained in a lobster net.

Measurements: Length of carapace in median line 5.5 mm., width 4.5 mm.

Habitat: Rocky shore, 10–20 metres deep.

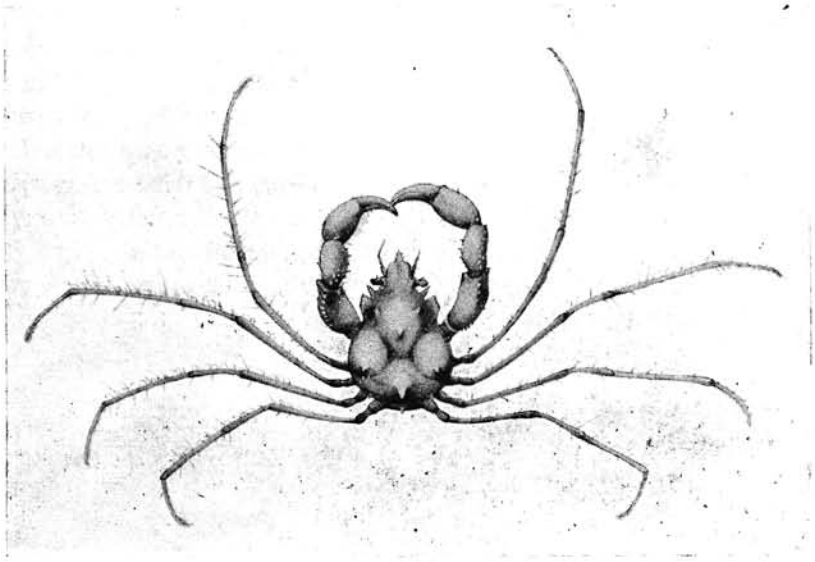
Genus *Pseudocollodes* RATHBUN.

RATHBUN 1911, p. 247; BALSS 1929, p. 4.

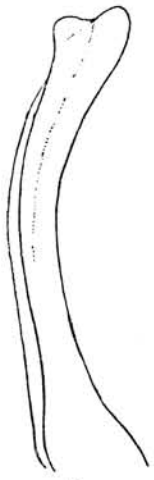
This genus comprises only two species, viz., *P. amplectus* RATHBUN 1911 from Seychelles and *P. demani* BALSS 1929 from Japan, the latter was again described by RATHBUN in 1932 under the name of *Achaeopsis atypicus*.

Pseudocollodes demani BALSS.

BALSS 1929, p. 4, text-fig. 2; YOKOYA 1933, p. 146, text-fig. 53.
Syn.: *Achaeopsis atypicus* RATHBUN 1932.



a



b

Text-fig. 16.

Pseudocollodes demani BALSS.

a. Entire animal (♂) in dorsal aspect.
b. Anterior male pleopod.
(a×1·7; b×22.)

The general characteristics of this species coincide with those of *Achaeopsis*, from which it can be readily distinguished in having the true rostrum much more prominent and produced forwards so as to be visible beyond the pseudo-rostrum in dorsal view, the latter is obsolete.

The carapace broadly triangular, the pseudo-rostrum obtuse and the margins indistinctly denticulated but not developed into spines or lobes as in *Achaeus* or *Achaeopsis*. The true rostrum is very prominent and produced horizontally forwards, its lateral margins being armed with two or three denticles. The spines on the dorsal surface of the carapace are disposed as follows: three on gastric region in a triangle base forwards, one on cardiac region and also one on each branchial region near the lateral angle. The hepatic lobes are somewhat expanded and their margins denticulated. The postero-lateral and posterior margins are finely spinulated.

Chelipeds stout, arm and wrist covered with sharp granules, of which those on the outer and inner borders are spiniform. Palm not much swollen and distally narrowed, its upper and outer surfaces sparingly

granulated. Fingers as long as palm, the cutting edges indistinctly denticulated and meeting throughout their whole length.

Ambulatory legs are furnished with two sorts of hairs, the curled hairs being found along the anterior border of each segment, and the long and slender hairs being found everywhere but fewer in number. Dactylus is straight and styliform.

Material examined:

1 ♂, coll. by the Sôyô-maru, St. 107 (south-west of Inuboezaki).

Measurements: Male, length of carapace without true rostrum 11 mm., width 8 mm.

Habitat: Rocky bottoms, 115–350 metres deep.

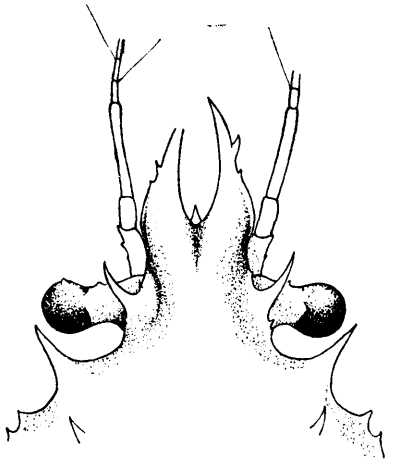
Type locality: Sagami Bay (BALSS).

Distribution: Japan, endemic:—Off Inuboe-zaki (YOKOYA), Sagami Bay (BALSS), and Sata-Misaki (RATHBUN).

Genus *Achaeopsis* STIMPSON.

STIMPSON 1857, p. 219; MIERS 1886, p. 18; STIMPSON 1907, p. 21; RATHBUN 1925, p. 27.

Syn.: *Dorynchus* NORMAN.
Lispognathus A. M. EDWARDS.



Text-fig. 17.

Achaeopsis rostrata SAKAI.
Anterior portion of carapace of female holotype in dorsal aspect. ×13.

This genus seems to be related to *Achaeus* in general aspect of the body, but is safely discriminated from that genus by the presence of a preocular and a postocular spine, the former is distinctly larger than those spinules or tubercles which are usually seen on the supra-ocular eaves of many species of *Achaeus*; the latter is usually very large and is situated in the interval between the supra-ocular eave and the hepatic protuberance, as in *Achaeopsis thomsoni*, *A. güntheri* and *A. rostrata*.

Several Japanese species, which have been referred to *Achaeopsis*, such as *A. sperciliaris* ORTMANN, *A. suluensis* RATHBUN, *A. pugnax* DE MAN are not true *Achaeopsis* but they belong to *Achaeus* as already stated; *Achaeopsis atypicus* RATHBUN is synonymous with *Pseudocollodes demani* BALSS. The only Japanese species of *Achaeopsis* that remain is *A. rostrata* mihi:

Achaeopsis rostrata SAKAI.

SAKAI 1932, p. 45, text-figs. 3 a-c.

This species is readily distinguished from its congeners by having one or two accessory spinules on the outer margin of the pseudorostral spines, which are very long and broadened at base. The characteristic supraocular and postocular spines are very prominent and acuminate.

Type locality: Misaki (SAKAI).

Distribution: Known only from the type locality.

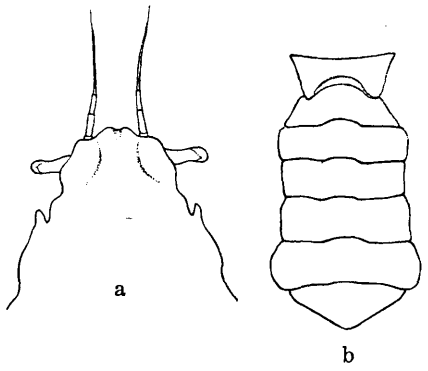
Genus *Camposcia* LATREILLE.

ALCOCK 1895, p. 184.

Camposcia retusa LATREILLE. Pl. XXIII, fig. 3.

ALCOCK 1895, p. 184 (list of earlier literature); STIMPSON 1907, p. 19; URITA 1926, p. 31; SAKAI 1934, p. 293; 1936, p. 80, pl. 18, fig. 2 (coloured).

The body and appendages thickly covered with curled hairs, which help the animal to attach various sea-weeds or sponges, by which the animal is perfectly protected from attack. The pseudorostrum very short and obtuse, marked with a shallow median sinus, the true rostrum is not fully developed, not extending backwards to the level of the basal articles of antennulae, which completely touch each other on account of the low and incomplete antennulary septum.



Text-fig. 18.

Camposcia retusa LATREILLE.

a. Anterior portion of carapace of male, denuded.
b. Abdomen of male.
(a, b×1·6).

The supraocular eaves are very indistinctly defined; intercalated spine not extant but it can be traced out as an obtuse lobule in front of the postocular spine, which is somewhat well developed in some specimens. The basal segment of antenna distally fused with the lateral ventral surface of the front, the first movable segment of flagellum long and cylindrical.

Chelipeds of both sexes shorter than the ambulatory legs. The first pair of ambulatory legs is distinctly shorter than the following three pairs, which are subequal in length.

Abdomen of both sexes composed of seven distinct segments.

Material examined:

2 ♂♂, 1 ♀, Aziro, east coast of Izu Peninsula, Oct. 1932.
3 ♂♂, 2 ♀♀, Simoda, obtained in a lobster net.
1 ♂, 1 ♀, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
1 ♂, 1 ♀, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 37 mm., width 27 mm., length of cheliped 47 mm., that of first ambulatory leg 62 mm., that of second ambulatory leg 77 mm.

Habitat: Inhabits rocky, weedy bottoms, not far from the shore line. Usually masked with various sponges, sea-weeds etc.

Distribution: Tokyo Bay, Sagami Bay, Izu Peninsula, Kii Peninsula, Tosa Bay, Kagosima, Nagasaki; this species ranges widely in warmer regions of Indo-Pacific, the northern limit of distribution may be Tokyo Bay.

Genus *Macrocheira* DE HAAN.

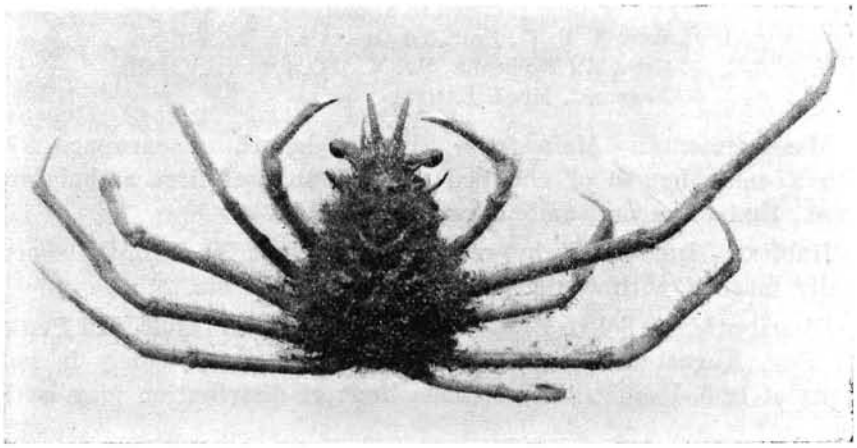
DE HAAN 1839, p. 89; MIERS 1886, p. 33.

Macrocheira kaempferi DE HAAN. Pl. XXIV, fig. 1.

Macrocheira kaempferi DE HAAN F. J. C. p. 100, pls. 25–28; MIERS 1886, p. 33; ORTMANN 1893, p. 40; BALSS 1924, p. 25; URITA 1926, p. 32; YOKOYA 1933, p. 147; SAKAI 1936, p. 77, pl. 16 (coloured).
Kaempferia kaempferi (MIERS 1886, p. 33), DOFLEIN 1902, p. 655; PARISI 1915, p. 284.

A well-known giant crab, the carapace of which being more than 350 mm. measured along the median line, and its chelipeds expanding more than three metres when stretched. The carapace is pyriform, the regions are distinctly divided by deepish grooves and wrinkles; the whole surface being thickly covered with wartlike tubercles. The spines of the pseudorostrum of full-grown specimen is very short and curved outwards at tip, but in the young specimens, measuring less than 70 mm. in median line of carapace, the spines are relatively long and nearly one third as long as the length of carapace proper. In very young specimen, carapace measuring about 30 mm., the spines are also very long and straight, being not markedly curved outwards. In accordance with this proportional length of the pseudorostral spines, the supraocular, intercalated and post-ocular spines of the juvenile specimens are also relatively longer than those of the adult specimens. This may be explained by the fact that in various Decapod Crustaceans, the spines of the body decrease in size as

the age advances. The true rostrum is prominent throughout every stage of development, projecting almost perpendicularly and slightly forwards at the tip.



Text-fig. 19.

Macrocheira kaempferi DE HAAN, juvenile ♂ from Tosa Bay, nat. size.

The basal segment of antenna is freely movable, so that it can be said that this genus occupies a very primitive position among the subfamily Inachinae (cf. BALSS 1929, p. 2), but the development of a spine at the posterior angle of the supraocular eave, and the presence of intercalated spine and antennulary septum seem to attribute a rather high position to this genus.

Chelipeds are very long in full-grown male but usually shorter than the first ambulatory legs in the case of relatively young male and invariably in the female. As to such variability in proportional length of chelipeds according to the sex and development, we can point out other instances in Oxyrhyncha, such as *Naxioides hystrix* (MIERS) etc.

Material examined:

1 ♂, Hayama, Mr. K. HOSOYA.
1 ♂, Koyawata in Sagami Bay, Mr. Y. YUZURIHARA.
1 ♂, juv., Aziro, the collection of The Aziro Primary School.
2 ♂♂, 1 ♀, Simoda, Feb. 1933.
2 ♂♂, 2 ♀♀, Seto M. B. L., Mr. SAIGA.
1 ♂, juv. and many abult specimens Tosa Bay, Prof. T. KAMOHARA, and Mr. MITIHIRO.
1 ♂, Nagasaki, the Fischeries Experimental Station.

Measurements: Male from Sagami Bay, length of carapace 335 mm., width 305 mm., length of pseudorostrum 38 mm., length of cheliped 1500 mm.

Habitat: Inhabits the sandy or muddy bottoms, 50 to 300 metres deep.

Type locality: Japan (DE HAAN).

Distribution: Japan, endemic; from Tokyo Bay to Kyûsyû.

Genus *Oregonia* DANA 1851.

RATHBUN 1925, p. 70.

Key to the Japanese species of *Oregonia*.

2. Pseudorostral horns longer than one fourth the length of postfrontal portion of carapace, they are parallel and continuous with each other. Carapace unevenly tuberculated. Terminal segment of male abdomen very broad and emarginate on the posterior border. .....*O. gracilis.*

2. Pseudorostral horns shorter, being one fourth the length of postfrontal portion of carapace, and are not continuous. Carapace less conspicuously tuberculated. Terminal segment of male abdomen obtusely triangular .....*O. mutsuensis.*

1. *Oregonia gracilis* DANA. Pl. XXXIV, fig. 1.

RATHBUN 1925, p. 71, pls. 24, 25, text-fig. 19, 20 (literature); YOKOYA 1928, p. 765; 1933, p. 141; SHEN 1932, p. 45, text-figs. 23, 25, pl. 2, fig. 1; SAKAI 1936, p. 82, textfig. 32.

Syn.: *Oregonia hirta* DANA 1851.
Oregonia longimana SPENCE BATE 1864.

Carapace elongate pyriform, regions moderately convex and covered with tubercles of various sizes, the larger ones being decorated with curled setae. The true rostrum vertical and not very prominent, the pseudorostral horns very long and horizontal, parallel and continuous but divergent at tip. The supraocular eave thick and convergent forwards and is angular at the posterior end. A large orbital sinus, behind which the postocular spine is very prominent and projects obliquely forwards beyond the eyes. The basal segment of antenna is slender and granulated, subtruncate at the distal end; a large tubercle placed on the outer side of the green gland.

Chelipeds are very stout and larger than the legs; arm, wrist and upper border of palm are covered with tubercles. Fingers gape in basal half, the movable finger being armed with a stout tooth near base. Ambulatory legs are very slender and unarmed.

Abdomen of both sexes consists of seven distinct segments.

Material examined:

1 ♂, Akkeshi M. B. S., Mr. M. IWASA of the Hokkaido Imperial University.
1 ♂, Mutsu Bay, July 1929.

1 ♂, 1 ♀, Coast of Kesengun, Iwate-ken, Mr. G. TOBA.
1 ♂, 1 ♀, coast of Manchoukuo, Mr. S. MATSUO.
1 ♂, Yellow Sea (34° N., 123° E., 60–70 metres deep), Kusiromaru, Mr. S. INUO, sent through Mr. I. TAKI.

Measurements: Male from Akkeshi, length of carapace 41 mm., width 31 mm., length of pseudorostral spine 12 mm.

Habitat: Inhabits the grounds of mud or sandy mud, shallow water to 370 metres deep.

Distribution: Ranges widely in northern districts of Pacific Ocean, from California, Alaska, Behring Sea to Japan and North China. The southern limit of distribution of this species on the Pacific side of Japan is Inuboe-zaki (YOKOYA).

2. *Oregonia mutsuensis* YOKOYA.

YOKOYA 1928, p. 766, text-fig. 3; 1933, p. 143.

According to YOKOYA, the dorsal surface of carapace of this species is less markedly tuberculated excepting six tubercles on the gastric region. The pseudorostral spines are parallel but not in contact with each other and are much smaller than those of *O. gracilis*, being about one fourth the length of the carapace. The hepatic regions are more strongly produced laterally. Chelipeds of male are very slender and shorter than the ambulatory legs, the fingers being almost as long as the palm. The terminal segment of male abdomen obtusely acuminate, not emarginate as that of the former species. No specimen of this species is comprised among our collections.

Type locality: Mutsu Bay (YOKOYA).

Distribution: From Mutsu Bay to Todo-zaki, Kinkazan and Siwoya-zaki (YOKOYA).

Genus *Pleistacantha* MIERS.

MIERS 1879, p. 24; DOFLEIN 1904, p. 76; BALSS 1924, p. 21; IHLE & IHLE-LANDENBERG 1931, p. 162.
Syn.: *Echinoplax* MIERS 1886.
Pleisticanthoides YOKOYA 1933.

The genus *Ergasticus* A. MILNE EDWARDS 1881 was regarded as a synonym of *Pleistacantha* by DOFLEIN (1902) and also by BALSS (1924), but according to IHLE & IHLE-LANDENBERG (1931), the type of *Ergasticus*, *E. culesi* A. M. EDWARDS from the Mediterranean and East Atlantic waters differs from the true *Pleistacantha* on account of the different shape of the chelipeds, and the second species of *Ergasticus*, *E. naresii* MIERS corresponds to a distinct subgenus of *Pleistacantha* on account of

the broadened and distally truncated merus of the external maxillipeds etc. Very recently, YOKOYA (1933) created two new genera from Japan —*Pleisticanthoides* and *Parapleisticantha*; the former is apparently synonymous with *Pleistacantha* while the latter seems to correspond to the same subgenus with » *Ergasticus* » of MIERS (not of A. M. EDWARDS); so that the name *Parapleisticantha* may advisably be substituted for a subgenus of *Pleistacantha*.

Key to the Japanese species of *Pleistacantha*.

1. True rostral spine bifurcated.
   - i. Carapace covered with acuminate spinules among which interspersed a number of large spines. The pseudorostral spines are very long and slender.
     - a. Pseudorostral spines very slender and continuous, the tip only being divergent; a series of accessory spinules on their ventral surface ..... *P. sancti-johannis.*
     - b. Pseudorostral spines divergent from the base, their accessory spinules occur on upper, outer and lower surfaces. ..... *P. moseleyi.*
   - ii. Carapace pyriform, covered with laciniated spinules and setae. Pseudorostral spines very short and widely divergent from the base.
     - a. Supraocular eave and hepatic margin armed with a series of parallel spines. ..... *P. simplex.*
     - b. Supraocular eave and hepatic margin less markedly spinulated. ..... *P. nipponensis.*
2. True rostral spine simple.
   - i. Carapace covered with long spines mixed with short spinules. Two supraocular spines and two intercalated spines, and also three hepatic spines behind the postocular spine. Pseudorostral spines short and widely divergent, armed on all sides. ..... *P. terribilis.*

1. *Pleistacantha sancti-johannis* MIERS. Pl. XXIII, fig. 1.

MIERS 1879, p. 24, pl. 1, fig. 1; BALSS 1924, p. 22, text-fig. 1 (lit.); YOKOYA 1933, p. 138; SAKAI 1934, p. 293; 1936, p. 78, pl. 15, fig. 1 (coloured).

Carapace rounded trianglar, regions well defined. The dorsal surface is thickly covered with very acuminate spinules interspersed with a number of larger spines, i.e., four on gastric region, of which three anterior are placed in a transverse series and one median is on the posterior slope; two placed side by side on the cardiac region and also on the intestinal region; one on the hepatic region behind the prominent postocular spine; and finally two dorsal and three marginal ones on each branchial region. The true rostrum is very prominent and bifid at tip; the pseudorostral horns very slender and a little more than third the length of the carapace proper, they project upwards at an angle of about 45°, and are in contact with each other till near the tip where they diverge; they are spinulated on the ventral surface only.

Supraocular eave has a few spinules and its posterior angle is produced into a large spine, between this spine and the prominent postocular spine are disposed two or three spinules. The pterygostomian regions are smooth and armed with a large median spine. The basal segment of antenna is very slender and freely movable, armed with a few spines on the ventral surface; flagellum longer than the pseudorostral horns. The exposed surface of the sternum, as well as that of the external maxillipeds are thickly covered with spinules.

Chelipeds of male are stouter than the ambulatory legs; the arm, wrist and palm are covered with numerous spinules, which are somewhat disposed in longitudinal rows; the last mentioned segment is distally broadened and the fingers widely gape in the basal two thirds. Merus of ambulatory legs is densely spinulated, the spinules on the anterior border are stouter; carpus and palm are less markedly spinulated excepting the spinules on the anterior and posterior borders, which are fringed with long setae. Dactylus is unarmed and is covered with soft hairs.

Abdomen of male consists of seven distinct segments, in the female, however, the sixth and seventh segments are immovably jointed.

Material examined:

5 ♂♂, 4 ♀♀, Manazuru, "Misago" and "Amagi", 1934–1936.
2 ♂♂, 2 ♀♀, Hukuura, "Misago", June 1934.
2 ♂♂, 1 ♀, between Ito and Hatsusima, "Amagi", Aug. 1936.
1 ♂, 1 ♀, coast of Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 1 ♀, Nagasaki, Mr. I. Kaneko.

Measurements: Male from Sagami Bay, length of carapace 18.5 mm., width 15 mm., length of pseudorostral horn 7.4 mm.

Habitat: Inhabits the bottoms of mud, sand or broken shells; 30 to 220 metres deep.

Type locality: Lat. 34° 1′ N., long. 136° 20′ E. (Off the coast of Miye-Ken) (MIERS).

Distribution: Japan, endemic: Tokyo Bay, Sagami Bay, Izu Peninsula, Suruga Bay, Kii Peninsula, Nagasaki, Kosiki-Isls., Mikuni (Hukui-ken).

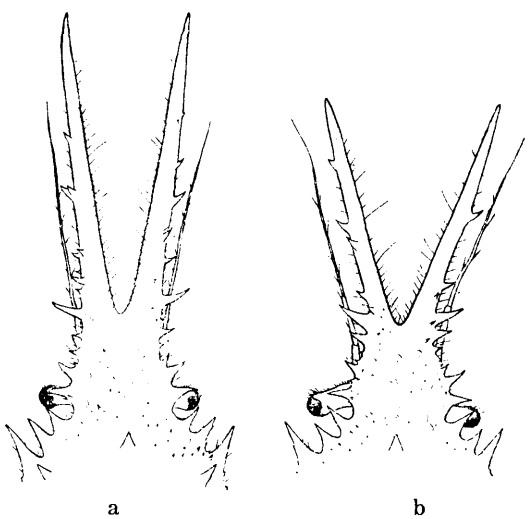
2. *Pleistacantha moseleyi* (MIERS). Pl. XXXIV, figs. 2, 3.

Echinoplax moseleyi MIERS 1886, p. 32, pl. 4, fig. 2.
Echinoplax pungens WOOD-MASON 1891, p. 259; ALCOCK 1895, p. 179; Illus. Invest. Crust. pl. 17, fig. 1; ALCOCK 1899, p. 43.
Pleistacantha oryx ORTMANN 1893, p. 39.
Pleistacantha moseleyi, DOFLEIN 1904, p. 76, pl. 24, figs. 5. 6, pls. 25, 26; BALSS 1924, p. 21; YOKOYA 1933, p. 138.

The carapace is sensibly longer than broad; the gastric, cardiac and branchial regions being moderately swollen, covered with numerous

spinules of various sizes. There are longish spines interspersed among these spinules, viz. four on the gastric region, two on the cardiac region and two on each branchial region.

The spines of the pseudorostrum are slender and usually almost straight or directed very slightly upwards. They are armed with ten or twelve accessory spinules distributed on upper, outer and under surfaces. The true rostrum is divided into two spines at the tip, forming a right angle with the pseudorostrum. The supraocular eaves are armed with two prominent spines, of which the anterior is erect, while the posterior is directed downwards. Two intercalated spines between the supraocular and the postocular spines, the latter being most prominent and directed obliquely downwards. The hepatic and branchial margins are armed with two or three large spines, which are placed among the spinules above mentioned.



Text-fig. 20.
Pleistacantha moseleyi (MIERS).
Anterior portion of carapace in two male specimens from Sagami Bay. ×2·5.

The pterygostomian region, the surface of the sternum and also the exposed surface of the external maxillipeds are spinulated as the upper surface of the carapace. The epistome is very long and wide, without any spines nor hairs.

Chelipeds of the male are massive; arm is distally broadened and covered with spines, of which those near the distal end are very prominent; palm is very broad, armed with distant spinules in longitudinal arrangement.

The fingers of the female are very slender and touch each other throughout their whole length; those of the male are stout and gape widely, the movable finger being armed with two large teeth near the base. The merus of the ambulatory legs are spinulated, the spines found along the anterior and posterior borders being markedly prominent and interspersed with long stout setae; the carpus, propodus and dactylus are fringed with very long setae along both borders; the dactylus is entirely covered with short pubescence.

Abdomen in both sexes is seven-segmented, but the telson is immovably jointed with the penultimate segment.

An ovigerous female collected off the coast of Miyazaki-ken by Mr. M. KIMURA of the Miyazaki-ken Normal School is the largest specimen known of this species, the length of carapace being 60.5 mm. and the width 48 mm. (Pl. 14, fig. 3). Its general characters resemble those of the typical *P. moseleyi*, but differs in having very long and curved spines on the gastric region corresponding to those of the larger gastric spines of the typical form, and also in having very strongly upcurved pseudorostral horns. It is very probable that this peculiar difference should be attributed to its advanced age and also to environmental influence due to great depth.

Material examined:

1 ♂, Hayama, Mr. K. HOSOYA.
1 ♀, ovig. Misaki, M. B. S., Messrs. YERI and YOSHII.
1 ♂, Tatugahama, Kii, Mr. Y. KUSE.
1 ♂, coast of Wakayama, Mr. S. SAKAGUTI.
1 ♀, collection of the Miyazaki-ken Normal School.
1 ♂, 1 ♀ Nagasaki, Mr. I. KANEKO.

Measurements: Male from Hayama, length of carapace 32 mm., width 23 mm., length of pseudorostral horn 19.5 mm.

Habitat: Muddy or sandy or shelly ground, 100 to 300 metres deep.

Type locality: Philippine (MIERS).

Distribution: South of Inuboe-zaki (YOKOYA), Misaki, Hayama, Kii Peninsula, Bungo Str., off Miyazaki-ken, south of Kosiki Isls. Foreign localities are: Philippine, Port Nias, Great Nicobar, Andaman, Da-es-Salaam.

3. *Pleistacantha simplex* RATHBUN.

RATHBUN 1932, p. 30; SAKAI 1935, p. 68, text-fig. 4, pl. 7, fig. 1 (coloured); 1936, p. 78, text-fig. 31.

The dorsal surface of carapace thickly covered with sharp laciniated granules interspersed with long curled setae. The true rostrum is composed of two acuminate spines, which are widely divergent from the base and are directed forwards and downwards. The pseudorostral spines are short and widely divergent from the base, slightly upturned, having a large accessory spine at the base of the outer border. The supraocular eaves are armed with several very long and parallel spinules, the intercalated spine is not very long but the postocular spine is very prominent and is posteriorly followed by several hepatic spinules.

The chelipeds are markedly spinous, the fingers almost as long as the palm and are sensibly incurved. The ambulatory legs are furnished with very long setae, especially on both borders.

Material examined:

1 ♂, Misaki, Simosita, Mr. YERI.
1 ♂, 2 ♀♀, between Ito and Hatusima, "Misago", June 1935.
1 ♀, off Aziro, "Misago", June 1935.

Measurements: Female from Aziro, length of carapace 8.5 mm., width 6.3 mm., length of pseudorostral spine 1.6 mm.

Habitat: Muddy or shelly grounds, 50 to 200 metres deep.

Type locality: Osezaki Light (RATHBUN).

Distribution: Japan endemic, Sagami Bay and Goto Isls.

4. *Pleistacantha nipponensis* (YOKOYA).

Pleisticanthoides nipponensis YOKOYA 1933, p. 139, text-fig. 49.

This species much resembles *P. simplex*; according to YOKOYA, however, the pseudorostral spines are more obtuse and very short, supraocular eaves are only tuberculated in stead of spinulated; the hepatic region has only one spine behind the postocular spine instead of several (*simplex*). I have not had occasion to examine this species.

Distribution: Off Inuboe-zaki, west of Siwo-misaki and Bungo Strait.

5. *Pleistacantha terribilis* RATHBUN.

RATHBUN 1932, p. 30.

A small species, which has a simple sharp-pointed true rostrum, forming an angle of 45° with the pseudorostral spines, which are widely divergent and armed on all sides. The supraocular eave has two spines, one at the summit being prominent and suberect, the other at the posterior angle being very short; two intercalated spines and a usual postocular spine, behind which the hepatic region has three spines forming a triangle. Chelipeds and ambulatory legs are armed with many long spines.

No specimen of this species is comprised among our collections.

Type locality: Ohse-zaki Light (RATHBUN).

Habitat: Bottoms of grey sand, broken shells, 139 fathoms (RATHBUN).

Subgenus *Parapleisticantha* YOKOYA.

YOKOYA 1933, p. 140.

This subgenus differs from the typical *Pleistacantha* only in the different shape of the merus of the external maxillipeds, in which the anterior border is truncated and the antero-external angle produced, so that it is distinctly broader than the ischium. In other respects it agrees with *Pleistacantha*.

» *Ergasticus* » *naresii* MIERS 1886 may probably be included in this subgenus; that MIERS' species differs from true *Ergasticus* A. M. EDWARDS from the Mediterranean and East Atlantic waters and is worthy of a

distinct subgenus, was already stated by IHLE and IHLE-LANDENBERG in 1931.

The subgenus *Parapleisticantha* will thus be represented by two species:

Pleistacantha (*Parapleisticantha*) *naresii* (MIERS) 1886.
Pleistacantha (*Parapleisticantha*) *japonica* YOKOYA 1933.

Pleistacantha (*Parapleisticantha*) *japonica* YOKOYA.

Parapleisticantha japonica YOKOYA 1933, p. 140, text-fig. 50.

According to YOKOYA, the true rostrum of this species is bifurcated and the pseudorostral spines widely divergent from the base and broadened at the base. Two spinules on the supraocular eaves and three behind the eyes, the last one of which is most prominent; also some smaller spinules on the lateral margins of the carapace. Gastric region convex, armed with five spinules, of which two are placed on either side and one in the middle. There are also two cardiac spinules side by side. Chelipeds are spinulated, fingers much shorter than palm and gape.

No specimen of this species is comprised among our collections.

Distribution: Omae-zaki, Tanabe, between Nagasaki and Kosiki Isls., Goto Isls. (YOKOYA).

Genus *Platymaja* MIERS.

MIERS 1886, p. 12; ALCOCK 1895, p. 180; IHLE and IHLE-LANDENBERG, 1931, p. 148.

This genus comprises six species ranging widely in Indo-Pacific, one of which is now known from Japanese waters.

Platymaja wyville-thomsoni MIERS. Pl. XXIV, fig. 2.

MIERS 1886, p. 13, pl. 2; RATHBUN 1918, p. 7, pls. 3, 4 and 14; IHLE and IHLE-LANDENBERG 1931, p. 148; MIYAKE 1936, p. 417, pl. 28, fig. 3, text-fig. 1.

Carapace sub-orbicular and somewhat discoidal, the anterior two thirds of the dorsal surface being covered with flat granules of unequal sizes. The gastric and cardiac regions are slightly convex, the former is deeply trenched on either side and also in the rear. The spines are disposed as follows: four gastric, of which two are placed in the median line and one on either side a little anterior to the anterior median one; two cardiac, placed side by side and separated by a shallow median groove; two dorsal branchial and seven marginal ones, of which the anterior one is placed on the pterygostomian region and the succeeding five on the antero-lateral margin and the last one on the postero-lateral margin just

above the base of the fourth ambulatory leg. The hepatic region has two spines on the outer margin, the anterior one of which is very long and slender.

The rostrum is very smooth, composed of three stout spines, of which the median one arises from a lower plane and projects horizontally forwards and slightly upwards at tip; the lateral ones projecting a little upwards and slightly inwards at tip. The supraocular eaves are thick and unarmed and the postocular spine very large, below which the aforementioned anterior hepatic spine is visible in dorsal aspect, which is the most prominent and slender of all the spines of the body. There is no intercalated spine. The basal segment of antenna is very slender and movable, having a tubercle near the distal end.

The chelipeds are very short; the arm, wrist and palm are armed with spinules and long setae. Each segment of the first pair of legs is provided with long spines, of which those on the anterior border are especially long. The succeeding three pairs have the propodus flat and foliaceous, while the merus is spinulated along the anterior margin, but in the last pair the spines are quite obsolete.

Abdomen of both sexes composed of seven distinct segments; the first segment of female abdomen being armed with three spinules arranged in a transverse series.

Material examined:

2 ♀ ♀, Tosa Bay, Mr. MITIHIRO.
1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Female, length of carapace excluding rostrum, 27 mm., total length including rostrum, 32.5 mm., width of carapace 32.2 mm., length of chelipeds 40 mm., length of first ambulatory leg 116 mm., that of second leg, 148 mm.

Habitat: Inhabits the muddy or sandy-mud bottoms, 150 to 400 metres deep.

Type locality: Admiralty Isls. (MIERS).

Distribution: Japan, Tosa Bay and Nagasaki, Admiralty Isls., between Bali and Kangeang; north of Batan Is., and Australia.

Genus *Cyrtomaja* MIERS.

MIERS 1886, p. 14; Doflein 1904, p. 53; BALSS 1924, p. 23; 1929, p. 3.
Syn.: *Echinomaja* BORRADAILE 1916.

Key to the Japanese species of *Cyrtomaja*.

I. No preocular spine, but the intercalated spine prominent.
   1. Body and appendages covered with minute granules. Lateral gastric spines are erect and are not on a plane parallel to that of the pseudorostral spines.

i. Branchial spines are by far the largest of all the spines found on the carapace. Pseudorostral spines very short. Intercalated spine directed forward and is parallel with the postocular spine. .....*C. owstoni.*

ii. Lateral gastric spines are by far the largest of all the spines. Pseudorostral spines are very long and slender. Intercalated spine directed obliquely outwards .....*C. intermedia.* sp. n.

2. Body and at least the anterior three pairs of thoracic legs are covered with sharp granules concealed beneath the tomentum. The lateral gastric spines are by far the largest of all the spines and project forwards and parallel with the pseudorostral spines .....*C. horrida.*

II. No preocular and intercalated spines. The two peduncular segments of antenna are flattened; the merus of chelipeds and first pair of legs is swollen in the middle. True rostrum almost horizontal. .....*C. platypes.*

1. *Cyrtomaja owstoni* TERAZAKI. Pl. XXXV, fig. 1.

Cyrtomaja owstoni TERAZAKI 1903, Dôbutsugaku Zassi, vol. 15, No. 177, p. 239, text-figure of entire animal (in Japanese).
Cyrtomaja horrida japonica BALSS 1924, p. 23.
Cyrtomaja septemspinosa RATHBUN 1932, p. 30; YOKOYA 1933, p. 144.

Carapace transversely oval, dorsal surface extremely convex and almost smooth but finely granulated under the lens. There are seven slender spines on the dorsal surface, i.e. three on the gastric region of which one median posterior is very small and the other two very slender, each placed on the protogastric region; two placed side by side on the cardiac region which are as long as the protogastric spines; one on the lateral angle of the branchial region, by far the longest of all the spines mentioned.

The true rostrum is nearly vertically deflexed and its tip is very acuminate; the pseudorostral spines are short but acuminate, horizontally projecting and divided by U-shaped median sinus. Supra-ocular eaves are thick and unarmed; a slender intercalated spine, which is well isolated from both the supraocular eave and the postocular spine, the latter being as long as the median gastric spine and projecting forwards but somewhat deflexed. The hepatic region is a little convex, mounted with a small sharp spinule.

The ridge of the pterygostomian region is curved, haired, and armed with five or six sharp tubercles, one of which is prominent and occupies the middle position. On the lateral surface of the branchial region is a row of 12 or 13 erect tubercles, extending from the posterior end of the pterygostomian ridge to the base of the third ambulatory leg. The antero-external angle of the buccal cavern is produced into a prominent spine. The basal segment of antenna is immovable, being anteriorly fused with the anterior end of the supraocular eave and is ventrally armed with three or four spinules, one of which is especially large and occupies the distal position. The flagellum is very long and haired.

Chelipeds of male are very stout and long, ischium with two sharp spines on the anterior border, arm distally thickened, with its anterior border armed with 13 to 14 spines, the upper surface with 4 spinules and the inferior border with 14 to 15 spinules. Wrist is short, its outer upper and inner borders each with a row of several sharp spinules; palm is extremely broadened distally, its inner, upper and outer borders each with a row of 10–13 sharp spinules. The anterior two pairs of ambulatory legs have the merus armed with three longitudinal rows of spinules, interspersed with coarse hairs. The posterior two pairs of legs are smooth and unarmed.

Material examined:

1 ♂, (type of *C. owstoni?*), Misaki, The Science Museum, Tokyo.

Measurements: Length of carapace 25 mm., width 28 mm., length of branchial spine 7.5 mm., length of chelipeds 107 mm., length of first ambulatory leg 120 mm.

Habitat: Inhabits the muddy or oozy bottoms, 900 metres deep.

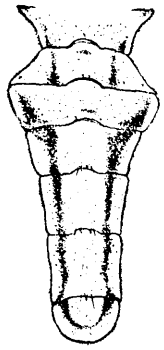
Type locality: Misaki (TERAZAKI).

Distribution: Tokyo Bay, Misaki, Ise Bay, Kii Peninsula, Kagosima Bay, Goto Isls., Tusima Is., Tsurikake-zaki Light.

Remarks: As the list of synonymy shows, this species has formerly been described under different names; the first record is that of TERAZAKI, who reported it under the specific title of *owstoni* with a figure of entire animal but with description in Japanese; the second is that of BALSS, who dealt it as a variety of *C. horrida* RATHBUN under the subspecific name of *japonica*; however, as IHLE and IHLE-LANDENBERG have recently pointed out, it seems not to have any relation to *C. horrida*; the third record is that of RATHBUN, who described it under the specific title of *septemspinosa*.

2. *Cyrtomaja intermedia* sp. nov. Pl. XXXV, fig. 3.

A full-grown male specimen of *Cyrtomaja* sent by Prof. U. KÔNO of the Eighth High School in Nagoya differs from *C. owstoni* in having the lateral gastric spines extremely long and stout (although they are regretfully broken in the middle) and the median gastric and branchial spines equally slender and not very long. The two cardiac spines are obtuse and not markedly slender. Besides the seven dorsal spines, there are a number of tubercles on the dorsal surface of the carapace, i.e. one in front of the median gastric spine, one, which is elongate, between the lateral gastric spine and the intercalated spine, two or three large ones on the dorsal surface of each branchial region and several smaller ones on the lateral surface of the branchial regions above the usual row of tubercles along the epimeral ridge. The entire dorsal surface of carapace



Text-fig. 21.

Cyrtomaja intermedia sp. nov. Abdomen of male holotype, ×2.

is thickly covered with rather vesiculous granules but with no hairs. The pseudorostral spines are obviously longer and slenderer than those of *C. owstoni*.

Chelipeds and ambulatory legs much resemble those of *C. owstoni*, but the palm of cheliped of the new species is not markedly broadened distally and the immovable finger not arched at the base contrary to that of *C. owstoni*.

In the general aspect of the body, this new species approaches *C. goodridgei* MCARDLE from the Indian waters, but that species has no intercalated spine. The new species can be distinguished from *C. bicornis* IHLE and IHLE-LANDENBERG in having the lateral gastric spines suberect and not projecting on the plane parallel to that of the pseudorostral spines.

Material examined:

1 ♂, holotype, loc. unknown, set by Prof. U. KONO of the Eighth High School, Nagoya. (Type specimen returned).

Measurements: Length of carapace measured from the rostral sinus, 32 mm., width of carapace without lateral spines 35.5 mm., length of pseudorostral spine 5.5 mm., length of cheliped 118 mm., that of first ambulatory leg 156 mm., that of last ambulatory leg 102 mm.

3. *Cyrtomaja horrida* RATHBUN.

RATHBUN 1916, p. 532; YOKOYA 1933, p. 145.

This species is included in the fauna of Japan on the authority of Dr. Y. YOKOYA; I have not yet had occasion to examine the specimen myself.

Distribution: Philippine and Japan—Omae-zaki, 196 metres.

4. *Cyrtomaja platypes* YOKOYA.

YOKOYA 1933, p. 145, text-fig. 52.

This species differs from *C. owstoni* in having the true rostrum much longer and horizontal, and the pseudorostral horns almost obsolete. The arrangement of the spines found on the dorsal surface of the carapace resembles that of *C. owstoni*, but according to YOKOYA's figure, the intestinal region has only a small spine and the branchial spine is followed posteriorly by two or three smaller spinules. There is no intercalated spine.

The two peduncular segments of antenna are very broad and foliaceous; the merus of chelipeds and of the first ambulatory legs is broadened near the middle. I think that this species is more closely related to *C. hispida* BORRADAILE 1916 and *C. balssi* IHLE and IHLE-LANDENBERG 1931 rather than to *C. owstoni* or *C. lamellata* RATHBUN as mentioned by the original author, on account of the characteristic peduncular segment of antenna and also of merus of chelipeds and the first pair of legs.

No specimen is comprised among our collections.

Distribution: Kii Peninsula, Tosa Bay, Bungo Strait, Tane Isls., Goto Isls., south-east of Tusima Is.; depth, 100 to 200 metres (YOKOYA).

2. Subfam. OPHTHALMIINAE BALSS.

BALSS 1929, p. 6.

The carapace of this subfamily is anteriorly narrowed and posteriorly produced; the true rostrum often very prominent; the pseudorostral spines are widely divergent or subparallel and are sometimes exceedingly long. Orbits are incomplete but the supraocular eaves are very often laterally dilated and ventrally hollowed, sometimes armed with antler-shaped spines. No intercalated spine.

Key to the Japanese genera of Ophthalmiinae.

1. Pseudorostral spines not very long, curved outwards and somewhat deflexed ventrally. No preocular spine, and the supraocular eave not markedly dilated laterally and not markedly hollowed ventrally. Eye-stalks short ..... *Zewa.*
2. Pseudorostral spines exceedingly long and well separated; supraocular eave markedly hollowed beneath, where exceedingly long eye-stalk is inserted.
   a. Supraocular eave dilated and ventrally hollowed, its posterior angle produced into a sharp spine. Eye-stalks are very long. Carapace with long spines on dorsal surface and also on margins; postocular spine very small ..... *Picrocerus.*
   b. Supraocular eave itself dilated into a very long curved spine, its basal ventral surface being hollowed, where exceedingly long eye-stalk is inserted. Carapace covered with tubercles, but with no spines. No postocular spine ..... *Ophthalmias.*
3. Pseudorostral spines short and deflexed, widely divergent at tip. Supraocular eave much dilated and ventrally hollowed, having two anterior and one posterior spines, the tip of which is rounded. Postocular spines also very long and rounded at tip ..... *Criocarcinus.*

Genus *Zewa* MCCULLOCH.

Zewa MCCULLOCH 1913, Rec. Austr. Mus., vol. 9, p. 332.

The genus *Zewa* McCULLOCH so much resembles *Pseudomicippe* A. M. EDWARDS, that some doubt must still remain as regards their generic distinctness; however, the former is at any rate characterized by having no preocular tooth, while the latter is characterized by a distinct preocular spine such as seen in *Ps. nodosa* HELLER and *Ps. tenuipes* A. M. EDWARDS (if the figure of the original author be reliable).

The Japanese species hitherto treated as *Pseudomicippe tenuipes* by BALSS (1924) and myself (1934, 1936) seems to differ from the true *Ps. tenuipes* on account of the different structure of the supraocular eave and also of the basal segment of antenna, and recent investigation leads me to admit the Japanese species as a new species referable to *Zewa*. According to A. M. EDWARDS' figure, the preocular spine of his species is as distinct as the tooth at the posterior angle of the supraocular eave, the basal segment of antenna distally truncate and only slightly produced sideways as a small tooth. In Japanese specimens, the posterior angle of the supraocular eave is armed with a large lobular tooth but with no preocular spine at all, the distal tooth of the basal segment of antenna very large and projecting obliquely forwards. As regards the disagreement of text and figure of A. M. EDWARDS' original paper in the arrangement and number of the tubercles and also in the shape of the pseudorostral spines, attention was already paid by ORTMANN (1894) and CALMAN (1900); in the case of the tubercles, the Japanese species more coincides with the text of A. M. EDWARDS, but in the case of the pseudorostral spines, the Japanese species agrees with the figure of A. M. EDWARDS. The hepatic and branchial regions of Japanese species are mounted with more numerous erect tubercles than those of A. M. EDWARDS' species.

At present two Japanese species of this genus are recognized:

Key to the Japanese species of *Zewa*.

1. Spines of pseudorostrum strongly deflexed, each having a lobular angle on the inner border near the middle. Sternum is canaliculated on either side near the base of the chelipeds. Fingers uniformly denticulated. Ambulatory legs thick and stout. ..... *Z. nipponica*. nom. nov.
2. Spines of pseudorostrum very slightly deflexed, without any indication of an angle on the inner border. Sternum smooth, above mentioned canaliculations very indistinct. Movable finger armed with a stout tooth near the middle. Ambulatory legs very slender. ..... *Z. okamotoi* sp. nov.

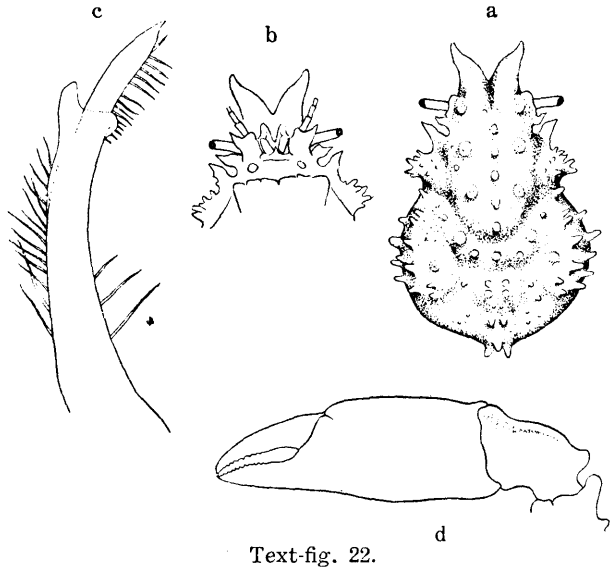
1. *Zewa nipponica* nom. nov. Pl. XXV, fig. 1.

Pseudomicippe tenuipes (?) BALSS 1924, p. 35, pl. 1, fig. 6; SAKAI 1934, p. 298; 1936, p. 84, pl. 20, fig. 1 (coloured).
(Nec *Ps. tenuipes* A. M. EDWARDS.)

The carapace elongate pyriform; the gastric region extremely convex, especially in full-grown specimens. The pseudorostral spines are well

divergent and strongly deflexed so as to be continuous with the anterior declivity of the gastric region; they are basally broadened and have an indistinct lobular angle near the middle of the inner border (text-fig. 22a).

There are five tubercles (at least they are constant in number in our specimens but in BALSS' specimen they are described as four), which are arranged in the median line of the gastric region and two flat ones on either side of this row; the cardiac region is mounted with four small tubercles forming a quadrangle. The intestinal region has a large tubercle in the middle and two side by side in front and in rear of it. There is a large low tubercle on each supraocular eave, which is covered with curled hairs. The hepatic regions are mounted with about ten tubercles, of which two at outer angle and another two below these are larger; the branchial regions have sixteen to eighteen tubercles, of which several marginal ones are larger and erect. These tubercles are invariably furnished with curled hairs, which help the animal to attach numerous sea weeds or hydroids, with which the animal is protected from attack.



Text-fig. 22.

Zewa nipponica nom. nov.

a. Carapace of male in dorsal aspect.
b. Anterior portion of carapace in ventral aspect.
c. Anterior male pleopod.
d. Chela of male.
(a, b×1; c×12; d×2.)

The supraocular eaves are somewhat ventrally hollowed and their posterior angle produced into an acuminate tooth but with no preocular spine at all. No intercalated spine but the postocular spine is broad and acuminate at tip. The sternum of the male is broadly canaliculated on either side at the base of the chelipeds, the inner ridge of each canaliculation being furnished with hairs.

The eye-stalks are very slender and thin, cornea oblique and scarcely swollen. The basal segment of antenna has a prominent tooth at the antero-external angle, which projects obliquely forwards. Chelipeds are not very stout, arm has usually three tubercles on the upper border, wrist has an indistinct carina on the outer border and its inner border is fringed with long setae; palm is distally

narrowed, fingers do not much gape, the cutting edges being uniformly denticulated.

Ambulatory legs are rather stout and thickly covered with long setae, interspersed with curled hairs especially along the anterior borders. The dactylus is strongly hooked at tip.

Material examined:

5 ♂♂, 6 ♀♀, various stations in the vicinity of Simoda, one male of which is designated as holotype.
1 ♂, Tateyama Bay, May 1929.
2 ♂♂, 1 ♀, Gobô, Kii Peninsula, Mr. K. CKAMOTO.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

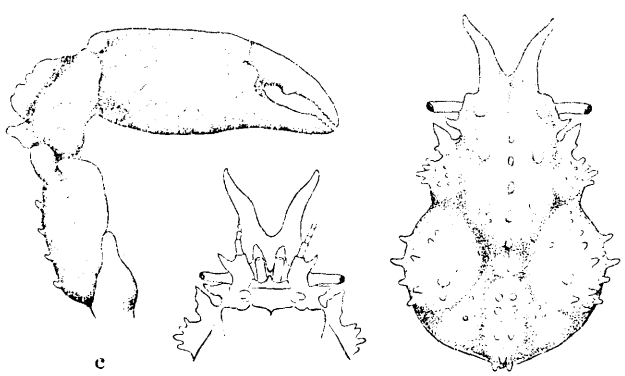
Measurements: Male holotype, length of carapace 32 mm., width 23 mm., length of pseudorostral spine 6.5 mm.

Habitat: Inhabits the rocky, weedy coasts, not far from the shore line. Usually masked with sea weeds or hydroids.

Distribution: Tokyo Bay, Sagami Bay, Izu Peninsula, Kii Peninsula, Nagasaki and ?Loo Choo (BALSS).

2. *Zewa okamotoi* sp. nov. Pl. XXXVI, fig. 1.

The carapace is narrower than that of *Z. nipponica* but the arrangement and number of tubercles found on the dorsal surface almost agree in both cases. The pseudorostral spines are slender and somewhat longer than those of *Z. nipponica*, they are not so strongly deflexed and their inner border not marked by a lobular angle at all. No preocular spine but the posterior angle of the supraocular eave is marked by a lobular tooth. The anterior surface of sternum of male is naked and the canaliculation on either side at the base of the cheliped is very shallow and indistinct.



Text-fig. 23.

Zewa okamotoi sp. nov.

a. Carapace of male holotype in dorsal aspect.
b. Anterior portion of carapace in ventral aspect.
c. Cheliped of male holotype.
(a, b×1·5; c×2.)

Chelipeds are very stout; arm is cylindrical and its superior border armed with two to five tubercles, the wrist being sharply carinate on the outer border, having

a deep notch near the base (text-fig. 23c). The palm is markedly swollen and vermiculated by pale whitish colouration on purplish red even in dried specimen. The fingers gape in the proximal half, the immovable finger hollowed in the proximal half and is distally armed with six to seven denticles; the movable finger has an obtuse tooth near the middle and its distal borders are armed with six to seven denticles.

The ambulatory legs are very slender, the diametre of each segment almost half that of *Z. nipponica*, the specimens of both sexes of almost equal size being compared.

In the shape of the pseudorostral spines, this species is related to *Z. banfieldi* McCULLOCH, but the last named species has only four gastric tubercles in the median line and the distal tooth of the basal segment of antenna very small and projecting side-ways; chelipeds also less markedly tuberculated and not carinated. *Zewa varians* (MIERS) is a quite different species.

Material examined:

2 ♂♂, Gobo in Kii Peninsula, Mr. K. OKAMOTO, one of which is designated as holotype.
1 ♂, Kagosima Bay, Mr. T. SAMEZIMA.

Measurements: Holotype, length of carapace measured in the median line 26.8 mm., width 18.2 mm., length of pseudorostral spine 8 mm.

Habitat: Same as the former species.

Distribution: Kii Peninsula and Kagosima.

Genus *Picrocerus* A. MILNE EDWARDS.

A. MILNE EDWARDS 1865, p. 136; 1872, p. 243.

The unique species represented is:

Picrocerus armatus A. MILNE EDWARDS. Pl. XXXV, fig. 2.

A. M. EDWARDS 1865, p. 137, pl. 3; 1872, p. 244, pl. 12, fig. 2 & pl. 13; SAKAI 1936, p. 85, text-fig. 35.

The carapace of this rare species is peculiar in shape; the postocular and posthepatic constrictions being very remarkable; the supraocular eave extremely dilated to form a hollowed orbit, and its posterior angle prolonged into a long spine but with no preocular spine. The true rostral spine is slender and projecting almost perpendicularly; the pseudorostral spines are extremely long and widely separated, subparallel or very slightly divergent anteriorly.

The dorsal surface of the carapace is sparingly beaded with granules, some of which are decorated with curled hairs. One long spine on the

gastric region a little behind the middle, and two short spines placed side by side on the cardiac centre, one small spine in the intestinal centre and two of a medium size side by side on the lobe of the posterior margin; the hepatic region has two spines, of which the posterior one is most prominent of all the spines of the carapace save the pseudorostral spines. The postocular spine is very small, the branchial regions have two prominent marginal spines and one dorsal spine near the lateral angle. The basal segment of antenna is longitudinally sulcated and sparingly granulated, its antero-external angle armed with a very stout spine.

Text-fig. 24.

Picrocerus armatus A.M. EDWARDS, carapace of typical form from Gobô, Kii Peninsula, ×1/2.

Chelipeds are not very robust, arm granulated, having four or five spines on the superior border and two terminal ones, the latter being invariably acuminate; the wrist is also granulated but without any stout spine contrary to A. M. EDWARDS' figure; the palm is smooth, fingers not gaping and are uniformly denticulated.

Ambulatory legs are very slender and cylindrical, sparingly furnished with long hairs over the whole surface, with curled hairs along the anterior border. Each segment is unarmed.

Abdomen of both sexes consists of seven distinct segments.

Material examined:

2 ♂♂, 1 ♀, Seto M. B. L., Mr. HIRO.
2 ♂♂, Gobo, Kii Peninsula, Mr. K. OKAMOTO (Typical form).

Measurements: Male from Gobô, length of carapace measured in the median line 62 mm., width 44 mm., length of pseudorostral spine 42 mm.

Habitat: Inhabits the rocky, weedy bottoms, depth unknown.

Type locality: New Caledonia (A. M. EDWARDS).

Distribution: Japan, Kii Peninsula is the only locality besides the type locality.

Remarks: There are two forms as regards the shape of the armature of the carapace of this species. As was figured in the original paper of A. M. EDWARDS (1865), the dorsal and marginal spines of the carapace of the typical form are sharply cut; there is a large male and female

specimens of such typical form in the collection of Mr. K. OKAMOTO from the coast of Gobô, Kii Peninsula. The second form is that drawn in A. M. EDWARDS' paper in 1872, all the spines of the carapace except the pseudorostral spines and the supraocular spines are knobbed at tip; such were the specimens sent from the Seto M. B. L.

The two forms present no other morphological differences worthy of varietal or subspecific value. The Japanese forms differ from the New Caledonian forms only in the absence of the long spine on the upper distal extremity of wrist of chelipeds.

Genus *Ophthalmias* RATHBUN.

Ophthalmias, RATHBUN 1897, p. 157 (= *Stenocionops* LATREILLE, partim).
Stenocionops LATREILLE, ALCOCK 1895, p. 247.

This genus comprises only two species, viz. *O. cervicornis* (HERBST) from East Africa, India and Hawaii and *O. curvisrostris* A. M. EDWARDS 1865 from the Red Sea; the former is comprised among our collections, although the Japanese specimen very slightly differs from those reported by the earlier authors.

Ophthalmias cervicornis (HERBST).

Cancer cervicornis HERBST, Krabben, III, iii, p. 49, pl. 58, fig. 2.
Stenocionopus cervicornis, M. EDW. H. N. C., I, p. 338; CUVIER'S Règne Animal, Crust., pl. 31, fig. 1; HENDERSON 1893, p. 343; ALCOCK 1895, p. 248.
Ophthalmias cervicornis RATHBUN 1911, p. 254.

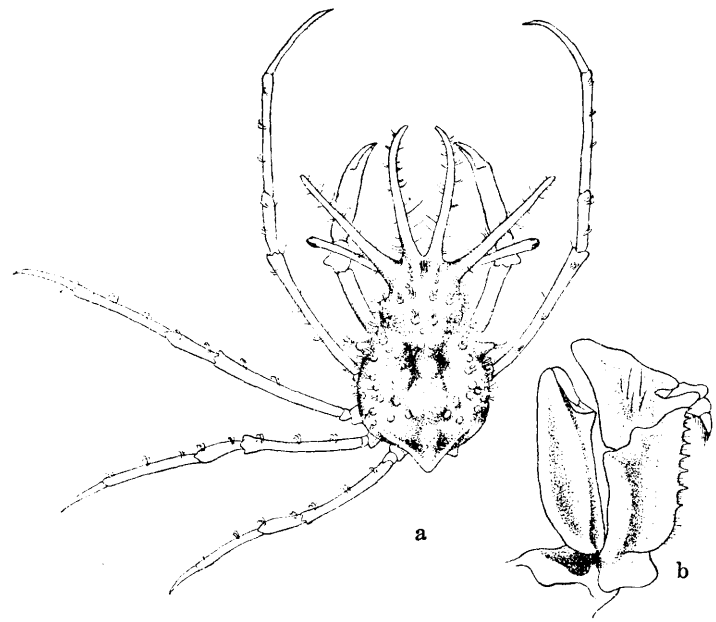
The carapace behind the orbital region is oval and its dorsal surface uneven; markedly depressed behind the gastric region and also on either side of the intestinal region. The entire surface is tuberculated, the tubercles being furnished with curled hairs, which help the animal to attach sponges or hydroids for the purpose of protection. There is a large tubercle on either lateral border of the branchial region and also a prominent lobular process projecting backwards and upwards on the posterior border.

The true rostrum is very small; the pseudorostral spines are slender and much longer than half the length of the carapace proper in our specimen (they are apparently shorter than half the length of the carapace in the figures of HERBST and also of H. M. EDWARDS); they are almost horizontal and curved inwards at tip (according to RATHBUN, the tips are upcurved as in the case of *O. curvirostris*).

The supraocular eaves are prolonged into a very long spine, which is almost as long as the pseudorostral spines and projects obliquely forwards and upwards; it is everywhere covered with curled hairs and its basal

ventral surface is hollowed, where the long and straight eye-stalk is inserted; the cornea extremely swollen.

The basal segment of antenna, which is completely fused with the epistome, is armed with a lobular, backwardly projecting process near the middle; a small obtuse spine also occurs on outer side of the green gland. The antero-external angles of the buccal cavern are very strongly produced into a lobule, which projects downwards and a little forwards. The external maxillipeds have the ischium denticulated on the inner border, and the exposed surface longitudinally sulcated; the merus extremely depressed and its antero-external angle strongly produced and its inner angle armed with two lobular projections, between which the lamelliform pulp is inserted.



Text-fig. 25.

Ophthalmias cervicornis (HERBST).
a. Male from Wakayama, ×1·?.
b. External maxilliped of right side, ×4·3.

Chelipeds are rather slender, arm indistinctly tuberculated, wrist very short and is armed with a large obtuse process on the upper surface near the proximal end; palm slightly compressed, having a few tubercles on outer and inner surfaces; fingers widely gaping in the proximal half, their distal borders being finely denticulated, the movable finger being armed with a small tooth near the base.

Ambulatory legs rapidly decrease in length from first to last, each segment being furnished with a few bundles of curled hairs; the dactylus is strongly curved at tip.

Abdomen of male consists of seven distinct segments, that of female of five.

Material examined:

1 ♂ (abdomen missing), coast of Wakayama, Mr. S. Sakaguti.

Measurements: Male, length of carapace 30 mm., width 18.5 mm., length of pseudorostral spine 19.2 mm.

Habitat: Rocky ground, depth unknown.

Distribution: East coast of Africa, Tuticorin, Hawaii and above locality. The record of occurrence in Japan is new!

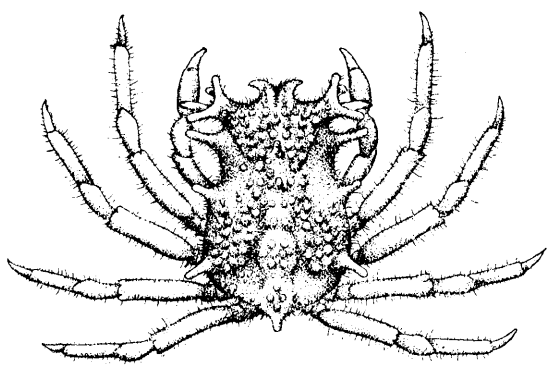
Genus *Criocarcinus* H. MILNE EDWARDS.

ALCOCK 1895, p. 246.

Criocarcinus superciliosus (HERBST).

Cancer superciliosus HERBST Krabben, I, ii, p. 227, pl. 14, fig. 89.
Criocarcinus superciliosus ALCOCK 1895, p. 247 (list of earlier literature); URITA 1926, p. 30.

The carapace anteriorly broadened, thickly covered with granules, which are tufted with curled hairs as in the former species. The hepatic regions are markedly depressed and also the lateral portions of the intestinal region.



Text-fig. 26.
Criocarcinus superciliosus (HERBST), ♂ from Kyûsyû, ×1·2.

The pseudorostral spines are very short and vertically detflexed, widely divergent at tip. The supraocular eaves are extremely dilated laterally, having an appearance of antlers, their anterior and posterior angles being produced into a knob-tipped spine, their anterior ventral angle also produced into such a spine. The eye-stalks are very long and their tip exceeds the said spines of the orbital margin.

The postocular spine is very long, its tip exceeding the tip of the orbital spines, having usually two or three tubercles, but in the Japanese specimen only one or two tubercles occur on the anterior border near the tip.

The gastric region has two spines one behind the other; the intestinal region has one spine near the posterior border. The branchial regions have each two spines on the lateral border; all these spines are knobbed at tip. Chelipeds are as slender as the ambulatory legs, each segment being unarmed. Ambulatory legs are thickly covered with two sorts of hairs, of which the curled hairs are found on the entire surface and the long hairs mainly on the anterior and posterior borders.

Abdomen of male consists of seven distinct segments, that of female of five.

Material examined:

1 ♂, Kyûshû, loc. unknown, Mr. M. HARADA in Hukuoka-ken. (Material returned).

Measurements: Length of carapace 28 mm., width 17.5 mm.

Habitat: Inhabits stony or pebbly beaches.

Distribution: Japan (Yakuzima—URITA), Andaman Sea and New Caledonia.

3. Subfam. ACANTHONYCHINAE ALCOCK.

ALCOCK 1895, pp. 160, 164; RATHBUN 1925, p. 140; BALSS 1929, p. 8.

Eyes without true orbits, the eye-stalks, which are very short or sometimes even obsolescent, are either concealed beneath a forwardly produced supraocular spine, or are sunk in the side of a large beak-like rostrum; a postocular spine or process is sometimes present, but is not excavated for reception of the retracted eye. The basal antennal joint is truncate-triangular. The external maxillipeds have the merus as broad as the ischium (ALCOCK).

Key to the Japanese genera of Acanthonychinae.

I. Pseudorostral spines are well divided by a median V-shaped sinus. Preocular and postocular spines distinct, against the latter the eye is retracted.
   1. Carapace typically pyriform or suboblong, the hepatic and branchial regions are laterally produced, each separated by a concave interspace. ....*Pugettia.*
   2. Carapace subpentagonal, having two laminar lateral expansions, which are inwardly united and outwardly marked by a closed fissure. .....*Mimulus.*

II. Pseudorostral spines are in contact throughout their whole length; supraocular eave with its anterior and posterior angles produced to form a tooth; no postocular tooth. .....*Menaethiops.*

III. Pseudorostrum simple.
   1. Pseudorostrum horizontally compressed and slightly bifid at tip. Carapace of both sexes subtriangular. .....*Menaethius.*
   2. Pseudorostrum laterally compressed. Carapace of male usually subtriangular, that of female with two lateral wing-like expasions. Eye-stalks very short and deeply sunken against the lateral surface of the neck.
      i. Preocular spine present. .....*Huenia.*
      ii. No preocular spine. .....*Simocarcinus.*

Genus *Pugettia* DANA 1851.

STIMPSON 1907, p. 24; SCHMITT, 1921, p. 205; RATHBUN 1925, p. 167.

Key to the Japanese species of *Pugettia*.

I. Carapace markedly lumpy, the cardiac, hepatic and branchial regions being mounted with large conical lumps or nodules. Thoracic legs exceedingly compressed. .....*P. sagamiensis.*

II. Carapace not lumpy.

1. The postocular tooth and the hepatic lobe completely fused together, forming a wing-like plate. Cardiac and epibranchial processes conical and acuminate. .....*P. incisa.*
2. The hepatic lobe is usually larger than the postocular or the epibranchial tooth.
   i. Body and appendages usually naked. Cardiac region not protuberant. Pseudorostral spines usually about one fifth the length of the carapace and are subparallel. .....*P. quadridens.*
   (var. *pellucens.*)
   (var. *intermedia.*)
   ii. Body and appendages covered with flat pavement of tomentum. Pseudorostral spines longer than half the length of the carapace and are divergent at an angle of 50°. .....*P. kagoshimensis.*
3. The hepatic spine not larger than the postocular or epibranchial spines. The branchial regions rounded and not markedly produced laterally so that the carapace appears rather elongate.
   i. Carapace naked, having three spine-tipped tubercles in the median line of carapace; lateral epibranchial spine also very slender. .....*P. minor.*
      a. Near *P. minor* but the carapace and chelipeds much more elongate. .. ..*P. elongata.*
      b. Near *P. minor* but the gastric region has two median and two lateral tubercles and the cardiac region not spine-tipped. A branchial tubercle in transverse line with the lateral epibranchial spines and the cardiac elevation. .....*P. similis.*
   ii. Carapace covered with velvet-like tomentum. Besides the three median tubercles, there are numerous tubercles, viz. three gastric, four epibranchial in a group, one mesogastric and one which is elongate on either side of the cardiac protuberance. .....*P. nipponensis.*

(*Pugettia veltina* MIERS 1886 was reported by YOKOYA (1933) from Suruga Bay, but this species was formerly referred to *Rochinia* by ALCOCK (1895).)

1. *Pugettia sagamiensis* GORDON. Pl. XXV, fig. 3.

Pugettia brevirostris PARISI (nec DOFLEIN), 1915, p. 287, pl. 7, fig. 1, text-fig. 2.

Pugettia sagamiensis GORDON 1931, p. 557, text-figs. 35, 36 c; SAKAI 1936, p. 87, text-fig. 36.

The carapace of this species is peculiar in having large lumpy protuberances:—the gastric region is very convex and mounted with three small nodules, one in the median posterior slope and one on either side not far in front of it; the cardiac region is very strongly convex and conical, its tip being covered with woolly hairs; the intestinal region is mounted with a small tubercle; the hepatic region projects laterally and forms a conical protuberance, and its anterior slope is fused with the postocular tooth; the branchial region has two nodules, of which one belongs to the epibranchial margin and is rounded and low, the other projecting from the lateral angle of this region and is as strong as the cardiac protuberance, its tip being obtusely pointed forwards and covered with short hairs.

The pseudorostral horns are less divergent and almost parallel with each other; the preocular tooth very obtuse, while the postocular tooth is thick and its posterior slope continuous with the hepatic protuberance as already mentioned. The pseudorostral horns, the protogastric regions and also the lateral surface of the branchial regions are thickly furnished with curled hairs. The basal segment of antenna is very broad but with no armature. The pterygostomian region has a curved row of about four tubercles.

Arm of chelipeds is typically prismatic, the three edges being sharply cristate; the wrist with its inner and outer edges cristate; the palm laterally compressed and its superior and inferior edges sharply cristate; the fingers not much gaping. The ambulatory legs are remarkably compressed, each segment being thickly fringed with hairs on both borders.

Material examined:

1 ♂, Hukuura, Sagami Bay, obtained in a lobster net.
1 ♀, Suruga Bay, Mr. S. MIYAUCHI.
1 ♂, Mimase, Tosa Bay, Mr. MITIHIRO.

Measurements: Male, length of carapace measured in median line 44 mm., width between the tips of the lateral branchial processes, 38.5 mm., length of pseudorostral spine 7.5 mm.

Habitat: Inhabits the muddy or sandy bottoms, 100 metres deep.

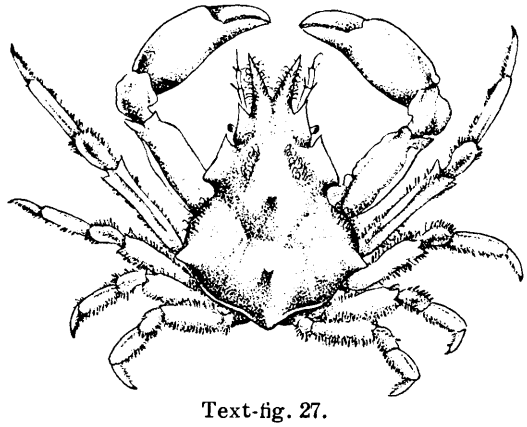
Type locality: Sagami Bay (PARISI—GORDON).

Distribution: Sagami Bay, Suruga Bay, Tosa Bay.

2. *Pugettia incisa* (DE HAAN).

Pisa (*Menaethius*) *incisa* DE HAAN, F. J. C., p. 98, pl. 24, fig. 3.
Pugettia incisa, MIERS 1879, p. 23; 1886, p. 40; IVES 1891, p. 215; ORTMANN 1893, p. 44; DOFLEIN 1902, p. 656; STIMPSON 1907, p. 24; PARISI 1915, p. 286; BALSS 1924, p. 26; YOKOYA 1928, p. 768; 1933, p. 148; SAKAI 1934, p. 294; 1936, p. 88, text-fig. 38.
Syn.: *Pugettia cristata* GORDON 1931.

A rather small species; the pseudorostral spines are divergent at an angle of about 60° and their length more than one fourth that of the carapace proper. The preocular spines acuminate, prominent; the postocular spines entirely continuous with the hepatic lobes, forming a wing-like outgrowth on either side of the carapace. The epibranchial spine conical, prominent, projecting upwards and backwards. The gastric tubercle is small, while the cardiac region is markedly convex and conical; the intestinal tubercle is moderately prominent.



Text-fig. 27.
Pugettia incisa DE HAAN, ♂ from Ise Bay. ×1·5.

Chelipeds are compressed, the merus prismatic, having three wing-like crests, the crests of wrist and palm are also moderately prominent. Ambulatory legs are compressed, the merus with a crest on anterior border, which is fringed with knobbed hairs, the next three segments also with hairs on anterior and posterior borders.

P. cristata GORDON is in all probability synonymous with this species.

Material examined:

3 ♂♂, 2 ♀♀, Tateyama Bay, May, 1928.
2 ♂♂, 2 ♀♀, Momotori in Ise Bay, Aug. 1932.
1 ♂, 1 ♀, Onomiti M. B. S., Prof. I. TAKI.
2 ♂♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Tokyo Bay, length of carapace 18 mm., width 15 mm., length of pseudorostral spine 4.5 mm.

Habitat: Inhabits the bottoms of mud or sandy mud; depth 50 to 100 metres.

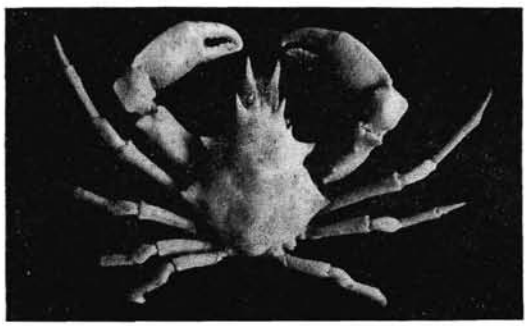
Type locality: Japan (DE HAAN).

Distribution: Hakodate, Mutsu Bay, Tokyo Bay, Sagami Bay, Mikawa, Ise Bay, Onomiti, Kagosima, Nagasaki, Corea Strait, Amoy.

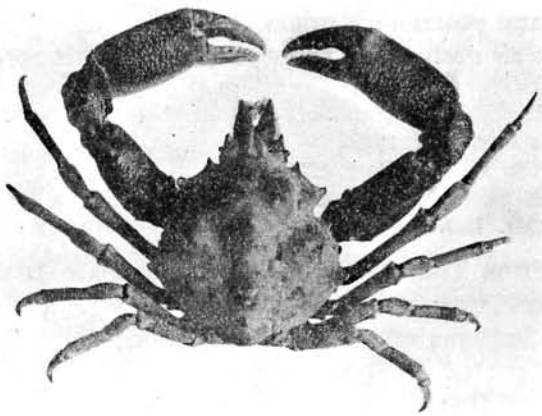
3. *Pugetti quadridens* (DE HAAN). Pl. XXVI, fig. 1.

Pisa (*Menaethius*) *quadridens*, DE HAAN, F. J. C., p. 97, pl. 24, fig. 2.
Pugettia quadridens, MIERS 1879, p. 23; ORTMANN 1893, p. 13; RATHBUN 1894, p. 71 (nec syn.); DOFLEIN 1902, p. 655; RATHBUN 1902, p. 28; PARISI 1915, p. 285; BALSS 1924, p. 26; URITA 1926, p. 32; SHEN 1932, p. 49, pl. 2, fig. 2, text-figs. 26–30; YOKOYA 1933, p. 148; SAKAI 1934, p. 294; 1936, p. 88, pl. 20, fig. 2 (coloured), text-fig. 37.

The carapace not markedly convex, the grooves which separate the regions are almost obliterated. The gastric region has four very indistinct tubercles, two in the median line and one on either side close to the anterior one. The cardiac and intestinal regions are rounded, without any indication of tubercles. The hepatic region laterally produced into a laminar tooth, which is distinctly larger than the postocular tooth, the sinus between the two teeth being usually well concave. The branchial region with two dorsal tubercles, the anterior of which usually has one or two accessory tubercles (which are very often obliterated); the lateral branchial tooth is a little smaller than the hepatic tooth.



a



b

Text-fig. 28.

Pugettia quadridens DE HAAN.

a. Typical form (♂) from Simoda.
b. A large specimen (♂) from the coast of Iwate-ken.
(a, b×3/5.)

The pseudorostral spines are about one fifth the length of the carapace proper, their outer borders are almost parallel and their tips slightly incurved, and their bases thickly covered with curled hairs. The preocular spines prominent, projecting almost parallel to the pseudorostral spines, the posterior angle of the supraocular eave never marked by an angle. The postocular tooth is very small, while the hepatic spine is very large and compressed, its tip projecting horizontally outwards. The epibranchial spine is obtuse and slightly curved forwards, its base being broad. The basal segment of antenna has a small tooth at the antero-external angle. The pterygostomian region marked with a curved row of four tubercles.

Chelipeds of male are very stout; the ischium has a terminal tooth on the anterior border; the arm prismatic and its upper border with three

low tubercles; the wrist short and irregular in shape, with its inner and outer borders obtusely cristate and its upper border with two very obtuse tubercles, which are sometimes almost confluent. The palm is very high and the upper border obtusely cristate near the base. The fingers are widely gaping at base, the movable finger has, typically, two large teeth, which are isolated from the teeth of the distal half. Ambulatory legs are not much compressed and are usually naked; the propodus has a bundle of hairs near the distal end of the posterior border. The dactylus is finely denticulated on upper and lower margins of the posterior border.

In the female, the carapace is usually extremely convex, so that the pseudorostral spines appear more deflexed than those of the male; the tubercles found on each region are also more distinct and more markedly haired.

Material examined: There are many ♂♂ and ♀♀, from various localities on Japanese coasts:—Iwate-ken, Tokyo Bay, Sagami Bay, Izu Peninsula, Ise Bay, Kii Peninsula and Nagasaki.

Measurements: Male from Simoda, length of carapace 30 mm., width excluding lateral branchial spine 24 mm., length of pseudorostral spine 5.5 mm.

Habitat: Inhabits the rocky, weedy coasts, not far from the shore line.

Type locality: Japan (DE HAAN).

Distribution: Japan, from Mutsu Bay to Kyûsyû, coast of Manchoukuo, North China.

Remarks on variation:

The classification of *Pugettia quadridens* seems to be a matter of difficulty, because this species includes various variations regarding the form of pseudorostrum, size of hepatic lobe, shape of the sinus between the hepatic lobe and the postocular tooth, proportion between length and width of carapace and lastly the number of tubercles found on the carapace.

Specimens from the Tohoku Province (coast of Iwate-ken) kindly sent by Mr. G. TOBA of the Iwate-ken Normal School, deviate from the typical specimens of the southern coast mainly in having the carapace markedly broader and the hepatic lobe more or less fused with the postocular tooth as seen in the case of *P. incisa*, and very often they form a plate-like expansion as in that species. The tubercles on each region are well marked and the movable finger of chelipeds is uniformly denticulated throughout its whole length, not being armed with the two isolated teeth of the typical form.

I am convinced that these forms should be regarded as a local variation, but some doubt must still remain whether they represent a well defined new variety or not (compare text-fig. 28).

4. *Pugettia quadridens pellucens* RATHBUN. Pl. XXXVI, fig. 3.

RATHBUN 1932, p. 31.

This subspecies differs from the typical *quadridens* only in the following few points:

1. The dorsal surface of carapace even and smooth, the preocular, hepatic and epibranchial spines thin and sharply defined. The pseudorostral horns are distinctly longer than those of the typical species, being about three sevenths the length of the carapace; they are widely divergent in their distal half.

2. The arm of chelipeds is prismatic, its upper border has a row of three laminar teeth, which are continuous at their base; the terminal tooth of this border is also laminar; the wrist is strongly crested on outer and inner edges and its upper surface has an oblique crest. The palm is obtusely crested on the inferior border but sharply so on the superior border.

3. Ambulatory legs are very slender and furnished with club-shaped hairs; the merus of the first pair bears a few tubercles on superior and inferior borders but in other pairs, these tubercles are not revealed.

A number of intermediate forms between this subspecies and the typical species are observed.

Material examined:

1 ♂, 1 ♀, coast of Hatusima, near Ito, Aug. 1935.
2 ♂♂, Simoda, off Kisami, "Misago".
1 ♂, coast of Wakayama, Mr. S. SAKAGUTI.

Measurements: Male, length of carapace 13.2 mm., width 9.5 mm., length of pseudorostral spine 5.8 mm.

Habitat: Sandy or weedy bottoms, 20 to 50 metres deep.

Type locality: Omae-zaki Light (RATHBUN).

Distribution: Sagami Bay, Suruga Bay, Kii Peninsula.

5. *Pugettia quadridens intermedia* subsp. nov. Pl. XXXVI, fig. 2.

The carapace is broadly triangular and its upper surface somewhat depressed; the regions being distinctly divided by deepish grooves. The gastric region has four tubercles, of which the two median are in a transverse line between the anterior and posterior ones. The cardiac region conical and mounted with a tubercle, intestinal tubercle also distinct. The hepatic spine slender and curved forwards at tip; the lateral branchial spine very prominent, projecting backwards, upwards and forwards at tip; two tubercles on epibranchial region and also another on the inner side of the lateral spine.

The pseudorostral spines are divergent at an angle of about 50°; their bases flattened and their tips acuminate and curved outwards. Pre-

ocular spine very acuminate, the posterior angle of the supraocular eave marked by a rounded angle; the postocular tooth as strong as the hepatic spine. Four tubercles on the pterygostomian ridge and a row of three or four tubercles above the epimeral ridge.

Chelipeds are stout; ischium with two lobular teeth on the anterior border, arm with four crested longitudinal ridges, each ridge being armed with three or four irregular teeth; wrist with its outer and inner edges sharply crested and with two spine-like tubercles on the upper border.

Ambulatory legs are covered with velvet-like tomentum and also fringed with club-shaped hairs on anterior and posterior edges. A series of curled hairs on either side of the gastric region at the base of the rostral spine and on the lateral surface of the branchial regions, otherwise the carapace is naked.

Material examined:

3 ♂♂, Simoda, off the coast of the M. B. S.
1 ♂, Ise Bay, Mr. T. YAMADA.
1 ♂, 1 ♀, coast of Gobô, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 1 ♀, coast of Wakayama, Mr. S. SAKAGUTI.

Measurements: Male, holotype, length of carapace 19.5 mm., width excluding epibranchial spines, 15.3 mm., length of pseudorostral spine 5.5 mm.

Habitat: Inhabits sandy or muddy bottoms, 30 to 50 metres deep.

Distribution: Izu Peninsula, Ise Bay and Kii Peninsula.

6. *Pugettia kagoshimensis* RATHBUN.

RATHBUN 1932, p. 31; YOKOYA 1933, p. 153.

The entire animal excepting the fingers is covered with flat pavement of rounded setae. The pseudorostral spines are very long, being more than half as long as carapace and are divergent at an angle of about 50°. The hepatic spine very long and slender, directed upwards and forwards; the branchial spine short, conical; the cardiac region rising in a large high protuberance, flattened antero-posteriorly and bifid at tip. Intestinal protuberance flattened sideways and more deeply bifid.

Material examined:

1 ♂, coast of Wakayama, Mr. S. SAKAGUTI; it was doutfully referred to this species. If my identification were correct, then this species may safely be referred to a subspecies of *P. quadridens*.

Measurements: Male, length of carapace 13 mm., width 9.5 mm., length of pseudorostral spine 5.5 mm.

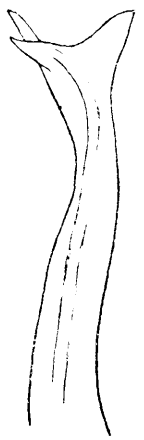
Habitat: Shelly or stony grounds, depth 100 to 190 metres.

Type locality: Sata-misaki Light (RATHBUN).

Distribution: Sagami Bay (YOKOYA), Kii Peninsula (present paper) and Sata-misaki.

7. *Pugettia minor* ORTMANN. Pl. XXV, fig. 2.

ORTMANN 1893, p. 44; DOFLEIN 1902, p. 656; PARISI 1915, p. 286; BALSS 1924, p. 26; URITA 1926, p. 31; YOKOYA 1928, p. 768; 1933, p. 149; GORDON 1931, text-fig. 33 a (p. 554); SAKAI 1934, p. 294; 1936, p. 89, pl. 20, fig. 3 (coloured), text-fig. 39.



Text-fig. 29.
Pugettia minor ORTMANN, anterior pleopod of male. ×28.

A rather small species; the carapace more elongate than its congeners on account of the less convex hepatical and branchial protuberances. The pseudorostral spines are divergent at an angle of about 40° and are usually about one third the length of the carapace. The preocular spine small, the postocular spine larger than the hepatic spine and still more so than the branchial spine, the last named spine projecting upwards and slightly backwards. The gastric tubercle is obtuse, cardiac spine very prominent, and the intestinal tubercle a little smaller.

The merus and carpus of the chelipeds are not markedly carinate, the ambulatory legs are very slender but usually naked.

Material examined:

15 ♂♂, 13 ♀♀, various localities in Sagami Bay, at Manazuru, Aziro and Ito.
3 ♂♂, 4 ♀♀, Simoda, off Kisami, "Misago".
2 ♂♂, 2 ♀♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Sagami Bay, length of carapace 16 mm., width 12 mm., length of pseudorostral spine 5 mm.

Habitat: Inhabits the bottoms of sand, sandy-mud, mud or broken shells; depth, 50 to 150 metres.

Type locality: Sagami Bay (ORTMANN).

Distribution: Endemic to Japan, from Mutsu Bay to Kyûsyû.

8. *Pugettia elongata* YOKOYA.

YOKOYA 1933, p. 153, text-fig. 54.

According to YOKOYA, the carapace of this species is more elongate than that of *P. minor*; the sinus between the postocular tooth and the hepatic spine is very shallow and indistinctly defined. There are three spine-tipped tubercles in the median line of the carapace, the last of which is most remarkable. The epibranchial spine very small and projected sideways. The chelipeds and ambulatory legs are much more

slender than those of *P. minor*, the former being distinctly longer than the latter.

No specimen of this species is comprised in our collections.

Type locality: Omae-zaki (YOKOYA).

9. *Pugettia similis* RATHBUN.

RATHBUN 1932, p. 32.

According to RATHBUN, this species is closely related to *P. minor*, the surface of the carapace being smooth and the hepatic and branchial spines equally slender; the cardiac region conical, not spine-tipped; the intestinal spine short and blunt. A branchial tubercle in transverse line with the lateral spine and the cardiac elevation. Four low, gastric tubercles, of which the two median are in a transverse line slightly in front of the posterior median tubercle. The first movable article of antenna about five times as long as wide.

Chelipeds narrow, the palm bluntly rounded below, carinate above, becoming blunt at distal end.

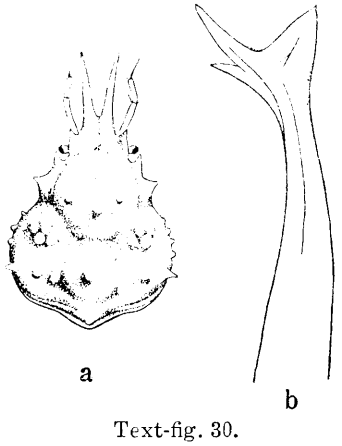
No specimen of this species is comprised in our collections.

Type locality: Ose-zaki (RATHBUN).

Distribution: Known only from the type locality.

10. *Pugettia nipponensis* RATHBUN. Pl. XXVI, fig. 2.

RATHBUN 1932, p. 31; YOKOYA 1933, p. 152; SAKAI 1936, p. 90, pl. 21, fig. 4 (coloured), text-fig. 40.



Text-fig. 30.
Pugettia nipponensis RATHBUN.
a. Carapace of male in dorsal aspect.
b. Anterior male pleopod.
(a×1·5; b×22.)

The body and ambulatory legs are densely covered with velvet-like tomentum; the carapace elongate pyriform, the regions are well defined and lumpy. The gastric region with a median posterior tubercle and a smaller one on either side a little in front of it; a small median anterior tubercle is sometimes present. The cardiac region very convex and conical; intestinal region with a small tubercle. The hepatic region with a conical lateral tooth and a smaller one above it. The branchial region is armed with a small, acuminate spinule at the postero-external angle, with three or four tubercles in a group on the epibranchial region and a small one on the inner surface of the epibranchial spine, and also a curved

elongate one on outer side of the cardiac protuberance. There is a row of three tubercles on the lateral surface of the branchial region immediately above the epimeral ridge. The pseudorostral spines are very long and slender, usually little divergent and subparallel, but in some cases considerably divergent. The preocular spine moderately prominent, the postocular tooth not very large, but is somewhat stouter than the hepatic and epibranchial spines. The basal segment of antenna with two obscure tubercles on the outer border, one basal and the other terminal. The pterygostomian region has a curved row of three or four tubercles.

Arm of chelipeds prismatic, distally thickened, with three indistinct tubercles on the upper border. Wrist with its inner, upper and outer borders cristate; palm laterally compressed and its superior border sharply cristate. Ambulatory legs are very slender and thickly covered with velvet-like tomentum.

Material examined:

5 ♂♂, 4 ♀♀, Onahama, The Fisheries Institute, Tokyo.
10 ♂♂, 11 ♀♀, various stations in Sagami Bay, "Misago" and "Amagi".
3 ♂♂, 4 ♀♀, Simoda, off the coast of the M. B. S., "Misago".

Measurements: Male from Sagami Bay, length of carapace 16.5 mm., width 13 mm., length of pseudorostral spine 5.5 mm.

Habitat: Inhabits the bottoms of mud, sand or broken shells; depth 50 to 150 metres.

Type locality: Doumiki Saki? (RATHBUN).

Distribution: Onahama (Hukusima-ken), Sagami Bay, Izu Peninsula, Suruga Bay, Ise Bay, Kii Peninsula, Tosa Bay.

Genus *Mimulus* STIMPSON 1860.

RATHBUN 1925, p. 182.

This genus comprises only two species, one of which inhabits the west coast of America, the other is from Japan. No specimen of this genus is comprised among our collections.

Mimulus cristatus BALSS.

BALSS 1924, p. 28, pl. 1, figs. 4, 5.

Type locality, Zusi in Sagami Bay, 130 metres deep.

Distribution: Hitherto known only from the type locality.

Genus *Menaethiops* ALCOCK.

Menaethiops ALCOCK 1895, p. 289; BALSS 1929, p. 8.
Parahoplophrys NOBILI 1905, 1906a, p. 105.
Herbstia Klunzinger 1906, p. 27 (nec H. M. EDWARDS).

The only Japanese species known of this genus is:

Menaethiops okai SAKAI. Pl. XXXVI, fig. 4.

SAKAI 1934, p. 69, pl. 7, fig. 1 (coloured); 1936, p. 86, Frontispiece, fig. 1 (coloured).

This species was reported by me in the previous paper of the Science reports (1935), so that description is purposely omitted here.

Type locality: Between Ito and Hatusima (SAKAI).

Distribution: Sagami Bay and Izu Peninsula.

Genus *Menaethius* H. M. EDWARDS.

ALCOCK 1895, p. 197.

Menaethius monoceros LATREILLE. Pl. XXVI, fig. 3.

ALCOCK 1895, p. 197 (list of earlier lit. and syn.); KLUNZINGER 1906, p. 20; BALSS 1924, p. 27 (list of recent lit.); URITA 1926, p. 32; SAKAI 1934, p. 294; 1936, p. 91, pl. 21, fig. 3 (coloured).

The carapace elongate triangular, the dorsal surface depressed but the gastric and cardiac regions sensibly convex, the former being mounted with three tubercles, and the latter with one. The intestinal region little convex and is mounted with a tubercle in the middle. The hepatic region produced laterally into a tooth, which sometimes has an accessory denticle on the anterior slope. The branchial region has usually two teeth on the lateral border and one or two tubercles on the dorsal surface; there is also a small tooth on either side of the posterior border.

The pseudorostrum of male is very long, slender, horizontal and somewhat deflexed, the tip being more or less bifurcated; in the female however, it is usually shorter. The preocular tooth is very prominent but the eyes are non-retractile, the orbits being non-protected. The basal segment of antenna is broad at base, armed with a distal tooth at the external angle; the flagellum very long and exceeds the tip of the pseudorostrum. The merus of the external maxillipeds is produced at the antero-external angle.

Chelipeds of male are longer than any of the ambulatory legs, the arm is mounted with a few tubercles on the upper border near the base and with three obscure teeth near the distal end; the palm laterally compressed and the upper and lower borders rounded. The fingers widely gape at base, the movable finger with a stout tooth near the base. Merus of the ambulatory legs has a few tubercles, which are usually haired, on the anterior border; the dactylus is spinulated along the posterior border.

Abdomen of male consists of seven distinct segments, that of female of five segments.

Material examined:

2 ♂♂, 5 ♀♀, Tateyama Bay, May 1929.
Many ♂♂, ♀♀, Simoda, on the shore in front of the M. B. S.
1 ♂, 1 ♀, Seto M. B. L., Prof. Yô OKADA, and Mr. SHIINO.
2 ♂♂, Gobo, coast of Kii Peninsula, Mr. K. OKAMOTO.
2 ♂♂, 2 ♀♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 17 mm., width 13 mm.

Habitat: Inhabits the rocky, weedy coasts, at low tide-marks.

Distribution: Tateyama Bay, Izu Peninsula, Kii Peninsula, Kagosima, Nagasaki and Formosa; this species ranges widely in Indo-Pacific, from Japan to the Red Sea and East Coast of Africa, also toward Sandwich Islands.

Genus *Huenia* DE HAAN.

DE HAAN 1839, p. 83; ALCOCK 1895, p. 194.

Huenia proteus DE HAAN. Pl. XXVI, figs. 4, 5.

Maja (*Huenia*) *proteus* DE HAAN, F. J. C. p. 95, pl. 23, figs. 4–6.
Huenia proteus ALCOCK 1895, p. 195 (list of earlier lit.); BALSS 1924, p. 25 (list of recent lit.); URITA 1926, p. 31; SAKAI 1934, p. 294; 1936, p. 91, pl. 21, figs. 1, 2 (coloured).

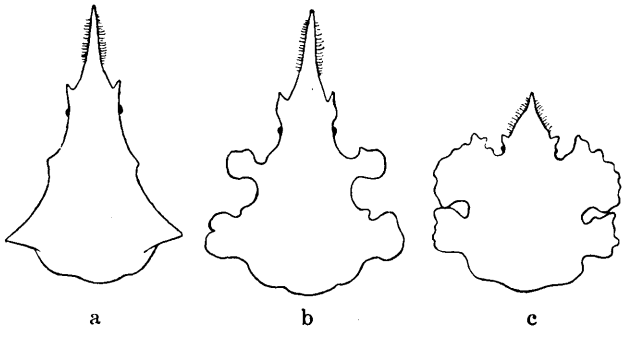
Description of male:—The carapace elongate triangular in outline, the dorsal surface markedly depressed and flattish. The gastric region has three tubercles placed in a triangle, the base forwards; the cardiac region mounted with a conical tubercle. The antero-lateral border has two lobules, the anterior or hepatic one being usually smaller and very often quite rudimentary, the posterior or branchial one being usually laterally produced but it forms sometimes only an angle. The pseudorostrum is very long and laterally compressed, haired on both borders. The preocular tooth distinct but no other orbital teeth, the eyes being non-protected and lodged in circular rudimentary orbits on the lateral vertical surface of the neck.

Chelipeds are stouter than any of the ambulatory legs but a little shorter than the first leg; the arm is smooth or indistinctly tuberculated on upper surface and is cristate along the upper distal border and also sometimes along the inner border. The wrist with its outer border cristate, the palm laterally compressed with the superior and inferior borders sharply cristate, the fingers gaping at base, the movable finger

being armed with a large tooth near the base. Ambulatory legs are also compressed and cristate on both borders.

Abdomen distinctly seven-segmented.

Description of female:—The carapace is broader in proportion to the length, the pseudorostrum being much shorter than that of male, the preocular tooth placed not far in front of the eyes. The gastric region has only one median tubercle, the cardiac tubercle not very prominent. Of the two laminar projections on the antero-lateral borders, the anterior or the hepatic lobe is very large and broad, upturned at the lateral margin, the posterior or branchial lobe is usually smaller and laterally truncate. Chelipeds are not much stouter than the ambulatory legs, which are also compressed and cristate on both borders.



Text-fig. 31.

Huenia proteus DE HANN. Outline of carapace in three specimens. (a, ♂ ×1·5; b, ♂ ×1·5; c, ♀ ×1·2.)

Abdomen consists of five pieces, the fourth to sixth being fused together.

Material examined: There are many ♂♂ and ♀♀ from various localities in Japan, viz. Tokyo Bay, Sagami Bay, Simoda, Ise Bay, Kii Peninsula, Nagasaki.

Measurements: Male, length of carapace 29 mm., width 20 mm.; female, length of carapace 22 mm., width 17 mm.

Habitat: Inhabits rocky or weedy beaches as also rocky or pebbly bottoms, not deeper than 50 meters.

Type locality: Japan (DE HAAN).

Distribution: Japan, from Tokyo Bay to Kyûsyû; this species widely ranges in Indo-Pacific, from Japan, Hawaii to Red Sea.

Genus *Simocarcinus* MIERS.

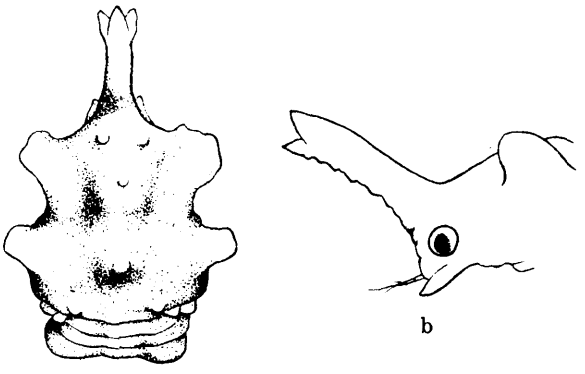
MIERS 1879a, p. 649; ALCOCK 1895, p. 196; KLUNZINGER 1906, p. 17.

Simocarcinus camelus pinnirostris KLUNZINGER.

KLUNZINGER 1906, p. 18, pl. 1, fig. 2e; LENZ 1910, p. 540.

It is a very curious fact that, although no representative of this common genus has yet been comprised in the Japanese carcinological fauna,

a species of the Red Sea is now known from Tosa Bay, without any continuation of distribution between the two localities. I compared it with KLUNZINGER's description and figure and am convinced that it agrees well with his var. *pinnirostris*, although there are some slight points of difference between them.



Text-fig. 32.

Simocarcinus camelus pinnirostris KLUNZINGER.

a. Dorsal aspect of carapace of female from Tosa Bay.
b. Profile view of the anterior portion of carapace of same.
(a×2·2; b×3·4.)

The gastric tubercles are three, of which the two anterior are larger and arranged side by side in front of the other. The pseudorostrum is more sunken at the base than in KLUNZINGER's figure and is very long and slender, both inferior borders being somewhat serrated; the tip of the pseudorostrum is obtusely pointed, having a lobule on either ventral side, thus these three lobules form a three-pronged fork. Of the two antero-lateral lobes, the anterior is a little longer than the posterior. The postocular tooth is much more prominent than in any other related species of this genus. To my regret, all the trunk legs of our single specimen have been lost.

Material examined:

1 ♀, Tosa-Okinosima, Prof. T. KAMOHARA.

Measurements: Length of carapace including pseudorostrum 19 mm., greatest width 14 mm., length of pseudorostrum 6.3 mm.

Habitat: Inhabits the coral reef, not deeper than 10 metres.

Type locality: Red Sea (KLUNZINGER).

Distribution: Japan*—Tosa Bay (new locality), Red Sea and Madagascar.

4. Subfam. PISINAE BALSS (sens. restr.).

BALSS 1929, p. 11.

Eyes with rudimentary orbits, the postocular cup hollowed on the inner surface, to which the short slender eye-stalk is retractile but the cornea not completely concealed. There is an intercalated spine.

* Very recently, I received a female specimen of this species, which was collected by Mr. K. OKAMOTO of the Hidaka Middle School, Kii, at Loo Choo, Aug. 1937.

Key to the Japanese genera of Pisinae.

1. Carapace covered with well defined granules or spinules. The pseudorostral spines are armed with an accessory spinule either at tip or in their distal half. Ambulatory legs are usually very slender and long .....*Naxioides.*
2. Carapace covered with flat and distant tubercles. The pseudorostral spines, which do not bear an accessory spinule, are short and widely separated from each other. Ambulatory legs are relatively short and stout.
   a. Pseudorostral spines coalesced at base, only their tips being widely divergent. Preocular spine prominent. External maxillipeds normal .....*Tylocarcinus.*
   b. Pseudorostral spines widely separated at the base by a U-shaped median sinus. No preocular spine. The merus and ischium of external maxillipeds fused in outer half of their width. .....*Choniognathus.*
3. Carapace broad and flat, not pyriform as in other related genera. Pseudorostral spines very short and broad. No preocular spine; intercalated spine very small and tuberculiform.
   a. Carapace as long as broad and subtriangular in outline. Ambulatory legs flattened. Chelipeds distinctly shorter than the first three pairs of ambulatory legs .....*Chionoecetes*.*
   b. Carapace longer than broad and lyrate in outline, the postocular cup and the hepatic region continuous. Ambulatory legs cylindrical; chelipeds usually very long and stouter than the ambulatory legs .....*Hyas*.*

Genus *Naxioides* A. M. EDWARDS 1865.

Naxia MIERS 1879a, p. 658; ALCOCK 1895, p. 216; ORTMANN 1894, p. 42.
Naxioides, A. M. EDWARDS 1865, p. 142; BALSS 1929, p. 14.

Key to the Japanese species of *Naxioides*.

A. Armature of carapace consisting almost entirely of large clean cut spines. Pseudorostral horns very short, not more than one tenth the remainder of carapace (in full-grown specimen). .....*N. hystrix.*

B. Armature of carapace consisting chiefly of tubercles, among which are sometimes a few spines. Pseudorostral horns very long, being more than ¼ as long as the carapace proper.
   1. Pseudorostral horns stout, divergent at an angle of about 20°. Armature of carapace conical and acuminate. Merus of ambulatory legs terminally armed with a spine. .....*N. mammillata.*
   2. Pseudorostral horns slender, parallel with each other till near the tip. Regions of carapace covered with a cluster of granules. Merus of walking legs without a teminal spine. .....*N. hirta.*

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* Previous authors (RATHBUN 1925, pp. 193, 194; BALSS 1929, p. 11.) admitted that *Chionoecetes* and *Hyas* as having no intercalated spine, but in reality, these genera have a small tubercle in the interval between supraocular eave and postocular cup; this tubercle clearly corresponds to the so-called intercalated spine. Thus these genera seem to be intermedate between Pisinae and Hyasteniinae.

1. *Naxioides hystrix* (MIERS). Pl. XXVII, fig. 3.

Naxia hystrix MIERS 1886, p. 60, pl. 6, fig. 4; POCOCK 1890, p. 79; ALCOCK 1895, p. 220; PARISI 1915, p. 293; BALSS 1924, p. 32; SAKAI 1932, p. 46, pl. 3, fig. 1; YOKOYA 1933, p. 162, text-fig. 59.
Naxioides hystrix, RATHBUN 1897, p. 157; BALSS 1929, p. 14; SAKAI 1934, p. 296; 1936, p. 92, pl. 22, fig. 2 (coloured).

Carapace elongate pyriform in the immature specimens, but it is almost globular in full-grown specimens, owing to the convexity of the hepatic regions. The dorsal surface is thickly covered with a coat of very fine tomentum. There are four prominent spines in the median line, two of which are gastric, one cardiac and the other intestinal, the last one projecting somewhat horizontally backwards. On either side of the anterior gastric spine is a small spine. The hepatic region armed with a spine, branchial region with seven spines, four of which are placed on the lateral margin (the last one being deviated on the dorsal surface), one on the epibranchial region, and the other two are small and placed near the inner surface. The preocular spine prominent and the postocular cup very broad. The pseudorostral spines are proximally fused together, and their distal half divergent, each having an accessory spinule on the upper inner border near the distal end. Basal segment of antenna has two teeth, one at the distal end and the other near the base of the outer border. There is a prominent spine on the pterygostomian region and a small spine at the antero-external angle of the buccal cavern.

Chelipeds and ambulatory legs are very long and slender, each segment being cylindrical and the merus armed with a terminal spine on the upper border. In the full-grown male, the chelipeds are far longer than any of the ambulatory legs but in immature male as well as in the female, they are shorter than the 1st ambulatory legs, which are extremely elongate with dactylus very long.

Material examined: There are many specimens of both sexes before me, obtained from various localities in Japan—Tokyo Bay, Sagami Bay, Izu Peninsula, Ise Bay, Kii Peninsula, Nagasaki and Amakusa.

Measurements: Male, length of carapace in median line 26 mm., width without lateral spines 21 mm., pseudorostral spine 4.3 mm.

Habitat: Inhabits the bottoms of mud, sandy-mud, gravels or broken shells. Depth, 50 to 150 metres.

Type locality: Molluccas, Amboina (MIERS).

Distribution: Tokyo Bay, Sagami Bay, Izu Peninsula, Suruga Bay, Ise Bay, Kii Peninsula, Nagasaki, Tusima Strait; Amboina, Andaman Sea.

2. *Naxioides mammillata* (ORTMANN). Pl. XXVII, fig. 1.

Naxia mammillata ORTMANN 1893, p. 56, pl. 3, fig. 7.
Naxioides mammillata, RATHBUN 1911, p. 253; BALSS 1929, p. 14 (name only).

The body and appendages densely covered with velvet-like tomentum; the carapace is elongate pyriform, the regions being fairly well defined and the dorsal surface covered with numerous spines, which are also concealed by tomentum mentioned above, so that the tips of the larger spines only being perceptible in natural condition. On denudation, the interorbital region has four tubercular spines; the gastric region has about 23 spines, three or four of which are placed in the median line; the cardiac region conical and mounted with a large spine, which is surmounted by 5 or 6 spinules, having another spine near the gastro-cardiac groove; the intestinal region has three spines, of which the posterior median one is very prominent and projecting backwards and forwards at tip; the hepatic region has about 4 spines, one of which is prominent and placed on the lateral border; the branchial region has 3 large and a few smaller spines on the mesobranchial region, and lastly two or three near the postero-lateral border. A curved row of 5 or 6 spines on the lateral surface of the branchial region along the epimeral ridge and also two large and a few minute spines on the pterygostomian region.

The pseudorostral spines are very long, being about two thirds as long as the remainder of the carapace, and are subparallel in proximal two thirds, the tips being widely divergent; the usual accessory spinule is acuminate and occurs on the upper border a little in front of the middle.

The preocular spine prominent, supraocular and intercalated spines equal in size; the postocular cup very broad, having a rounded tubercle on the posterior slope. Basal segment of antenna armed with a very large terminal spine on the outer border, and also with an obtuse tooth near the base. The antero-external angle of the buccal cavern strongly produced.

Chelipeds of male somewhat stout; arm has a strong terminal spine on the upper border, wrist has a few granules on the upper border, palm is smooth and naked; the fingers gape at the base, the movable finger has a stout tooth near the base. The merus of the ambulatory legs is armed with an obtuse terminal tooth on the upper border, carpus distally broadened, propodus very slender and dactylus markedly curved.

Material examined:

2 ♂♂, 2 ♀♀, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
3 ♂♂, 2 ♀♀, coast of Wakayama, Mr. S. SAKAGUTI.
1 ♂, Tatugahama, near Wakayama, Mr. Y. KUSE.
1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male, length of carapace 96 mm., length of pseudorostral horn 47 mm., width of carapace 47 mm.

Habitat: Inhabits the grounds of mud or shelly sand. Depth, 100 to 200 metres.

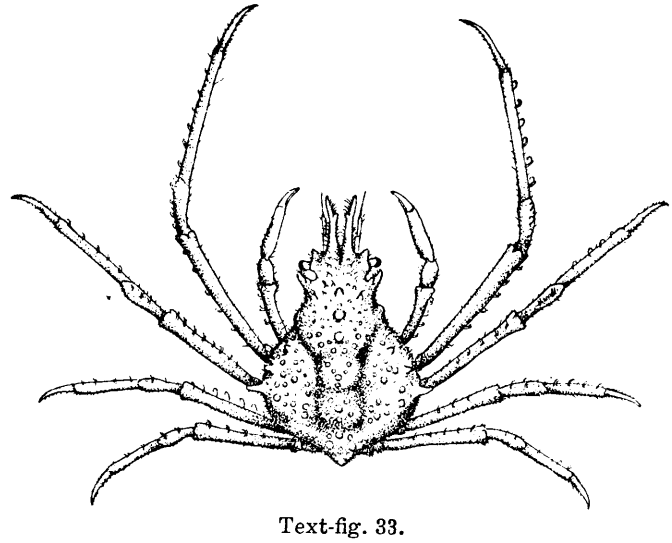
Type locality: Kagosima (ORTMANN).

Distribution: Kii Peninsula, Nagasaki and Kagosima; Salomon Bank (RATHBUN).

3. *Naxioides hirta* A. M. EDWARDS.

Naxioides hirta A. M. EDWARDS 1865, p. 143, pl. 4, fig. 1.
Podopisa petersii, HILGENDORF 1878, p. 785, pl. 1, figs. 1–5.
Naxia petersii, MIERS 1884, p. 523; DE MAN 1888, p. 19.
Naxia hirta POCOCK 1890, p. 79; HENDERSON 1893, p. 345; ALCOCK 1895, p. 218 (lit. and syn.).
Naxioides hirta RATHBUN 1911, p. 253; BALSS 1929, p. 14 (name only).

Carapace typically pyriform, the hepatic regions not being prominent and the branchial regions markedly swollen. The dorsal surface covered with numerous granules or tubercles of various sizes, of which three large ones are placed in the median line of the gastric region and also three erect ones arranged obliquely along the lateral border of the branchial region, the last of which is largest of all the tubercles and occupies the broadest portion of the carapace. Pseudorostral horns are about one fourth the length of the carapace, parallel with each other in their proximal half but widely divergent from the position where the usual accessory spinule occurs.



Text-fig. 33.

Naxioides hirta A. M. EDWARDS, ♀ from Kii Peninsula. (×4/5.)

Supra-ocular eave prominent but its anterior and posterior angles not markedly pointed. Close to the postocular cup is an intercalated spine, the sinus between it and the supraocular eave is deep and U-shaped.

There is a stout nipple-shaped tubercle near the middle of the pterygostomian region. The basal antennal article has two tubercles, one at its distal end and the other in the middle of its outer border.

Chelipeds of ♀ are very slender and short, not exceeding the length of the carapace proper. Ambulatory legs are slender and smooth, each segment being unarmed and furnished with a row of curled hairs on the anterior border.

Material examined:

1 ♀, Seto M. B. L., Mr. SAIGA.

Measurements: Length of carapace 34 mm., width of carapace 25 mm., length of pseudorostral spine 10 mm.

Habitat: Unknown.

Distribution: Tanabe Bay, Kii Peninsula; Philippine, Amirante, Salomon Bank, Andaman Sea.

The record of occurrence of this species in Japan is new!

Genus *Tylocarcinus* MIERS 1879.

ALCOCK 1895, p. 234.

Tylocarcinus styx (HERBST). Pl. XXXVI, fig. 5.

Cancer styx HERBST, Krabben III, iii, p. 53, pl. 8, fig. 6.
Pisa styx, H. M. EDWARDS 1834, p. 308; RICHTERS 1880, p. 141.
Arctopsis styx, ADAMS & WHITE, Samarang, Crust., p. 10.
Microphrys styx A. M. EDWARDS 1872, p. 247, pl. 11, fig. 4.
Tylocarcinus styx, MIERS 1879, p. 14; DE MAN 1881, p. 94; 1887, p. 228; ORTMANN 1893, p. 62; HENDERSON 1893, p. 349; ALCOCK 1895, p. 235; BALSS 1929, p. 13 (lit.); MIYAKE 1936, p. 511.

Carapace elongate pyriform, regions fairly well defined, the dorsal surface of each region being covered with numerous rounded tubercles, i.e., about 10 on the gastric region, one in the groove separating the gastric and cardiac regions; 3 on the cardiac region, 5 on the intestinal region (one on either side of the posterior border being larger), about 3 on the hepatic region, about 5 on the epibranchial region, about 5 on the mesobranchial region and 2 on the metabranchial region, one of which is elongate and curved, placed on either side of the cardiac region. The pterygostomian and epimeral regions are also finely granulated.

The true rostrum almost obsolete; the pseudorostral spines are slightly deflexed ventrally and fused together in proximal half, the spines being moderately divergent and incurved at tip. The preocular spine extremely prominent, the intercalated spine very small and in close contact with the supraocular eave and the postocular cup. These three

orbital components, together with the basal segment of the antenna, form a commencing orbit. The antero-external angle of the basal antennal segment is armed with a prominent spine. The ischium and merus of the external maxillipeds are slender, leaving a wide gap in the median line of the buccal cavern.

Chelipeds are stout in the male, the arm is armed with a few spines on the superior border; the palm smooth, the fingers widely gaping at base, the movable finger being armed with a stout tooth near the base. Merus of the ambulatory legs is armed with a row of two or three spinules along the anterior border, of which the terminal one is very long, and also a row of a few obtuse ones on the upper surface; carpus with a prominent spine near the distal end of the anterior border. Dactylus is strongly incurved, its inner border being armed with 7 to 8 minute teeth.

Abdomen of both sexes seven-segmented.

Material examined:

1 ♀, Tosa Okinosima, Prof. T. KAMOHARA.
1 ♂, 1 ♀, Loo Choo, Mr. S. SAKAGUTI.

Measurements: Female, length of carapace in median line 18 mm., width of same 12 mm., length of pseudorostral spine 2.5 mm.

Habitat: Inhabits the rocky beaches or reefs.

Distribution: Japan, Tosa Bay, Loo Choo; entire warmer coasts of Indo-Pacific.

Genus *Choniognathus* RATHBUN.

RATHBUN 1932, p. 33.

This genus was created by RATHBUN in 1932 to accommodate a new species, *Ch. coreensis* from Oki Shima, Japan Sea. It was reported preliminarily, and no figures was given nor its relation to other genera was mentioned. Despite of the short description, however, this species seems to be identical with *Eurynome reini* reported by BALSS from Sagami Bay and subsequently figured by YOKOYA (1933) and also by myself (1936).

Whether *E. reini* is a true *Eurynome* or not, I am quite uncertain, for no other species of this genus occur in Japanese waters, and I have not yet been able to examine any other species of this genus.

Judging from the descriptions and figures of other species of *Eurynome,* the shape of the chelipeds is *Lambrus*-form, while in *reini,* they are very slender and subcylindrical in both sexes. In true *Eurynome,* the external maxilipeds seem to have the merus and ischium distinctly jointed, while in *reini* they are fused in outer half of their width. The orbits of *reini* is very complete, the eyes being protected by supraocular eave, intercalated spine, postocular lobe (which is bifurcated), infraorbital lobe

(which is also very broad) and lastly by broad basal segment of the antenna (which has a large lobule on outer border).

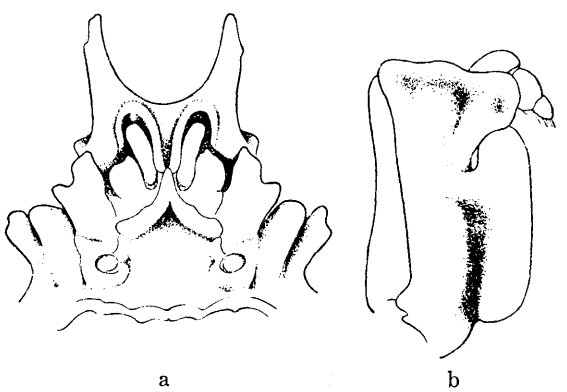
On account of these diagnoses, the Japanese species should advisably be separated from true *Eurynome,* and I propose to combine BALSS' species with RATHBUN's genus.

As to the generic position of *Choniognathus,* it is clear that it belongs to the subfamily Pisinae and approaches *Tylocarcinus,* from which it differs in having no preocular spine and having a very large and broad infraorbital lobe.

Choniognathus reini (BALSS) new combination. Pl. XXVII, fig. 2.

Eurynome reini BALSS 1924, p. 31, pl. 1, fig. 3; YOKOYA 1933, p. 158, text-fig. 57; SAKAI 1936, p. 92, pl. 22, fig. 1 (coloured).
Choniognathus coreensis RATHBUN 1932, p. 33.

Carapace longitudinally ovate, constricted behind the orbits and also behind the hepatic regions. The regions are separated by smooth broad grooves, their elevated surface being covered with numerous tubercles of various sizes; viz., a group of 13 to 14 tubercles in the middle of the gastric region and 5 to 7 on either side of this group; about 20 small tubercles on the interorbital surface; about 9 to 10 and a large central one on cardiac region; one large and 4 to 5 smaller on the intestinal area, and 2 high tubercles, one behind the other, on either side of this region, the posterior one of which being largest of all the tubercles of the carapace; 2 to 5 dorsal and 2 marginal ones on the hepatic region; a group of about 30 smaller and 5 larger ones on each branchial region.



Text-fig. 34.
Choniognathus reini (BALSS).
a. Anterior portion of carapace in ventral aspect.
b. External maxilliped of right side.
(a×12; b×21.)

The true rostrum is very low and indistinctly bilobate, the pseudorostral spines are very short and widely separated by a median U-shaped sinus; they are broad at base and sharply pointed at tip, their outer margins being subparallel. Supraocular eaves are thick, no preocular

spine, but the posterior angle forms an indistinct tooth; the intercalated, postocular and infraorbital lobes are very prominent and broad as aforementioned; the basal segment of antenna is also very broad and forms the ventral floor of the somewhat tubular orbit.

The ischium of the external maxillipeds is longitudinally sulcated, the merus produced at the antero-external angle; both segments are entirely fused with each other in the outer half of their width, in the inner half, however, they are separate. (text-fig. 34b).

Both chelipeds and ambulatory legs are very slender and thickly covered with tomentum, a small tubercle on the outer border of wrist, otherwise each segment is unarmed.

Abdomen of both sexes consists of seven distinct segments.

Material examined:

2 ♂♂, 3 ♀♀, between Ito and Hatusima, June 1934, "Misago".
3 ♂♂, 4 ♀♀, same locality, Aug. 1936, "Amagi".
1 ♂, 1 ♀, off Susaki, near Simoda, Aug. 1935, "Amagi".

Measurements: Male, length of carapace in median line 8 mm., width of same 5.5 mm., length of pseudorostral spine 1.2 mm.

Habitat: Inhabits the bottoms of mud or sandy-mud or dead shells; depth 50 to 200 metres.

Type locality: Misaki (BALSS).

Distribution: Japan, endemic:—Misaki (BALSS), Manazuru, Ito, Simoda, Mikuni (Hukui-ken—YOKOYA), Oki Is. (RATHBUN).

Genus *Chionoecetes* KRÖYER 1838.

RATHBUN 1925, p. 232.

Besides the common edible crab described below, one species*, of which I have not yet had occasion to study, is now reported from the adjacent waters of Japan Sea.

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* *Chionoecetes japonicus* RATHBUN.
RATHBUN 1932, p. 32.
?Syn.: *Chionoecetes angulatus bathyalis* DERJUNGIN & KOBJAKOWA 1935, p. 145, text-fig. 1.

Near *C. tanneri* RATHBUN. Animal smoother. The dorsal surface is tuberculate or granulate rather than spinous, especially in the old. Posterior branchial—nearly transverse—row of prominences very low, composed of groups of granules; anterior row with clusters further apart; the angle of meeting of the branchial crests at the postero-lateral margin is 60°, marked by a short spine, the first of a row which extends forward along the lateral margin and then downward to the buccal cavity. Tubercles of posterior margin low and blunt. Rostral teeth broader than the distance between tips; inner margins sinuous. Entire length of carapace 91.7, width without spines 91.4 mm.—RATHBUN.

Type locality: Sawa Zaki, Sado Island.

Chionoecetes opilio elongatus RATHBUN. Pl. XXVIII.

RATHBUN 1925, p. 233; YOKOYA 1933, p. 165; SAKAI 1934, p. 295; 1936, p. 93, pl. 23 (coloured).

The carapace including pseudorostrum slightly broader than long, the dorsal surface depressed and covered with flat, rasp-like tubercles on each region. There is a curved row of about 20 spinules along the antero-lateral border extending anteriorly to the antero-external angle of the buccal cavern. The postero-lateral borders are also lined with a curved row of numerous fine spinules, the posterior border almost straight and thickly covered with minute granules. The subhepatic region mounted with several sharp spinules. The pseudorostral lobes are very short and broad, median sinus being narrowly V-shaped. The supraocular eave is markedly convergent anteriorly, between this and the large postocular cup is a small tubercle, which corresponds to the intercalated spine.

The basal segment of antenna distally narrowed and finely serrated along the inner border; having a somewhat prominent subdistal tooth; the flagellum is very short. The infraorbital tooth is broad and serrated, isolated by a wide hiatus from both the postocular cup and the basal segment of antenna.

The arm of chelipeds somewhat compressed, its inner, outer and inferior borders are armed with sharp granules; wrist and palm not compressed, their upper, outer and lower surfaces covered with sharp spinules, which are mostly in longitudinal arrangement. Fingers are longer than the palm, very slender and denticulated throughout their whole length but the movable finger has a broad tooth near the base. Ambulatory legs are compressed, anterior two pairs subequal, third pair a little shorter and the last pair extremely small.

Abdomen of both sexes consists of seven distinct segments.

The female is usually half as large as the male (cf. measurements).

Material examined:

3 ♂♂, 12 ♀♀, market of Hukui-ken.
2 ♂♂, 3 ♀♀, coast of Kanazawa, market.

Measurements: Male, length of carapace including pseudorostrum 126 mm., width 128 mm., length of cheliped 265 mm., that of first ambulatory leg, 353 mm. Female, length of carapace 65 mm., width 66 mm., length of cheliped 85 mm., that of 1st ambulatory leg 141 mm.

Habitat: Inhabits the muddy or sandy bottoms, depth, 20 to 1215 fathoms (RATHBUN).

Distribution: The variety *elongatus* inhabits the adjacent waters of Japan, ranging from Kamchatka to Corea Strait; the southern limit of distribution on the Pacific side of Japan is Misaki (Parisi).

Genus *Hyas* LEACH 1814.

RATHBUN 1925, p. 252.

Hyas coarctatus alutaceus BRANDT 1851. Pl. XXXVII, fig. 1.

RATHBUN 1925, p. 258, pls. 96, 97 (list of literature and synonyms); SAKAI 1934, p. 295; 1936, p. 94, pl. 22, fig. 3 (coloured).
Syn.: *Hyas latifrons* STIMPSON 1857.

Carapace lyre-shaped, the postocular cup and the hepatic region being continuous and forming a wing-like expansion, the posterior angle of which is rounded and marked with a small rounded tubercle. The dorsal surface of carapace is minutely granulated and sparingly covered with a number of flat tubercles, of which two median gastric, one cardiac, eight marginal and four or five dorsal branchial are larger and are again covered with minute granules.

The pseudorostral lobes are broad and in contact with each other (in the young specimen, however, they are usually separated by a narrow median slit), they are about one tenth of the length of the carapace in adult, but about one seventh in young specimens.

The supraocular eave thick and anteriorly convergent, having a small intercalated tubercle as in *Chionoecetes*, so that I replaced this genus in Pisinae instead of Hyasteniinae of BALSS.

The basal segment of antenna broad and indistinctly granulated, having a small terminal tubercle on the ventral surface; the first movable segment is very broad, the following flagellum not being very long.

Chelipeds of the adult male are longer than the ambulatory legs; each segment is thickly covered with fine granules, the upper border of arm and wrist has some flattish tubercles, which are covered with granules. Each segment of the ambulatory legs is cylindrical, unarmed and naked; the dactylus alone is covered with velvet-like tomentum save the claw-like tip.

Abdomen of both sexes composed of seven distinct segments.

Material examined:

2 ♂♂, 1 ♀, east coast of Kamchatka, Mr. K. SIMODA of the Imperial Fisheries Experimental Station, Tokyo.
1 ♂, East China Sea, Osyoro-maru (reported by me in 1934).

Measurements: Male, length of carapace including pseudorostral spine 74 mm., width of same 60 mm., length of cheliped 142 mm., length of first ambulatory leg 133 mm.

Habitat: Inhabits the bottoms of mud, sand or gravels; 20 to 200 fathoms deep.

Distribution: Behring Sea, Okhotsk Sea, various localities in Japan Sea, East China Sea southward to Shanghai. (RATHBUN).

Remarks:

Hyas coarctatus ursinus RATHBUN (Proc. U. S. Nat. Mus., v. 64, art. 14, 1924) was originally reported from the Japan Sea, and according to RATHBUN it ranges from Southern Camchatka southward to Shanghai; it is characterized in having the legs and the ventral surface of the body much more thickly haired, the carapace narrower across the hepatic regions and also the pseudorostrum more elongate than in the case of *alutaceous*.

5. Subfamily HYASTENIINAE BALSS.

BALSS 1929, pp. 11, 14.

This subfamily only differs from Pisinae in the absence of the intercalated spine.

Key to the Japanese genera of Hyasteniinae.

A. Pseudorostral spines very long and slender, separated from the base. Supraocluar eave not in close contact with the postocular cup.
   1. Carapace armed with long acuminate spines in regular arrangement. Supraocular eave armed with a very long curved spine. ..... *Rochinia.*
   2. Carapace smooth or covered with tubercles of various sizes, if spinulated, the spines are never uniform in size and arrangement.
      i. Preocular spine indistinct, if present it may be not very prominent. Upper orbital sinus more or less U-shaped or proximally rounded. .... *Hyastenus.*
      ii. Preocular tooth prominent. Upper orbital sinus V-shaped. Palm of cheliped broad and its upper border sharply cristate. ..... *Chorilia.*
   3. Carapace with huge symmetrical pedicled tablets. No preocular tooth. .... *Sphenocarcinus.*

B. Pseudorostral spines thin and flattish. Chelipeds stout, arm and wrist cristate, palm smooth and its upper border thin. ..... *Scyra.*

C. Pseudorostral spines extremely short.
   1. Pseudorostral spines coalesced in proximal half, their tips being separated by a median slit. Upper orbital sinus very narrow.
      i. Carapace pyriform. Supraocular eave with its anterior angle obtusely produced. ..... *Pisoides.*
      ii. Carapace subcircular or discoidal. Supraocular eave with no preocular tooth. ..... *Doclea.*
   2. Supraocular eave in closest contact with the postocular cup (or completely fused with it).
      i. No orbital hiatus, but the suture line between supraocular eave and the postocular cup is perceptible. Carapace and thoracic legs armed with spines of regular arrangement. ..... *Hoplophrys.*
      ii. Supraocular eave completely fused with the postocular cup. Carapace broadly pyriform and covered with tubercles. ..... *Perinea.*

Genus *Rochinia* A. M. EDWARDS 1875.

Scyramathia, ALCOCK 1895, p. 201.
Rochinia RATHBUN 1925, p. 204.

Key to the Japanese species of *Rochinia*.

1. Dorsal surface of carapace armed with 20 long acuminate spines, of which two belong to the supraocular eaves and project upwards as the other spines. .....*R. pulchra.*
2. Carapace armed with only two long spines placed at the lateral branchial angles. A short spine on the intestinal region and a conical elevation on the hepatic region. Preocular spine not very prominent. .....*R. debilis.**

Besides these two species, Yokoya (1933) reported *Pugettia veltina* MIERS 1886 from south of Omae-zaki; this species may, according to Alcock (1895), be referred to this genus (cf. Alcock 1895, p. 206).

Our collection comprises only one species as described below:

Rochinia pulchra (MIERS). Pl. XXXVII, fig. 4.

Anamathia pulchra MIERS 1886, p. 26, pl. 4, fig. 1.
Anamathia liverorii WOOD-MASON 1891, p. 260; Illus. Invest. Crust., pl. 14, fig. 3.
Scyramathia pulchra, ALCOCK 1895, p. 202; RATHBUN 1911, p. 250.

Carapace elongate triangular, armed with twenty erect and well-cut spines, i.e., one on each supraocular eave, six on the gastric region, two of which are placed in the median line and two on either side of them; one each on cardiac, intestinal, and hepatic region and four on each branchial region, two of which are on the lateral margin.

Text-fig. 35.
Rochinia pulchra (MIERS). Profile view of carapace of female from Kii Peninsula. (×2.)

The true rostrum is moderately prominent, the pseudorostral spines are straight, horizontal and divergent at an angle of about 45°. There is a large gap between the supraocular spine and the postocular cup, the latter being very broad and hollowed on the inner surface. The basal segment of antenna has a small terminal tooth at the antero-external angle; there is a small tubercle at the outer side of the green gland and a row of three or four tubercles on the pterygostomian region. The merus of the external maxillipeds is extremely produced at the antero-external angle.

* RATHBUN 1932, p. 32.

Chelipeds of female are very slender, but in the male they are far stouter than the ambulatory legs; arm has a small terminal spine on the upper border, wrist is cristate on the inner and outer borders and its upper border also obtusely cristate; palm laterally compressed and the upper and lower edges obtusely cristate. Merus of the ambulatory legs is armed with a small terminal spine on the upper border.

Abdomen of both sexes consists of seven distinct segments.

Material examined:

1 ♀, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 1 ♀, Mimase, Tosa Bay, Mr. M. MITIHIRO.

Measurements: Length of carapace without spines 17 mm., width 11.5 mm., length of pseudorostral spine 10 mm.

Habitat: Inhabits the bottoms of mud or sandy mud; depth 34–560 fathoms.

Type locality: Philippine (MIERS).

Distribution: Andaman Sea, Saya de Malha, Seychelles and Japan as above mentioned. The record of occurrence in Japan is new!

Genus *Hyastenus* WHITE 1847.

ALCOCK 1895, p. 206; BALSS 1934–1935, p. 122.

Key to the Japanese species of *Hyastenus*.

A. Anterior angle of supraocular eave not markedly produced into a spine. Pseudorostral spines are not longer than half the length of carapace, they are not widely divergent and are usually subparallel. Carapace beneath the tomentum almost smooth.
   1. Carapace broadly triangular, armed with a stout spine at either lateral angle of the branchial region. .....*H. diacanthus.*
   2. Carapace elongate pyriform, having no epibranchial spine. .....*H. elongatus.*

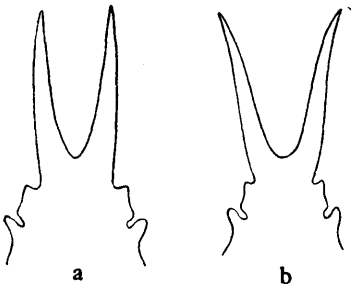
B. Anterior angle of supraocular eave produced into a short spine. Pseudorostral spines are markedly divergent from the base.
   1. Carapace beneath the tomentum smooth. Postocular cup bears a lobular process on the anterior margin. .....*H. kyusyuensis.*
   2. Gastric region has five tubercles in transverse arrangement and one on the median posterior slope. Postocular cup not armed with a lobule on the anterior margin. .....*H. borradailei.*
   3. Carapace thickly covered with tubercles, some of which are erect and in regular position. Postocular cup sinuate on the anterior margin. ..*H. cornigerus* sp. n.

1. *Hyastenus diacanthus* (DE HAAN). Pl. XXIX, fig. 2.

Pisa (Naxia) diacantha DE HAAN, F. J. C. p. 96, pl. 24, fig. 1.
Halimus diacanthus, BALSS 1924, p. 32 (references); URITA 1926, p. 33; SAKAI 1934, p. 295.

Hyastenus diacanthus ALCOCK 1895, p. 210 (list of earlier lit.); SAKAI 1936, p. 95, pl. 24, fig. 2 (coloured).

The body and appendages are densely covered with soft tomentum; the carapace behind the orbital region is triangular in outline, smooth and glabrous beneath the tomentum. The gastric region markedly convex, having two obtuse tubercles in the median line, the anterior of which being very indistinct; there is also a small low tubercle on each protogastric region, but it becomes sometimes indistinct. The cardiac and intestinal regions are slightly convex, the latter being mounted with a low tubercle. The branchial regions are less convex, having a strong forwardly-pointed spine at the junction of the antero-lateral and postero-lateral borders.



Text-fig. 36.
Hyastenus diacanthus DE HAAN, pseudorostral horns in two specimens.
(a, ♀ ×1·2; b, ♂ ×1·2.)

The pseudorostral spines are shorter than half the length of the carapace; they are usually not widely divergent, although the angle between them is individually variable (cf. text-fig. 36). The preocular tooth almost obscure; postocular cup with no accessory process on the superior margin. The basal antennal segment slender, armed distally with an obscure tooth and also with an obtuse one on the outer border near the base. A small tubercle just outside the green gland probably corresponds to the infraorbital lobe. There is a prominent tubercle on the pterygostomian region followed by a smaller one.

Chelipeds are unarmed and thickly covered with tomentum, but the fingers are naked in both sexes. In full-grown male, the fingers gape near the base, the movable finger being proximally armed with a stout tooth; in the female (and also in young male) they leave no hiatus and are uniformly denticulated throughout their whole length. Ambulatory legs are thickly covered with tomentum, the tip of dactylus being only naked and sharply curved.

Abdomen of male consists of seven distinct segments, while that of female consists of five segments*, the 4th to sixth being fused together,

* Abdomen of female of this genus is usually admitted as having seven distinct segments (cf. ALCOCK 1895, p. 207), so it is in the case of the female of *H. borradailei;* in the case of the female of *H. elongatus*, the 4th to 6th segments are almost fused togethre but the suture lines are yet perceptible; in the case of *H. diacanthus* and H. *cornigerus*, the 4th to 6th segments of female abdomen are completely fused together and the suture lines between these segments are entirely obliterated.

the suture line between these segments can be faintly traced in the median convex part.

Material examined:

3 ♂♂, 2 ♀♀, Tateyama Bay, May 1928.
3 ♂♂, 2 ♀♀, Momotori in Ise Bay, Aug. 1932.
2 ♂♂, 3 ♀♀, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
2 ♂♂, 2 ♀♀, Nagasaki, Mr. I. KANEKO.

Measurements: Female from Tokyo Bay, length of carapace 42 mm., width without epibranchial spines 30 mm., length of pseudorostral spine 16.5 mm.

Habitat and habit: Inhabits the bottoms of mud, sandy-mud or shells; depth, 50 to 100 metres. Usually masked with numerous sponges or hydroids.

Type locality: Japan (DE HAAN).

Distribution: Tokyo Bay, Sagami Bay, Ise Bay, Kii Peninsula, Kagosima, Nagasaki, Corea Strait. The foreign localities are: Hong Kong, Gulf of Siam, Java, Singapore, Ceylon, Andaman, Laccadive, East of Australia, New Zealand, etc.

2. *Hyastenus elongatus* ORTMANN. Pl. XXXVI, fig. 6.

Hyastenus diacanthus var. *elongata* ORTMANN 1893, p. 55.
Halimus elongatus RATHBUN 1911, p. 251; SAKAI 1934, p. 295, text-figs. 9. a, b.
Hyastenus elongatus SAKAI 1936, p. 96, text-fig. 43.

The carapace behind the orbits is elongate pyriform, the dorsal surface beneath the tomentum is smooth and glabrous. The gastric region is convex and mounted with an obtuse tubercle on the summit, the cardiac region slightly swollen, intestinal region mounted with a tubercle which in the female is almost obscure, the branchial regions are rounded, no epibranchial spine at all.

The pseudorostral spines are about half as long as the carapace proper and are parallel with each other but slightly divergent at tip. The preocular spine indistinct, the sinus between the supraocular eave and the postocular cup is very narrow.

The basal antennal segment is very narrow, its distal end unarmed; and the tooth on the outer margin near base is also very indistinct. The pterygostomian region has two tubercles, of which the anterior one is prominent.

Chelipeds and ambulatory legs are similar to those of *H. diacanthus*.

Material examined:

1 ♂, 1 ♀, Tateyama Bay, May 1928.
1 ♂, Simoda, off the coast of the M. B. S.
2 ♂♂, 1 ♀, coast of Wakayama, Mr. S. SAKAGUTI.
2 ♂♂, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 2 ♀♀, Nagasaki, Mr. I. KANEKO.

Measurements: Female from Tokyo Bay, length of carapace 21.5 mm., width 14.8 mm., length of pseudorostoral spine 10 mm.

Habitat: Same as the former species.

Type locality: Kagosima (ORTMANN).

Distribution: Tokyo Bay, Sagami Bay, Izu Peninsula, Miye-Ken, Kii Peninsula, Kagosima, Nagasaki; Amirante.

3. *Hyastenus kyusyuensis* (YOKOYA). Pl. XXIX, fig. 1.

Halimus kyusyuensis YOKOYA 1933, p. 143, text-fig. 51.
Hyastenus kyusyuensis, SAKAI 1936, p. 96, pl. 24, fig. 1 (coloured).

Carapace elongate pyriform, regions fairly well defined and their upper surface beneath the tomentum is almost smooth. The gastric region has three low, indistinct tubercles, one in the middle (which, however, is not mentioned by the original author) and the other on either side in front of the former. Cardiac region convex, hepatic regions very small and indistinctly mounted with a tubercle; branchial regions are slightly convex, having an indistinct low tubercle at the junction of the antero-lateral and postero-lateral borders.

The pseudorostral spines are slender and distinctly more than half the length of the carapace proper, they are divergent at an angle of about 60°. The supraocular eave is armed with a sharp preocular tooth. The postocular cup has an accessory lobule on the inner border which interrupts the upper orbital sinus.

The basal segment of antenna is very broad, armed with two teeth on the outer border, one being slender and placed at the distal end, the other proximal and is very broad. There is a tubercle just outer side of the green gland, corresponding to the infraorbital lobe. The merus of the external maxillipeds is produced at its antero-external angle.

Chelipeds are covered with tomentum excepting the fingers, which gape proximally; the movable finger is armed with a large tooth near the base. Ambulatory legs are covered with knob-shaped hairs, the anterior and posterior borders being fringed with long feather-like hairs at regular intervals.

Material examined:

1 ♂, between Ito and Hatusima, June, 1935, "Misago".

Measurements: Length of carapace 10.2 mm., width of same 7 mm., length of pseudorostral spine 6.1 mm.

Habitat: Weedy bottoms, 50–120 metres deep.

Type locality: West of Tanegasima, Kyûsyû (YOKOYA).

Distribution: Known only from the two localities above mentioned.

4. *Hyastenus borradailei* RATHBUN. Pl. XXXVI, fig. 7.

Hyastenus elegans tenuicornis BORRADAILE 1900, p. 574, pl. 40 fig. 2 (nec *H.* (*chorilia*) *tenuicornis* POCOCK 1890).
Halimus borradailei RATHBUN 1907, p. 64; 1911, p. 251, pl. 20, fig. 5.

This species differs from *H. kyusyuensis* in having five tubercles, which are placed in a transverse row on the anterior surface of the gastric region, one of which occupies the median position and is posteriorly followed by another tubercle. Other remarkable tubercles are: one behind the postocular cup on the hepatic margin, two at outer anterior corner of branchial region and a sharp one at the junction of the antero-lateral and postero-lateral borders.

The entire animal is closely covered with pubescence and the regions are fairly well delimited. The pseudorostral spines are almost half the length of the carapace and are divergent at an angle of about 50°. The preocular spine distinct; the postocular cup has no accessory lobule on the upper inner border. The basal antennal segment has a sharp antero-external tooth and an indistinct one near the proximal end.

All thoracic appendages are thickly covered with tomentum, excepting the fingers, which do not gape at the base.

Material examined:

1 ♂, Misaki. Mr. RYOZIRO SAITO.
1 ♀, Tosa Okinosima, Prof. T. KAMOHARA.
1 ♀, coast of Wakayama-ken, Mr. S. SAKAGUTI.

Measurements: Length of carapace 16 mm., width 11 mm., length of pseudorostrum 14 mm.

Habitat: Inhabits the weedy rocks or reef, down to 50 metres deep.

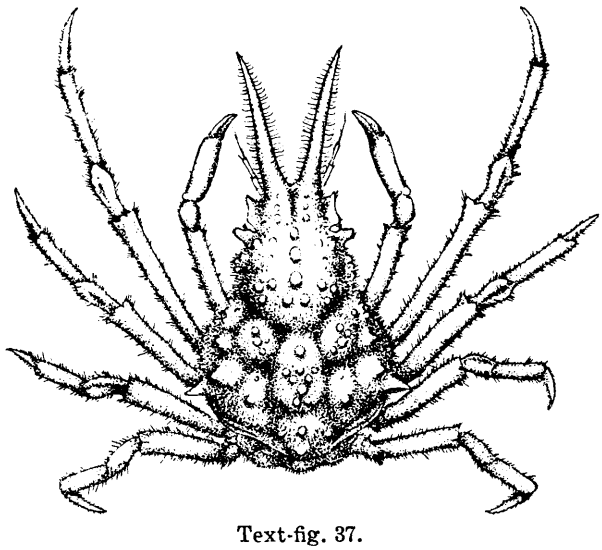
Type locality: Funafuti (RATHBUN).

Distribution: Sagami Bay, Kii Peninsula, Tosa Bay; Funafuti; Amirante; Cape Jaubert.

5. *Hyastenus cornigerus* sp. nov.

Carapace behind the orbital region is rounded triangular, the regions are defined by deepish grooves. The gastric region is mounted with four tubercles in the median line, followed by two small ones side by side on the posterior slope; on protogastric region, not far behind the orbit are placed two large tubercles side by side; and lastly four or five tubercles, one of which is high, on either side of the fourth median gastric tubercle. In the interval between the gastric and cardiac regions are three low tubercles, of which two are placed side by side in front of the median one. The cardiac region convex, its summit is mounted with a large tubercle which is surrounded by about eleven tubercles. The intestinal

region is mounted with about five tubercles, of which the median one is prominent and erect. The hepatic regions are armed with four of five tubercles; the branchial regions with large tubercles along the lateral margin, of which one posterior is prominent, corresponding to the usual lateral branchial spine; on the inner angle of this region, near the gastro-cardiac groove, is a group of four or five tubercles, and also three or four on either side of the cardiac region; along the postero-lateral border are also placed six or seven tubercles. On the pterygostomian region is a row of two erect tubercles, followed by another tubercle which is situated just above the base of the cheliped. Antero-external angle of the buccal cavern forms a lobular tooth.



Text-fig. 37.

Hyastenus cornigerus sp. nov. Dorsal view of female holotype. ×2.

The pseudorostral spines are subcylindrical and well divergent, the tips being very acuminate. The anterior angle of the supraocular eaves forms a sharp tooth. The postocular cups are almost lateral in position, their inner border is sinuate. The basal segment of antenna is distally armed with a slender spine, which is followed by a very broad tooth. The infraorbital tooth is small and tuberculiform.

Chelipeds (♀) are not stouter than the ambulatory legs, the arm is mounted with three tubercles along the upper border, the fingers are compressed and short, somewhat concave on the inner surface. The ambulatory legs are thickly covered with tomentum, interspersed with bundles of long setae.

Material examined:

1 ♀, holotype, Simoda, obtained in a lobster net, Oct. 1934.
2 ♀♀, Gobo, Wakayama-ken, Mr. K. OKAMOTO.

Measurements: Female, holotype, length of carapace 19 mm., width of same 13 mm., length of pseudorostral spine 10.5 mm.

Habitat: Inhabits the weedy rocky shore, 10–20 metres deep.

Distribution: Izu Peninsula, Kii Peninsula.

Genus *Chorilia* DANA.

DANA 1852, p. 91; RATHBUN 1925, p. 202.

(This genus is usually admitted as a synonym of *Hyastenus*.)
The only Japanese species known is:

Chorilia longipes japonicus MIERS. Pl. XXXVI, fig. 8.

Hyastenus (Chorilia) japonicus MIERS 1879, p. 27, pl. 1, fig. 2.
Hyastenus japonicus MIERS 1886, p. 56.
Halimus japonicus, PARISI 1915, p. 291.
Halimus longipes, BALSS 1924, p. 32.
Chorilia longipes japonicus, RATHBUN 1925, p. 204; YOKOYA 1933, p. 164.

Carapace behind the orbits almost triangular in outline, regions deeply defined and covered with numerous tubercles. There are some hairs on protogastric, interorbital and lateral branchial surfaces, otherwise the carapace is naked. The gastric region has two median tubercles, of which the anterior one is acuminate and erect; on either side of this median row are three tubercles. Cardiac region markedly convex, armed with two median flat tubercles and three small ones on the anterior slope. The intestinal region little produced posteriorly and its summit armed with a tubercle. Hepatic region has five or six tubercles, of which one at the posterior angle is very large and dilated laterally into an obtuse lobe. The epibranchial region convex, armed with three large tubercles and seven or eight indistinct tubercles; meso- and metabranchial regions are continuous and low, with five or six small tubercles and with a large forwardly curved epibranchial spine at the lateral angle. On either side of the cardiac region are also four or five tubercles which are continuous and form an elongate elevation.

The pseudorostral spines are slender, horizontal, divergent at an angle of about 30°; they are covered with long hairs especially along the inner and outer borders. The preocular spine very prominent, the upper orbital sinus narrow; postocular cup very broad, its lower anterior edge is somewhat produced. Basal antennal segment has a usual terminal spine and an obtuse tubercle on the outer border near the base; the following two peduncular segments are long and flattened. Infraorbital lobe vestigeous. The ridge of the pterygostomian region armed with six or seven tubercles; there are also nine or ten tubercles on the lateral surface of the carapace above the epimeral ridge.

Chelipeds are very stout; arm prismatic, with two prominent processes on the upper border near the base, its inner border cristate and the lower border with four or five tubercles; wrist short and irregular in shape, its inner border cristate and its upper and outer surfaces with 4

or 5 short cristate wrinkles; palm compressed and its upper border sharply cristate but the lower edge scarcely so; movable finger is armed proximally with a large tooth, distal half of both fingers being uniformly denticulated. Ambulatory legs are compressed and covered with pubescence, the dactylus is curved inwards and its tip naked.

Abdomen of both sexes consists of seven distinct segments.

Material examined:

1 ♂, Misaki, the Tokyo Science Museum.
1 ♂, Onagawa, sent by Mr. Z. IMAI.
1 ♂, Misaki, Prof. U. KONO, the Eighth High School at Nagoya.

Measurements: Length of carapace 35 mm., width without epibranchial spine 26 mm., length of pseudorostral spine 11 mm.

Habitat: Bottoms of sand, mud or broken shells, depth 100–300 metres.

Type locality: Near Siriya-zaki (MIERS).

Distribution: Siriya-zaki, Kinkazan, Siwoya-zaki (YOKOYA), Sagami Bay.

Genus *Sphenocarcinus* A. M. EDWARDS 1875.

ALCOCK 1895, p. 193; BALSS 1924, p. 27; RATHBUN 1925, p. 185.
Oxypleurodon MIERS 1886, p. 38.

The only known Japanese species is:

Sphenocarcinus stimpsoni (MIERS). Pl. XXIX, fig. 3.

Oxypleurodon stimpsoni MIERS 1886, p. 38, pl. 6, fig. 1; ORTMANN 1893, p. 43.
Sphenocarcinus stimpsoni BALSS 1924, p. 28; SAKAI 1934, p. 294.

The carapace triangular, the gastric, cardiac, hepatic and branchial regions are isolated and circumscribed by deepish channels; each isolated area being smooth and minutely pitted, the gastric area being longitudinally oval, the cardiac area transversely oval, the hepatic lobes small and continuous with the postocular cup, which is hollowed as usual; the branchial lobes are dilated postero-laterally and finally projecting laterally into an obtuse lobe. Below the branchial lobes is also a small area and in front of it are other two small lobes arranged obliquely toward the antero-external angle of the buccal cavern. Postero-lateral and posterior borders are continuous, forming a broad ridge.

The pseudorostral spines are slightly divergent and curved outwards and upwards at tip, their base being more or less fused. No preocular spine, the supraocular eave being smooth and somewhat isolated as in the regions of the carapace. Upper orbital sinus very narrow. Basal

segment of antenna with no tooth or spine at all, a small tubercle at outer side of the green gland corresponds to the infraorbital lobe.

Chelipeds are stout (like those of *Pugettia*), arm subprismatic, wrist with the upper surface ridged, palm compressed and its upper and lower ridges obtusely crested; fingers with a wide gap at the base, the movable finger of male having a large tooth near the base of the prehensile edge. The ambulatory legs are not very slender and unarmed, dactylus alone is covered with tomentum, but its tip sharply curved and polished.

Abdomen of male and female consists of seven segments.

Material examined:

1 ♀, Mimase Tosa Bay, Mr. M. MITIHIRO.
1 ♂, Corea, Mr. I. KANEKO.

Measurements: Length of carapace in median line 15.5 mm., width 14 mm., length of pseudorostral spine 7.9 mm.

Habitat: Inhabits the ground of mud or sand; depth 200 to 680 metres.

Type locality: Kei Islands (MIERS)

Distribution: Sagami Bay (ORTMANN), Tosa Bay (present paper), Corea, Philippine, Kei Islands, Colombo.

Genus *Scyra* DANA.

DANA 1852, p. 95; RATHBUN 1925, p. 195.

Comprises only three species, one of which inhabits the west coast of North America, the others being described from Japan.

Key to the Japanese species of *Scyra*.

1. Pseudorostral spines laminiform and dilated on outer border. Hepatic region armed with a sharp spine; epibranchial spine stout and curved forwards. Basal segment of antenna armed with a tooth at distal end. . .*S. compressipes*.
2. Spines of pseudorostrum not dilated on outer border. Hepatic region obtusely rounded, a rounded angle instead of the epibranchial spine. Basal segment of antenna unarmed. .....*S. tuberculata*.

1. *Scyra compressipes* STIMPSON.

STIMPSON 1857, p. 218; MIERS 1886, p. 63, pl. 7, fig. 4; STIMPSON 1907, p. 17, pl. 3, fig. 4; PARISI 1915, p. 291; YOKOYA 1928, p. 770, 1933, p. 155 (distribution in Japan); SAKAI 1936, p. 97, text-fig. 98.

The carapace is triangular in outline, the dorsal surface not much convex; the regions are fairly well defined. The gastric region is armed with two or three tubercles in the median line and one on either side of

the median gastric one, also a few minute tubercles irregularly disposed among them . Cardiac region little convex and mounted with an obtuse tubercle; intestinal region with a medium-sized tubercle. The hepatic region continuous with the postocular cup, having a sharp spinule near the posterior end; the branchial region has an oblique row of three tubercles along the lateral border, of which the middle one is very large; this row is followed by a prominent, forwardly pointed epibranchial spine placed at the junction of the antero-lateral and postero-lateral borders.

Text-fig. 38

Scyra compressipes STIMPSON. ♀ from Siriya-zaki, ×1.

The pseudorostral spines are flattened and laminiform, their outer border being convex. The supra-ocular eaves are thin and armed with acuminate preocular spine; the upper orbital sinus very narrow. The ridge of the pterygostomian region is irregularly marked with 4 or 5 tubercles. The infra-orbital lobe is rudimentary. The basal antennal segment is broad and armed with a terminal tooth; the two following segments are compressed.

Chelipeds of both sexes are much stouter than the ambulatory legs, the arm is prismatic, its lower and inner borders are cristate; wrist with its inner border cristate and its superior and outer surfaces irregularly ridged; the palm is smooth and laterally compressed, upper and lower edges being sharply cristate; fingers of both sexes not gaping and armed with about 10 or 11 triangular teeth. Merus, carpus (and also propodus of posterior two pairs) of the ambulatory legs are fringed with feathered hairs along the anterior and posterior borders. Dactylus is acuminate and curved at tip, its posterior margin being armed with two rows of minute denticles, which are concealed beneath the pubescence.

Abdomen of both sexes composed of seven distinct segments.

Material examined:

1 ♀, Off siriyazaki, Sôyô-maru.

Measurements: Female, length of carapace 25 mm., width of same 19.5 mm., length of pseudorostral spine 4.5 mm.

Habitat: Found on a bottom of weedy sand (STIMPSON), depth, 10 to 160 metres.

Type locality: Hakodate (STIMPSON).

Distribution: Northern coasts of Japan, ranging south-wards to Sagami Bay (PARISI) on the Pacific coast, to Oga Peninsula on the continental side (YOKOYA).

2. *Scyra tuberculata* YOKOYA.

YOKOYA 1933, p. 156, Text-fig. 55.

Distribution: Hitherto only reported by the original author from Kosiki Isls., and south of Kagosima.

Genus *Pisoides* M. EDWARDS & LUCAS 1843.

RATHBUN 1925, p. 284.

This genus has been represented by only two species, one *P. edwardsi* (BELL) from Panama to Strait of Magellan and Galapagos Islands; the other from Japan as described below. The early-known species *Doclea bidentata* A. M. EDWARDS (=*Doclea orientalis* MIERS) is, as BALSS (1929) has insisted on, not true *Doclea*, but must more properly be referred to this genus.

Key to the Japanese species of *Pisoides*.

1. Carapace typically pyriform, hepatic region not very swollen and its marginal tubercle less prominent; branchial region armed with two erect tubercles on the lateral angle. Pseudorostral sinus very shallow, the horns being somewhat horizontal. ..... *P. ortmanni.*
2. Carapace broadly pyriform, hepatic tubercle conical and the carapace broadened at this point. Branchial region has one conical epibranchial process at the lateral angle. Pseudorostral sinus somewhat deeper, the horns being somewhat deflexed. ..... *P. bidentatus.*

1. *Pisoides ortmanni* (BALSS). Pl. XXIX, fig. 4.

Herbstia ortmanni BALSS 1924, p. 33, pl. 1, figs. 1, 2.
Pisoides ortmanni BALSS 1929, p. 13, text-fig. 6; SAKAI 1935, p. 70; 1936, p. 97, pl. 24, fig. 3 (coloured).
Syn.: *Herbstia japonica* YOKOYA 1933.

Carapace typically pyriform, convex, covered thickly with short pubescence. The gastric region is armed with 10 or 12 tubercles, of which 4 or 5 are placed in the median line. Cardiac region conical and is mounted with a large tubercle, which is surrounded by 6 or 7 tubercles. On either side of this region is a series of 3 or 4 tubercles. The intestinal

region low but the median tubercle is distinct. The hepatic region armed with about four tubercles, one of which is larger and placed on the lateral margin. The branchial region is armed with 16 or 17 tubercles, of which two are somewhat conical and placed on the lateral border near the lateral angle.

The pseudorostrum is nearly horizontal and narrowed anteriorly, the two spines are very obsolete and separated by the median sinus which is usually very shallow. The supraocular eave oblique, the preocular tooth not very acuminate; on the interorbital area are placed about 6 small tubercles. The postocular tooth very slightly cupped on the inner surface. The ridge of the pterygostomian region is armed with about 4 tubercles; there are also about 3 tubercles above the epimeral ridge. The basal segment of antenna distally subtruncate, its outer border has an indistinct tooth near the base; the following peduncular segments are foliaceous.

Chelipeds of male are very stout and resemble those of *Pugettia;* arm subprismatic but its ridges rounded; palm very broad and laterally compressed, upper and lower borders crested; fingers scarcely gaping. All these segments are naked in the male but thickly tomentose in the female excepting the fingers. Ambulatory legs are unarmed and thickly covered with velvet-like tomentum.

Abdomen in both sexes consists of seven distinct segments.

Material examined:

2 ♂♂, 2 ♀♀, between Ito and Hatusima, Aug. 1936, "Amagi".
10 ♂♂, 8 ♀♀, Simoda, off the coast of Kisami, "Misago".
1 ♂, 1 ♀, Momotori in Ise Bay, Aug. 1931.
1 ♂, Gobô, Kii Peninsula, Mr. K. OKAMOTO.

Measurements: Male from Simoda, length of carapace and pseudorostrum 13.5 mm., width 10.5 mm. The largest specimen examined came from Onahama, measuring 20 mm. long and 15.5 mm. wide.

Habitat: Inhabits the bottoms of sand, mud or broken shells. Depth, 30 to 150 metres.

Type locality: Zusi, Sagami Bay (BALSS).

Distribution: Off Kinkazan, Onahama, Inuboe-zaki, Sagami Bay, Izu Peninsula, Ise Bay, Kii Peninsula.

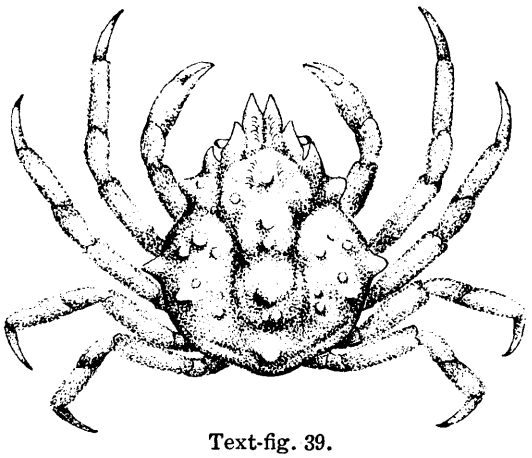
2. *Pisoides bidentatus* (A. M. EDWARDS) new combination.

Libinia bidentata A. M. EDWARDS 1873, p. 253.
Doclea orientalis MIERS 1879, p. 28, pl. 2, fig. 1.
Doclea bidentata ORTMANN 1893, p. 48; BALSS 1924, p. 30; YOKOYA 1928, p. 769; 1933, p. 154; DERJUGIN & KOBJAKOWA 1935, p. 143.

That this species does not belong to *Doclea* was maintained by BALSS (1929, p. 14), who considered it to be related to *Pugettia* or *Hyas.* In

my recent investigation however, it seems to be natural to place it near *Pisoides ortmanni* (BALSS).

The general aspect of the body much resembles that of the former species. The carapace somewhat broader than that of *P. ortmanni* and is thickly covered with tomentum and the regions are well defined. The gastric region has usually 7 tubercles of which three are placed in the median line; the cardiac region mounted with a tubercle on the summit, and a small one on its posterior slope, another one or two on the anterior slope. The intestinal region somewhat convex and is armed with a tubercle. Hepatic region with two tubercles, one of which is conical and large, the carapace is broader at this point than in the former species. The branchial region has nine to ten tubercles, of which two or three are placed near the cardiac region, one at the junction of the antero-lateral and postero-lateral borders is prominent and conical.



Text-fig. 39.
Pisoides bidentatus (A. M. EDWARDS).
♂ from Mutu Bay. (×1·2.)

The pseudorostral spines are somewhat deflexed downwards and are deeply divided than in the case of the former species. The preocular tooth obtuse, postocular lobe markedly pointed and its inner surface slightly cupped. The basal segment of antenna with a terminal tooth and also a tubercle on outer border near the base. Infraorbital lobe is somewhat larger than in the former species. Pterygostomian ridge is armed with three to four tubercles, behind this series and above the base of the cheliped is another tubercle.

Chelipeds of both sexes are not much stouter than the ambulatory legs and are covered with velvet-like tomentum; fingers meet throughout their whole length. The dactyli of the ambulatory legs are strongly curved and acuminate.

Abdomen of both sexes as in the former species.

Material examined:

1 ♂, 1 ♀, Akkesi Marine Biol. Stn., Mr. M. IWASA.
1 ♂, Mutu Bay, Sakai, July 1929.
1 ♂, Onagawa, Mr. Z. IMAI.
1 ♂, 1 ♀, Misaki, Mr. RYOZIRO SAITO.

Measurements: Male from Akkesi, length of carapace measured in the median line 32.5 mm., width 28 mm.

Habitat: Inhabits the bottoms of mud or sandy mud; littoral to 100 metres deep.

Type locality: Mouth of Amoor River (A. M. EDWARDS).

Distribution: Coast of Hokkaidô, Mutsu Bay, Tohoku Province, Misaki (southern limit!), mouth of Amur River, Vladivostok.

Genus *Doclea* LEACH.

ALCOCK 1895, p. 225.

Two species of this genus are now known from Japanese waters.

The early-known *Doclea bidentata* (=*D. orientalis* MIERS) is now referred to *Pisoides* as aforementioned. *Doclea* sp. reported by YOKOYA (1928) from Mutsu Bay seems to be a juvenile form of *Pugettia*.

Key to the Japanese species of *Doclea*.

1. At least three spines in the median line of carapace, one posterior gastric, one cardiac, and one intestinal which is prominent and horizontally produced backwards. Branchial region has three spines on the antero-lateral margin, the last one being largest. ..... *D. canalifera*.
2. Carapace has no median spines, intestinal region also usually unarmed. Branchial region has three short spines on the antero-lateral margin, the last of which is very small and tuberculiform. ..... *D. ovis*.

1. *Doclea canalifera* STIMPSON. Pl. XXXVII, fig. 3.

STIMPSON 1857, p. 217; ALCOCK 1895, p. 228; DE MAN 1895, p. 486, fig. 1; LANCHESTER 1901, p. 535; RATHBUN 1902, p. 29 (part?); NOBILI 1903, p. 28; BALSS 1924, p. 30 (part); URITA 1926, p. 33; CHOPRA 1935, p. 469.

Carapace subcircular and thickly covered with velvet-like tomentum; in the young specimen, however, the carapace seems rather rhomboidal, as the pseudorostral, epibranchial and intestinal spines are proportionally more projecting than those of the adult. The gastric region is armed with four median tubercles, of which one posterior is erect and spiniform; on either side of this row are two low tubercles. The cardiac region has an erect median spine, between it and the posterior gastric spine is another low tubercle. The intestinal spine is very long and horizontally projected backwards. The hepatic region scarcely convex, having a small tubercle. The branchial region has three marginal spines, two anterior are small, while the last one is very prominent and pointed obliquely backwards. The epibranchial region is mounted with two indistinct tubercles, the mesobranchial region with four, arranged in an oblique row, and also a tubercle on either side of the cardiac region.

The pseudorostrum is narrow, horizontally produced, bifid in the distal half, the median sinus being very narrow. No preocular spine at

all, the postocular cup pointed at the tip. Basal segment of antenna is armed distally with a large tooth, the flagellum being very slender and short. A very long spine at the outer side of the green gland, which corresponds to the infraorbital tooth; the antero-external angle of the buccal cavern is produced into a prominent spine. The pterygostomian region has two spines, of which the anterior one is very small, while the other is very large and is visible from dorsal side; this region is characterized in having a hairy channel extending along the buccal frame.

Chelipeds are short and slender, each segment being cylindrical and covered with tomentum, fingers alone are naked. Ambulatory legs are rather stout, the dactylus naked and strongly compressed.

Abdomen of both sexes seven-segmented.

Material examined:

1 ♂, 1 ♀, Tatugahama, Kii Peninsula, Mr. Y. KUSE.
1 ♂, Mr. K. OKAMOTO, Gobô, Kii Peninsula.
1 ♀, Mimase, Tosa Bay, Mr. M. MITIHIRO.

Measurements: Male, length of carapace without pseudorostral and intestinal spine 40 mm., width without epibranchial spine 35 mm.

Habitat: Inhabits the muddy bottom, down to 50 metres deep.

Type locality: Off Tamtoo Island near Hong Kong (STIMPSON).

Distribution: Kii Peninsula, Tosa Bay, Kagosima, Hong Kong, coast of India.

2. *Doclea ovis* (HERBST). Pl. XXXVII, fig. 2.

Cancer ovis HERBST, Krabben, I, ii, pl. 13, fig. 82.
Doclea ovis H. M. EDWARDS, H. N. C. I. p. 294; CUVIER'S Règne Animal, Crust. pl. 33, fig. 2; ALCOCK 1895, p. 227 (list of earlier lit.); GORDON 1931, p. 529; CHOPRA 1935, p. 467, text-fig. 1.
Syn.: *Doclea japonica* ORTMANN 1893.

This species only differs from *D. canalifera* in the following few points:

(1) The tubercles in the median line of the carapace are all very low and not spiniform, i.e. the gastric region has four low median tubercles, the cardiac region three, while the intestinal region has none except a rudimentary tubercle in some specimens.

(2) Of the three marginal spines on the branchial region, the last one is rudimentary.

(3) The ambulatory legs are somewhat thicker than those of *D. canalifera*.

In other respects the two species much resemble each other, however, the present species seems to attain a larger size than the former.

Material examined:

2 ♂♂, 1 ♀, Gobô, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 1 ♀, coast of Wakayama, Mr. S. SAKAGUTI.
1 ♂, Tosa Bay, Prof. T. KAMOHARA.
1 ♂, 1 ♀, coast of Miyazaki-ken, collection of the Miyazaki-ken Normal School.
2 ♂♂, 3 ♀♀, Kagosima Bay, Mr. T. SAMEZIMA.

Measurements: Male, length of carapace measured in the median line 53 mm., width 46 mm.

Habitat: Inhabits the muddy bottom at river-mouth or muddy or pebbly beaches not far from the littoral zone.

Distribution: Kii Peninsula, Tosa Bay, Miyazaki-ken, Kagosima Bay; this species widely ranges over the warmer regions in Indo-Pacific.

Genus *Hoplophrys* HENDERSON.

HENDERSON 1893, p. 346; ALCOCK 1895, p. 233.

This genus comprises only two species, one from Queensland, and the other from Indian and Japanese waters.

Hoplophrys oatesii HENDERSON.

HENDERSON 1893, p. 347, pl. 36, figs. 1–4; ALCOCK 1895, p. 233; Illus. Zool. Invest. Crust. pl. 56, figs. 1, 2; RATHBUN 1911, p. 253; SAKAI 1932, p. 48, pl. 2, fig. 4; 1934, p. 296; 1936, p. 94, text-fig. 42.

The only known locality of this species in Japan is Amakusa, where a female specimen was collected by Mr. IDE of the Tomioka Primary School, as a commensal of alcyonalians. It was reported by me in the 1st volume of the Science Reports (loc. cit.).

Type locality: Gulf of Martaban (HENDERSON).

Distribution: Amakusa; coast of India, Providence, Amirante, Gulf of Martaban.

Genus *Perinea* DANA.

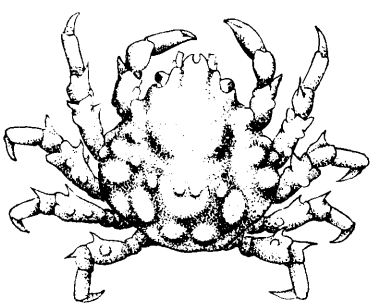
DANA 1852, p. 114.
Syn.: *Parathoë* MIERS 1879.

Perinea tumida DANA.

Perinea tumida DANA 1852, p. 114, pl. 4, fig. 1; RATHBUN 1907, p. 65; STIMPSON 1907, p. 23; CALMAN 1909, p. 785; EDMONDSON 1925, p. 31; BALSS 1929, p. 14 (lit.).

Parathoë rotundata MIERS 1879a, p. 16, pl. 5, figs. 2, 2a; HASWELL 1882, p. 30; KLUNZINGER 1906, p. 45, pl. 1, fig. 7, text-fig. 10; BOUVIER 1915, p. 67, pl. 5, fig. 10.

A small species with carapace broadly pyriform, rounded behind and slightly longer than broad. The dorsal surface uneven and indistinctly tuberculated; the gastric region weakly convex, tubercles obsolete besides a pair of rudimentary ones placed side by side on the metagastric region; cardiac region convex, mounted with several small tubercles; intestinal region armed with two small tubercles arranged side by side near the posterior margin; hepatic region very small, armed with a tubercle on the lateral border behind the postocular cup. The branchial regions are deeply separated by a curved groove from both hepatic and cardiac regions; of the branchial tubercles, two are found on the antero-lateral margin behind the hepatic tubercle, the other two are large and rounded, placed along the antero-lateral margin, and two other small ones scattered inside of them. On either side of the cardiac protuberance is a large elongate tubercle and another small indistinct one in front of it.



Text-fig. 40.
Perinea tumida DANA. ♀ from Daitozima. ×3·6.

The pseudorostral horns are very short, the tips are, contrary to the figure of Dana, curved inward, leaving a rounded median interspace. No trace of upper orbital sinus, the supraocular eave and the postocular cup being completely fused together, the preocular tooth small and obtuse. The basal antennal article is broad and stout, its antero-external angle is produced into a robust process, which can be observed from above on either side of the pseudorostrum.

Chelipeds of male very stout; merus short, with two teeth on the upper inner border, of which the distal one is more prominent; the upper outer surface also with two obtuse tubercles while the lower surface is sparingly pilose. Carpus and propodus smooth, the latter somewhat compressed and cristate above. Tip of the fingers not so distinctly hollowed in our specimens, the cutting edges are minutely denticulated.

The ambulatory legs are robust and short; merus provided with two obtuse spines on the anterior crest, with two or three tubercles on the upper surface, of which the distal one is very often predominant in size. Carpus is armed with a strong spine on the anterior border, propodus compressed and pilose. The dactylus is armed with 4 or 5 denticles on the posterior border, the horny tip being strongly curved.

Material examined:

1 ♂, 2 ♀♀, Northern Daitozima, Mr. H. YAMANARI.

Measurements: Female, length of carapace measured in the median line, 7 mm., width 6.8 mm.

Habitat: Coral reefs, littoral.

Distribution: Northern Daitozima, Hawaii, Fiji Isls., Mauritius, Paumotu Isls., Red Sea.

6. Subfam. MAJINAE BALSS (sens. restr.).

BALSS 1929, p. 16.

Carapace elongate-pyriform or suborbicular, its dorsum or margins usually armed with spines. True rostrum and pseudorostral spines well developed, the latter may be very long and divergent and are usually horizontal. Orbits are roofed above by arched supraocular eave, intercalated spine, and postocular cup; the basal segment of antenna not broad and not forming the floor of the orbit, it is distally armed with two spines.

The abdomen of both sexes distinctly seven-segmented.

Key to the Japanese genera of the subfamily Majinae.

I. Antennary flagellum arises from within the orbit; eye-stalks slender, cornea elongate, more ventral than terminal.
  1. An accessory spine on outer margin of pseudorostral spines; supraocular eave serrated. Merus of external maxillipeds produced at antero-external angle. Wrist and palm of chelipeds very short and spinulated. ....*Majella.*
  2. No accessory spine on pseudorostral spines; supraocular eave not serrated but its posterior angle armed with a spine as usual. Merus of external maxillipeds not markedly produced at antero-external angle. Wrist and palm of chelipeds slender and smooth. .....*Maja.*

II. Antennary flagellum shut out from the orbit.
  1. No preocular spine but the posterior angle of supraocular eave produced into a stout tooth.
    i. Eye-stalks slender, cornea elongate, more ventral than terminal. Carapace covered with granules. .....*Leptomithrax.*
    ii. Eye-stalks short and stout, cornea rounded and terminal.
      a. Carapace elongate pyriform, dorsal surface smooth. No accessory spine on pseudorostral spines and also on postocular spines. Tip of fingers not hollowed. .....*Schizophroida.*
      b. Carapace nearly orbicular; dorsal surface with granules and spines. Pseudorostral spines and postocular spines each with an accessory spine. Tip of fingers hollowed. .....*Schizophrys.*
  2. Anterior and posterior angles of supraocular eave armed each with spines. Eye-stalks very slender and curved, cornea elongate and ventral. .... *Acanthophrys.*

Genus *Maja* LAMARCK.

ALCOCK 1895, p. 238.

Syn.: *Paramaja* KUBO 1936.

Five species of this genus are now known from Japanese waters, ranging mainly from Tokyo Bay to Formosa.

Key to the Japanese species of *Maja*.

A. Carapace covered with vesicular granules, armed with spines on the median line and also on the margins.
   1. Basal segment of antenna with a proximal tooth on the outer border. Carapace with five median and five marginal spines and also with two dorsal branchial ones. ..... *M. spinigera.*
   2. Basal segment of antenna with no basal tooth on the outer border.
      a. Only two median spines, one gastric and the other cardiac. Five marginal spines but with no dorsal branchial spine. Pseudorostral spines projecting upwards. ..... *M. miersi.*
      b. Four median spines, i.e., two gastric, one cardiac, and one intestinal. Pseudorostral spines horizontal. Three marginal spines only.
         i. Carapace elongate pyriform. The tip of the anterior male pleopod pointed. Thoracic legs slender and their carpus cylindrical.. *M. japonica.*
         ii. Carapace broader; chelipeds stouter, carpus being depressed and canaliculated on the upper surface. The tip of the anterior pleopod of male ovate and fringed with hairs. ..... *M. nipponensis.*

B. Carapace covered with large wart-like tubercles, no dorsal or marginal spines. Basal segment of antenna with no basal tooth on the outer border. .... *M. kominatoensis.*

1. *Maja spinigera* DE HAAN. Pl. XXX, fig. 1.

Maja spinigera DE HAAN, F. J. C. p. 93, pl. 24, fig. 4; ADAMS & WHITE, Samarang, Crust. p. 15; DANA 1852, p. 85; ORTMANN 1893, p. 51; ALCOCK 1895, p. 239; Illus. Zool. Invest. Crust., pl. 34, fig. 3; PARISI 1915. p. 289; BALSS 1924, p. 34; SAKAI 1934, p. 297; 1936, p. 98, pl. 25, fig. 3 (coloured).

Carapace somewhat depressed and the dorsal surface covered with vesicular granules, each of which is furnished with a few curled hairs; the regions are ill-defined. There are five long spines in the median line of the carapace, three being gastric, one cardiac and one intestinal; on the posterior margin are placed two small spines side by side. The true rostral spine is prominent and projects forwards and downwards. The pseudorostral spines are cylindrical and very long, being more than one fourth as long as the remainder of the carapace, they are moderately divergent and directed obliquely upwards. The supraocular eave very thick and its posterior angle produced into a prominent spine, the tip of which is curved upward; there is no preocular spine at all. Intercalated spine slender, the postocular spine very long and acuminate, projecting horizontally outwards and forwards, having an accessory spinule at the base of the inner border. Behind the postocular spine follows a marginal row of five spines, one hepatic and the others branchial; they are very long and project outwards and upwards, inside the last of which is a curved row of two dorsal spines.

Subhepatic and epimeral regions are armed with erect spinules; the basal antennal segment is armed with a proximal spine on the outer border and with two larger terminal spines, one ventral and the other lateral. Infraorbital lobe present, its tip being subtruncate.

Chelipeds of full-grown male are very smooth and slender, the palm is inflated and the fingers gape at the base, the movable finger being armed with a subbasal tooth. The ambulatory legs are covered with very long yellowish hairs. The merus of each pair has a long spine at the distal end of the upper border.

Abdomen of both sexes composed of seven distinct segments.

Material examined:

1 ♀, coast of Odawara, collection of the Odawara Middle School.
1 ♂, Manazuru, "Misago" June, 1934.
1 ♀, Seto M. B. L., Prof. Yô OKADA, and Mr. SHIINO.
1 ♂, collection of the Amakusa Primary School.

Measurements: Male from Amakusa, length of carapace 92 mm., width 75 mm., length of pseudorostral spine 26 mm.

Habitat: Grounds of mud or broken shells, depth 50 to 150 metres.

Type locality: Japan (DE HAAN).

Distribution: Tokyo Bay, Sagami Bay, Kii Peninsula, Nagasaki, Amakusa, Takao in Formosa; Beluchistan (ALCOCK).

2. *Maja miersii* WALKER. Pl. XXXVIII, fig. 2.

WALKER 1890, p. 113, pl. 6, figs. 1–3; PARISI 1915, p. 289; YOKOYA 1933, p. 157.

The carapace is covered with vesiculous granules as in the former species but it has only two spines in the median line, one gastric and the other cardiac. The posterior margin is not armed. The true rostrum is relatively shorter, the pseudorostral spines are widely divergent and directed upwards, they are thickly fringed with hairs on both borders. The supraocular eaves are very thick and wide, its posterior angle is produced into a spine but there is no preocular spine. There are five rather short marginal spines behind the prominent postocular spine, the first one placed on the hepatic region and the others on the branchial region, the fifth, which is the largest of all, being deviated on the dorsal surface; no other spines on the branchial regions. The merus of the thoracic legs has no terminal spine.

Material examined:

1 ♀, coast of Wakayama, Mr. S. SAKAGUTI.

Measurements: Length of carapace measured in the median line, 32.3 mm., width 25 mm., length of pseudorostral spine 10 mm.

Habitat: Same as that of *M. spinigera.*

Type locality: Singapore (WALKER).

Distribution: Sagami Bay (PARISI), Kii Peninsula (present paper), near Saisyu-to (YOKOYA) and Singapore (WALKER).

3. *Maja japonica* RATHBUN. Pl. XXX, fig. 2.

RATHBUN 1932, p. 33; SAKAI 1934, p. 297, text-fig. 10, 11a; SAKAI 1936, p. 99, pl. 25, fig. 2 (coloured), text-fig. 45.

(Not *Maja japonica* YOKOYA 1933, which is designated as *M. nipponensis* SAKAI).

Carapace elongate pyriform, thickly covered with granules and short hairs. There are four knob-tipped spines in the median line of the carapace, viz. two gastric, of which the anterior one is small, one cardiac and one intestinal. The pseudorostral spines are very slender and widely divergent at tip. The three orbital spines are disposed so as to retain some interval between one another, the general view of the neck being somewhat slender. The hepatic spine small, the branchial region has three spines on the lateral border, the last one being largest and deviated on the dorsal surface; the distance between the 1st and 2nd tooth is larger than that between the 2nd and 3rd. There is a pair of small spines on the posterior margin. No basal tooth on the outer border of the basal antennal segment, the two distal spines also not very prominent.

The chela of the male is somewhat inflated, the immovable finger being armed with a tooth near the base of the cutting edge. All segments of the ambulatory legs are very slender and are fringed with long, soft hairs, especially on the anterior and posterior borders.

Material examined:

1 ♂, East China Sea (as reported in 1934).

1 ♀, between Ito and Hatusima, "Misago", June 1935.

Measurements: Female from Ito, length of carapace 13.3 mm., width 10 mm., length of pseudorostral spine 2 mm.

Habitat: Inhabits the bottoms of mud or broken shells, 50 to 100 metres deep.

Type locality: Seno Umi(?) (RATHBUN).

Distribution: Sagami Bay, East China Sea.

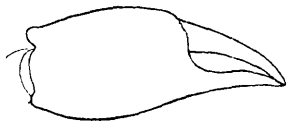
4. *Maja nipponensis* SAKAI. Pl. XXXVIII, fig. 1.

Maja »japonica« YOKOYA 1933, p. 157, text-fig. 56 (nom. preoccup.).

Maja nipponensis SAKAI 1934, p. 297, text-fig. 11; 1936, p. 100, text-fig. 46.

Closely resembles *M. japonica,* but the carapace is broader, the branchial regions being somewhat more swollen and the postorbital region also broader. The arrangement of the spines on the dorsal surface and

also on margins of carapace is almost identical with that of *M. japonica*; the pseudorostral spines more slender and their outer borders subparallel in proximal half but divergent at tip. The three orbital spines are somewhat broader and leave no wide intervals between them. The fingers of the chelipeds unarmed. The ambulatory legs are more densely fringed with yellowish hairs, each segment is stouter than that of *M. japonica*, the carpus being distally broadened and its upper surface longitudinally sulcated. The characteristic anterior abdominal appendage was figured in my previous papers (1934, 1936).



Text-fig. 41.
Maja nipponensis SAKAI.
Chela of ♂ from Sagami Bay. ×3.

Material examined:

1 ♂, Manazuru, Mr. TUYUKI, a fisherman (=*Maja* sp. SAKAI 1932).
1 ♂, same loc. "Misago", June 1934.
1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Female, length of carapace 20 mm., width 16.5 mm., length of pseudorostral spine 4 mm.

Habitat: Same as the former species.

Type locality: Nagasaki (SAKAI).

Distribution: Sagami Bay (SAKAI) Ise Bay, Kii Peninsula, Tosa Bay, east of Tanegasima, east of Ariake Bay, south of Kosiki Isls., Goto Isls. (YOKOYA) and Nagasaki (SAKAI).

5. *Maja kominatoensis* (KUBO). Pl. XXXVIII, fig. 3.

Paramaja kominatoensis KUBO 1936, p. 361, figs. 1, 2.
Maja kominatoensis MIYAKE 1936, p. 418, pl. 28, figs. 1, 2.

This species may easily be distinguished from its congeners in the following constant characters:

The carapace behind the orbital region is almost circular and its dorsal surface covered with large wart-like tubercles. There are no spines in the median line, nor on the margins of the carapace. The pseudorostral spines are slender and not very long, less than one fourth the remainder of the carapace, their tips being slightly divergent and their bases being fringed with long hairs. The three orbital teeth are basally broad and are acuminate at tip, the postocular one being most prominent.

The basal segment of antenna is armed with two distal spines, but without any basal tooth on the outer border. Chelipeds are smooth and naked as usual, the palm of male slightly swollen but the fingers unarmed. Ambulatory legs are thickly covered with coarse hairs, each segment being cylindrical.

Material examined:

1 ♀, coast of Kyûsyû, loc. unknown, Mr. M. HARADA, Fukuoka-ken.

Measurements: Female from Kyûsyû, length of carapace 44 mm., width 40 mm.

Habitat: Bottom unknown, depth 200 fathoms (KUBO).

Type locality: Kominato, Tokyo Bay (KUBO).

Distribution: Hitherto exactly known only from Tokyo Bay and Danjo-Group, Nagasaki-ken.

Genus *Majella* ORTMANN.

ORTMANN 1893, p. 51.

Represented only by the genotype, known only from Sagami Bay.

Majella brevipes ORTMANN.

ORTMANN 1893, p. 51, pl. 3, fig. 5.

According to ORTMANN, the carapace of this species is suboval and anteriorly narrowed; the dorsal surface with scattered spines and the margins with clean-cup prominent spines. The supraocular eaves are serrated; the pseudorostral spines are armed with an accessory spinule on outer border. The antero-external angle of the merus of external maxillipeds is pronouncedly produced. As in the case of *Maja* the flagellum of antenna arises from within the orbit, this character may be appreciated as primitive for the subfamily Majinae. The arm, wrist, and palm of chelipeds are armed with some acuminate spinules.

No second specimen of this curious species has been obtained since ORTMANN's report.

Type locality: Sagami Bay, 70–120 fathoms (DÖDERLEIN-ORTMANN).

Genus *Leptomithrax* MIERS.

MIERS 1876b, p. 20; RATHBUN 1918, p. 19; BALSS 1929, p. 18.

Two species have long been known in Japanese waters, which are distinguished as follows:

1. Carapace behind the orbital region of adult animal is subcircular and sensibly convex. Postocular tooth triangular and acuminate at tip. ....*L. edwardsi.*
2. Carapace subtriangular, hepatic, epibranchial, and intestinal regions less convex. Postocular tooth bifid at tip. .....*L. bifidus.*

1. *Leptomithrax edwardsi* (DE HAAN). Pl. XXX, fig. 4.

Maja (*Paramithrax*) *edwardsi* DE HAAN, F. J. C. p. 92, pl. 21, fig. 2.
Paramithrax (*Leptomithrax*) *edwardsi* ORTMANN 1893, p. 52; DOFLEIN 1902, p. 656; PARISI 1915, p. 289; BALSS 1924, p. 34, YOKOYA 1933, p. 160.
Leptomithrax edwardsi SAKAI 1934, p. 298; 1936, p. 100, pl. 26, fig. 3 (coloured).

The carapace behind the orbital region is subcircular and pronouncedly convex, the regions are fairly well defined; the dorsal surface is closely covered with tubercles of unequal sizes, interspersed with fine tomentum. The gastric region is mounted with two conical spines placed in the median line; the cardiac region with two conical tubercles side by side, which are surrounded by small tubercles; the intestinal region with one or three large dorsal tubercles and also two spines side by side on the posterior margin. The hepatic region has a large lateral spine followed by a smaller one on its posterior slope; the branchial region has three large marginal spines and a dorsal mesobranchial one, which is usually worn out in full-grown specimens.

The true rostral spine is rather small and conical; the pseudorostral spines are horizontal, nearly one sixth the length of the carapace and are not much divergent. The supraocular eaves are very thick, its posterior angle ends in a large tooth, while it has no preocular tooth.

Intercalated spine sharp and elongate triangular in shape. Postocular tooth triangular and its inner surface hollowed, the two upper orbital fissures are very narrow.

The basal segment of antenna is very broad and armed with two terminal spines, one ventral and the other lateral; the flagellum is very slender and slightly exceeding the length of pseudorostral spines. Infraorbital tooth is rudimentary. Ischium of the external maxillipeds has a deepish channel, extending from the base towards the antero-internal angle; the channel has a shallow outer branch near the middle. The merus is broad and its anterior border very thin.

The arm of chelipeds is dorsally covered with sharp tubercles and distally armed with a sharp spine; the wrist is also dorsally covered with sharp tubercles; the palm is entirely smooth and moderately swollen on the inner surface; the fingers not gaping and their cutting edges are entire. Ambulatory legs are cylindrical and unarmed, dactylus being strongly incurved.

Abdomen in both sexes consists of seven distinct segments.

Material examined:

1 ♂, 1 ♀, Tateyama Bay, May, 1928.
2 ♂♂, 1 ♀, Misaki, Mr. K. AOKI.
2 ♂♂, 2 ♀♀, Manazuru, "Misago", June 1934.
2 ♂♂, 1 ♀, Simoda M. B. S.

1 ♂, 1 ♀, Ise Bay at Momotori.
1 ♂, 1 ♀, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
2 ♂♂, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 1♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male, length of carapace 70 mm., width of carapace 62 mm., length of pseudorostral spine 12.5 mm.

Habitat and Habits: Found on the bottoms of mud, sandy-mud or dead shells; 50 to 150 metres deep. The animal usually carries a few sea-anemones, *Actinia* sp.

Type locality: Japan (DE HAAN).

Distribution: Japan endemic—from Tokyo Bay to Kyûsyû; off Hukui-ken and Niigata.

2. *Leptomithrax bifidus* ORTMANN. Pl. XXXI, fig. 1.

Paramithrax (Leptomithrax) bifidus ORTMANN 1893, p. 52, pl. 3, fig. 6; PARISI 1915, p. 290, pl. 7, fig. 2; BALSS 1924, p. 34; YOKOYA 1933, p. 161.
Leptomithrax bifidus SAKAI 1934, p. 298; 1936, p. 101, pl. 25, fig. 1 (coloured).

The general outline of carapace of this species is subtriangular and thickly covered with granules; the hepatic, branchial and intestinal regions are less convex. The gastric region is armed with two spines in the median line, the cardiac region with two prominent ones side by side. The posterior margin has also two erect spines, one on either side. The hepatic region is armed with two lateral spines, of which the posterior one is small. The branchial region has three marginal and one mesobranchial spine, they are uniformly prominent and sharply-cut.

The pseudorostral spines are markedly divergent near the tip and are very slightly upcurved or incurved. The postocular tooth is strongly produced and its tip bifid. The arm and palm of chelipeds are covered with sharp tubercles, some of which on the upper border are larger and spiniform. The ambulatory legs are slenderer than those of the former species, each segment being furnished with longish hairs but fewer in number.

Material examined:

1 ♂, Tateyama Bay, May 1928.
1 ♂, 1 ♀, Misaki, Mr. K. AOKI.
3 ♂♂, 5 ♀♀, between Ito and Hatusima, "Misago" and "Amagi".
1 ♂, 1 ♀, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, Goto Islands, Mr. I. KANEKO.

Measurements: Male from Ito, length of carapace 32 mm., width 25 mm., length of pseudorostral spine 8.5 mm.

Habitat: Inhabits the grounds of mud, gravels or broken shells; 50 to 150 metres deep. So far as I am aware, the animal does not protect itself with sea-anemone.

Type locality: Sagami Bay (ORTMANN).

Distribution: Japan, endemic:—Tokyo Bay, Sagami Bay, Izu-Peninsula, Suruga Bay, Kii Peninsula, Asizuri-zaki, Goto Isls., Iki and Tusima Isls.

Genus *Schizophroida* SAKAI.

SAKAI 1933, p. 137.

Comprises only three species, two of which are inhabitants of the Japanese waters, the third being Hawaiian. Key was given in my previous paper in 1933.

1. Wrist of chelipeds spinous, movable fingers armed with a tooth near the base. Pseudorostral horns more than one fourth the length of the carapace proper. .....*S. simodaensis.*
2. Chelipeds very slender and unarmed, fingers not gaping and not armed. Pseudorostral horns less than one fourth the length of the carapace proper. .....*S. manazuruana.*

1. *Schizophroida simodaensis* SAKAI.

SAKAI 1933, p. 139, pl. 13, fig. 1 (coloured); 1936, p. 102, pl. 27, fig. 1 (coloured).

Carapace elongate pyriform, covered with fine tomentum, beneath which the surface is smooth. The gastric region has a small tubercle in the middle. The intestinal region has also a small tubercle in the middle, the posterior border is armed with two spines, one on either side. There are five marginal spines, one of which belongs to the hepatic region and is most prominent, the others belonging to the branchial region. The true rostral spine moderately prominent, the pseudorostral spines slender, straight, horizontal and are divergent at and angle of about 30°. The supraocular eave is armed with a tooth at the posterior angle; the intercalated spine moderately prominent; the postocular tooth very prominent, acuminate, and is hollowed on the inner surface near the base.

The subhepatic region has a group of four or five tubercles; one tubercle on the pterygostomian region and also one on the epimeral region above the base of the cheliped. The basal segment of antenna armed with two distal spines, of which the ventral one is larger. The infra-orbital tooth very small and rounded.

Chelipeds of male are longer than any of the ambulatory legs; the ischium and arm are unarmed; the wrist armed with about 12–13 obtuse spinules on the upper surface, the palm is much longer than any other segment and is smooth; the fingers gape at base, their tips being acuminate and not hollowed as in *Schizophrys*. The movable finger has a stout tooth near the base. Ambulatory legs are stout and thickly covered with fine tomentum, scattered with longer hairs.

Abdomen of male resembles that of *Schizophrys aspera*.

Material examined:

1 ♂, (holotype), Akane, in front of the Simoda M. B. S.
1 ♂, near Mikomoto Light, May 7, 1934, Fishermen.

Measurements: Male from Mikomoto, length of carapace 27 mm., width of same 19 mm., length of pseudorostral spine 18.2 mm., length of cheliped 51 mm.

Habitat: Inhabits the rocky weedy bottom, 10–50 metres deep.

Type locality: Akane in the harbour of Simoda (SAKAI).

Distribution: Known only from Simoda.

2. *Schizophroida manazuruana* SAKAI. Pl. XXX, fig. 3.

SAKAI 1933, p. 140, text-fig. 1; 1936, p. 103, pl. 27, fig. 2 (coloured).

This species closely resembles the former species but is distinguished in the following few points.

1. The gastric region smooth and unarmed; the pseudorostral spines shorter, being less than one fourth the length of the carapace; in *simodaensis*, however, they are more than one fourth the length of carapace.

2. Chelipeds in both sexes are very slender and smooth, the wrist has no spines on the upper surface; chela in both sexes very slender, the fingers not gaping and not armed.

This species is probably identical with *Schizophroida hilensis* (RATHBUN) 1906 from Hawaii, but that species is characterized in having three gastric spines arranged in a narrow triangle, base forward; in Japanese species the gastrict region is smooth and not armed.

Material examined:

1 ♂, (holotype), Manazuru, Mr. YOSHITARO TUYUKI.
1 ♂, between Ito and Hatusima, "Misago", June 1935.
1 ♂, Off Susaki, Simoda, "Misago", Sept, 1934.

Measurements: Female from Ito-Hatusima, length of carapace 14 mm., width of same 10 mm., length of pseudorostral spine 3 mm.

Habitat: Inhabits the rocky or sandy-mud bottoms; 50 to 100 metres deep.

Type locality: Manazuru in Sagami Bay (SAKAI).

Distribution: Known only from Sagami Bay and Simoda.

Genus *Schizophrys* WHITE 1848.

ALCOCK 1895, p. 243; SAKAI 1933, p. 138.

This genus is represented by only two species, one of which is common in Japan.

Schizophrys aspera (M. EDWARDS). Pl. XXXI, fig. 4.

Mithrax asper M. EDWARDS, H. N. C. I., p. 320.
Maja (Dione) affinis DE HAAN F. J. C., p. 94, pl. 22, fig. 4.
Schizophrys aspera, ALCOCK 1895, p. 243 (list of earlier lit. and syn.); BALSS 1924, p. 35 (recent lit.); SAKAI 1936, p. 103, pl. 27, fig. 3 (coloured).
Syn.: *Schizophrys serratus* WHITE 1847.
Schizophrys spiniger WHITE 1847.

The carapace behind the orbits is suborbicular and the upper surface not very convex and thickly covered with granules, among which are scattered sharp tubercles. The true rostrum moderately prominent; the pseudorostral spines are parallel or slightly incurved at tip, having a large accessory spine near the base on the outer border. The intercalated spine triangular; the postocular spine prominent, having a large accessory spine on the superior border. Behind the postocular tooth, the antero-lateral border has six equidistant marginal spines, one of which belongs to the hepatic region, the others to the branchial region and the two posterior are smaller, the last being deviated on the dorsal surface.

Subhepatic and epimeral regions are scattered with sharp spinules and the pterygostomian region with coarse granules. The basal segment of antenna is armed with two terminal spines, both being visible in dorsal view on either side of the pseudorostral spines. The infraorbital tooth is small but acuminate.

The arm and wrist of chelipeds are covered with sharp prominent spines, the palm is smooth and unarmed excepting one or two spinules near the base of the upper border; the fingers of male gape widely and their tips are hollowed; the movable finger has a larger tooth near the base. The ambulatory legs are densely covered with tomentum, the merus has a small terminal tooth on the upper border. Abdomen of both sexes consists of seven distinct segments.

Material examined:

Many ♂♂, ♀♀, from various stations of Sagami Bay, Izu-Peninsula, Kii Peninsula, Tosa Bay, and Nagasaki.

Measurements: Male from Simoda, length of carapace proper 48 mm., width excluding spines, 42 mm., length of pseudorostral spine 18 mm.

Habitat: Inhabits the rocky bottoms, not far from the shore line.

Distribution: Sagami Bay, Izu Peninsula, Kii Peninsula, Tosa Bay, coasts around Kyûsyû; this species widely ranges in the warmer regions of Indo-Pacific, from Japan to East Africa.

Genus *Acanthophrys* A. M. EDWARDS 1865.

BOUVIER 1906, p. 485; BALSS 1924, p. 29; 1929, p. 19.
Syn.: *Chlorinoides* HASWELL 1879.
Entomonyx MIERS 1884.

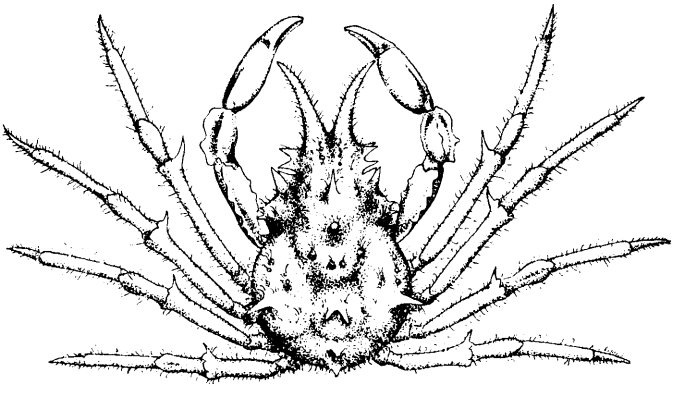
Key to the Japanese species of *Acanthophrys*.

1. There is only one spine on the branchial region. The anterior angle of supraocular eave armed with two spinules. Two spines (one behind the other) on gastric and intestinal regions and also two on cardiac region side by side. .....*A. harmandi.*
2. There are two branchial spines placed near the lateral angle; two gastric and two intestinal spines in the median line.
   i. Anterior angle of supraocular eave armed with two spinules. Cardiac region mounted with two spines side by side. All spines are knobbed at tip.
      a. Pseudorostral spines very long, horizontal and strongly curved outwards. .....*A. longispinus.*
      b. Pseudorostral spines not very long and deflexed, and less markedly divergent, their outer borders subparallel. .....*A. spinosus.*
   ii. Anterior angle of supraocular eave armed with a spinule. Cardiac region mounted with a spine in the middle. .....*A. aculeatus.*
3. There are four branchial spines on the lateral margins. One gastric spine, two cardiac (side by side) and also one intestinal spine. .....*A. brevispinosus.*

1. *Acanthophrys harmandi* BOUVIER.

ROUVIER 1906, p. 484 & p. 487 (in key); PARISI 1915, p. 290, pl. 7, fig. 4. BALSS 1924, p. 29.

The carapace is narrower than in any of the congeners. The gastric region has two very long spines in the median line, in front of the anterior one of which the interorbital region has a pair of longitudinal rows of several flat tubercles, and in rear of the posterior gastric spine is a pair



Text-fig. 42.
Acanthophrys harmandi BOUVIER. ♂ from Misaki, nat. size.

of tubercles side by side on the posterior slope. The cardiac region has two spines side by side, the bases of which are close together. The intestinal region has two spines in the median line; the branchial region has a single epibranchial spine, which is very long.

The pseudorostral spines nearly half the length of the carapace, they are very slender and widely divergent at tip. The supraocular eave has two anterior and one posterior spine. Intercalated spine laminar; postocular spine slant or bifurcate at the outer angle. The hepatic region armed with two lateral and three or four ventral tubercles.

The arm of chelipeds somewhat laterally compressed, its upper and lower borders sharply crested, the crest being armed with several laminar teeth; both borders of wrist and the superior border of palm are also cristate and dentate. The meri of the ambulatory legs have a terminal spine on the anterior border.

Abdomen of both sexes consists of seven distinct segments.

Material examined:

1 ♂, Misaki, M. B. S., coll. by Prof. M. YERI.
2 ♂♂, 2 ♀♀, Wakayama-ken, Mr. S. SAKAGUTI.
2 ♂♂, 1 ♀, Gobo, Kii Peninsula, Mr. K. OKAMOTO.

Measurements: Male, length of carapace 31 mm., width excluding branchial spines 21 mm., length of pseudorostral spine 12.5 mm.

Habitat: Inhabits the bottoms of sandy mud or broken shells, depth 100–180 metres.

Type locality: Japan (loc. unknown) (BOUVIER).

Distribution: Sagami Bay, Kii Peninsula.

2. *Acanthophrys longispinus* (DE HAAN). Pl. XXXI, fig. 2.

Chorinus longispinus DE HAAN, F. J. C., p. 94.
Ch. aculeatus DE HAAN F. J. C., pl. 23, fig. 2. (nec H. M. EDWARDS).
Chlorinoides longispinus, ORTMANN 1893, p. 53; RATHBUN 1911, p. 254.
Acanthophrys longispinus BOUVIER 1906, p. 488; BALSS 1924, p. 29 (list of lit. and syn.); SAKAI 1934, p. 295; 1936, p. 101, pl. 26, fig. 1 (coloured).

The dorsal surface of carapace uneven and covered everywhere with curled hairs, armed with long knobbed spines in regular arrangement, viz. the gastric region with two in the median line, cardiac region with two side by side with their bases united, intestinal region with two in the median line, branchial region with two near the lateral angle.

The pseudorostral spines are less than one third the length of the carapace and are much widely divergent and curved outward, their tips being knobbed. The supraocular eave has two anterior and one posterior spine; the intercalated spine thin and very acuminate; the postocular tooth has an accessory lobule on the outer border near the tip so that it

appears as bifid. The hepatic region has usually two lateral and three or four ventral tubercles. Basal segment of antenna is armed with a proximal tooth on the outer border and with two strong terminal teeth.

The arm of chelipeds is sharply crested on the upper and lower borders, the crest being divided into four to five laminar denticles; wrist with its upper and outer borders cristate; palm also with its upper and lower edges strongly cristate, the former being dentate near the proximal end. Ambulatory legs are densely covered with hairs, which help the animal to attach various sea weeds or sponges for the purpose of protection. The merus is armed with a terminal spine, which is knobbed as usual.

Material examined:

1 ♂, 1 ♀, coast of Kamakura, the Kanagawa-ken Normal School.
3 ♂♂, 5 ♀♀, Manazuru, Hukuura, Oct. 1932.
Many ♂♂, ♀♀, in the vicinity of Simoda.
2 ♂♂, 2 ♀♀, Seto M. B. L., Prof. Yô. OKADA and Mr. SHIINO.
1 ♂, 2 ♀♀, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 33 mm., width 23 mm., length of pseudorostral spine 12 mm.

Habitat: Inhabits the rocky bottoms, depth 10–30 metres.

Type locality: Japan (DE HAAN).

Distribution: Japan, various localities, from Tokyo Bay to Kyûsyû. Foreign localities are: Ceylon, Andaman, coast of Madras, Providence, Queensland.

3. *Acanthophrys spinosus* (MIERS). Pl. XXXI, fig. 3.

Entomonyx spinosus MIERS 1884, p. 526, pl. 47, fig. B.
Macrocoeloma nummifer ALCOCK 1895, p. 255, pl. 4, fig. 4; Illus. Invest. Crust. pl. 21, figs. 3, 4; BORRADAILE 1903, p. 689; RATHBUN 1911, p. 255.
Acanthophrys spinosus BALSS 1929, p. 20; SAKAI 1936, p. 102, pl. 26, fig. 2 (coloured).

The carapace is more uneven than in the former species, and is covered with minute granules and curled hairs. The gastric region is armed with two knobbed spines in the median line, cardiac region with two side by side; intestinal region with two in the median line, of which the anterior one is very small; the branchial region has two spines at the same position as in the former species.

The pseudorostral spines are acuminate, less markedly divergent and somewhat deflexed; the median sinus is V-shaped but outer borders of the spines are subparallel. The supraocular eaves are laterally produced to form a tubular orbit, they are armed with two anterior and one posterior

spines. Hepatic region has three lateral and two or three ventral tubercles. Basal segment of antenna very broad and its outer border expanded, with two terminal spines, one ventral and the other lateral, and with one proximal tooth as in *A. longispinus*.

Chelipeds are thickly granulated but each segment is not at all cristate, arm with six or seven tubercles on the upper border and five or six tubercles on the inferior border; wrist with a tubercle on the upper surface near the base; fingers gape at base, the movable finger having a strong tooth not far from the base. Ambulatory legs are thickly covered with curled hairs, merus having a terminal spine on the anterior border.

Material examined:

2 ♂♂, between Ito and Hatusima, "Misago", June 1934.
1 ♂, Mituisi, off Manazuru, "Misago", June 1934.

Measurements: Length of carapace 22 mm., width without spines 17.5 mm., length of pseudorostral spine 5.5 mm.

Habitat: Inhabits the bottoms of sandy-mud or broken shells, 60 to 100 metres deep.

Type locality: Providence Reef (MIERS).

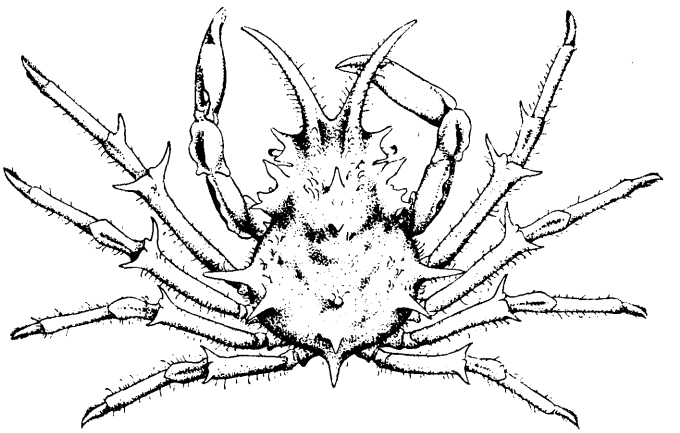
Distribution: Japan, Sagami Bay (SAKAI), Andaman Sea, Ceylon (ALCOCK), Providence Reef, Providence Is. (MIERS), Maldive, Laccadive (BORRADAILE), Amirante, Saya de Malha, Seychellen (RATHBUN), between Dampier Is. and north-west of Australia (BALSS).

4. *Acanthophrys aculeatus* (H. M. EDWARDS).

Chorinus aculeatus H. M. EDW. 1834, H. N. C., I, p. 316; ADAMS & WHITE, 'Samarang' Crust, p. 13. (Not *Acanthophys aculeatus* A. M. EDWARDS 1865).
Paramithrax (*Chlorinoides*) *aculeatus* var. *armatus*, MIERS 1884, p. 193, pl. 17, fig. A.
Chlorinoides aculeatus, HENDERSON, 1893, p. 345.
Paramithrax (*Chlorinoides*) *aculeatus* ALCOCK 1895, p. 241.
Acanhophrys aculeatus BOUVIER 1906, p. 488; BALSS 1934, p. 126.

A large species. There are four long acuminate spines in the median line of the carapace, two being gastric, one cardiac and one intestinal. The branchial region has two very long spines near the lateral angle. The true rostral spine vertical and not very prominent; the pseudorostral spines a little more than half of the length of carapace, they are widely divergent and strongly curved outwards. The supraocular eave has a long knobbed spine at the anterior angle and a short laminar tooth at the posterior angle. The intercalated spine flattish and acuminate at tip. The postocular tooth very broad and laminar, its tip being produced into a knobbed spine.

The hepatic region has a row of four erect tubercles, the two posterior being placed near the external angle and the others ventral. The pterygostomian region is armed with a sharp cristate ridge and its posterior angle produced into a spine. The basal segment of antenna very broad, armed with two terminal spines, one ventral and the other lateral.



Text-fig. 43.

Acanthophrys aculeatus (H. M. EDWARDS), ♂ from Kii Peninsula. (×4/5.)

Arm of chelipeds has upper and lower borders strongly cristate, the crest being wavy by four or five laminar teeth; wrist is cristate on outer border and indistinctly so on the inner and superior borders. The palm is smooth and its superior and inferior borders basally critate; fingers not much gaping and the cutting edges minutely denticulated. Ambulatory legs are covered with curled hairs, merus with two obtuse terminal spines, carpus of the first pair has also a similar spine on the inner border, otherwise each segment is unarmed.

Material examined:

2 ♂♂, Seto M. B. L., Mr. F. HIRO.
3 ♂♂, 2 ♀♀, coast of Wakayama, Mr. S. SAKAGUTI.
1 ♂, coast of Miyazaki, Mr. S. NAKAZIMA.

Measurements: Male from Wakayama, length of carapace 47 mm., width without spines 35 mm., length of pseudorostral spine 23 mm.

Habitat: Rocky, weedy bottoms, 50 to 100 metres deep.

Distribution: Zusi in Sagami Bay (BALSS), Kii peninsula, coast of Miyazaki-ken (present paper). This species widely ranges over the warmer regions in Indo-Pacific, from Japan to India and to north-east and north-west of Australia.

5. *Acanthophrys brevispinosus* (YOKOYA).

Chlorinoides brevispinosa YOKOYA 1933, p. 159, text-fig. 58.

This species may easily be distinguished from its congeners in having only one spinule each on gastric and intestinal region and a pair of spinules on the cardiac region. The postocular tooth and the hepatic lobe are very broad, the former slant on outer border, the latter bifid at tip; there are four acuminate marginal spines belonging to the branchial region. No specimen of this species is comprised in our collections.

Distribution: Near Tanabe, Wakayama-ken and east of Tanegasima (YOKOYA).

7. Subfam. MITHRACINAE BALSS.

BALSS 1929, pp. 16, 20.

Mithracinae differs from Majinae in having more complete orbits, that is, the arched supraocular eave, intercalated spine and postocular tooth are in close contact with one another and form the roof of the orbits, while the basal segment of antenna is very broad and forms the floor of the orbit. Pseudorostrum often vertically deflexed.

Micippa is the only Japanese genus known of this subfamily.

Genus *Micippa* LEACH 1817.

ALCOCK 1895, p. 248; KLUNZINGER 1906, p. 36.

Five species of this genus are now known from Japanese waters, two of which being newly added to the fauna of Japan.

Key to the Japanese species of *Micippa*.

A. Dorsal surface of carapace armed with acuminate spines. Pseudorostrum divided into two lobes by the median sinus.
   1. Pseudorostral lobes armed with five or four teeth on the outer border. Dorsal surface of carapace armed with about 20 spines in all. ..... *M. cristata granulipes.*
   2. Pseudorostrum not armed on outer margins, ending in two sharp outwardly curved spines. Carapace with two spines in the median line and one in the middle of each branchial region. ..... *M. thalia.*

B. Dorsal surface of carapace unarmed. Pseudorostrum very broad and divided into four lobes, two median being directed downward and the outer ones curved outward.
   1. Basal segment of antenna granulated and dilated, broadened anteriorly as well as ventrally. Antero-lateral border with four to six knobbed spinules. ..... *M. philyra.*

2. Basal segment of antenna flattish and smooth, having two antero-external spines. Antero-lateral borders are armed with about 10 spines, of which the last two or three are acuminate. ..... *M. platipes.*
3. There are three large pearl-like tubercles on the posterior border of carapace. Merue of ambulatory legs strongly foliaceous. *M. margaritifera.*

1. *Micippa cristata granulipes* ZEHNTNER.

ZEHNTNER 1894, p. 139, pl. 7, figs. 3, a, b; SAKAI 1932, p. 51, text-fig. 6; 1936a, p. 160; 1936, p. 105, text-fig. 49.

The dorsal surface of carapace thickly covered with granules and scattered with acuminate spines, i.e., four on gastric region, three of which are in transverse line in front of the median posterior one; two side by side on interorbital region; two side by side on cardiac region, and lastly three on intestinal region, one in front of the other two. The supra-ocular eaves are anteriorly armed with two spines and posteriorly with a spine. Intercalated spine is basally fused with the postocular spine, the latter has another accessory spine on the posterior slope. On the lateral margins are eight sharp spines, three of which belong to the hepatic margin and the others to the branchial margin, the last one deviating to the dorsal surface. There are also two long and two short spines on the dorsal surface of the branchial region.

The pseudorostral spines are vertically deflexed, it is bilobed at tip, each lobe being serrated into four or five teeth on the outer border. The basal segment of antenna sparingly granulated, its antero-external angle being extremely produced. The arm, wrist and palm of chelipeds are studded with vesiculous granules; fingers widely gaping near the base and their distal half of the cutting edges finely denticulated. Each segment of ambulatory legs is cylindrical, the carpus alone being longitudinally channeled on the upper surface.

Material examined:

1 ♂, Saisyû-tô, Hakuhomaru of the Imperial Fisheries' Exper. St. Tokyo.
1 ♂, 1 ♀, Palao Islands, Mr. F. HIRO of the Seto M. B. L.
1 ♂, 1 ♀, same locality, Mr. K. TAKAHASI of the Tokyo Bunrika Daigaku.

Measurements: ♂, from Saisyû-tô, length of carapace 40 mm., width 34 mm.

Habitat: Unknown.

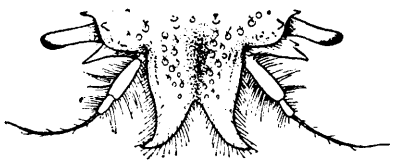
Type locality: Amboina? (ZEHNTNER).

Distribution: Saisyû-tô is the only known locality of this species in Japan; the other known localities are: Palao Isls. and Amboina.

2. *Micippa thalia* (HERBST). Pl. XXXII, fig. 3.

ALCOCK 1895, p. 251 (list of lit. and syn.); KLUNZINGER 1906, p. 39; BALSS 1924, p. 36 (list of recent lit.); 1929, p. 20; SAKAI 1934, p. 298; 1936, p. 104, pl. 28, fig. 2 (coloured).

Carapace behind the orbital region is subquadrate, only slightly broadened posteriorly; the regions are fairly well defined, the hepatic regions being markedly depressed. There are two spines, one behind the other, in the median line of the gastric region. The cardiac region armed with two small spines side by side. The true rostral spine ill-developed; the pseudorostral spines are deflexed downwards at an angle of about 45°, they are fused at the base and divergent at the tip, where they project outwards. A prominent erect spine in the middle of the supraocular eave and a short spine at the posterior angle of the latter but with no preocular spine. Intercalated spine moderately prominent, the postocular spine most prominent with its base broad. Behind the postocular spine are about nine upcurved spines, three of which belong to the hepatic margin and the others to the branchial. In the centre of the mesobranchial region, in almost transverse line with the cardiac spines, is a high dorsal branchial spine. The basal segment of antenna is very broad and laterally dilated, with an antero-external tooth and a small one behind it.



Text-fig. 44.
Micippa thalia (HERBST). Anterior portion of carapace viewed from in front. ×2.

Chelipeds of male are covered with fine granules; the ischium is ventrally convex, the arm is cylindrical and curved, with a distal and a subdistal tooth on the upper border; palm is not much swollen; fingers meet only near the distal end, the cutting edges being finely and uniformly denticulated. The granulation of the chelipeds is not remarkable in the case of the female. The ambulatory legs rapidly decrease in length from 1st to last, the merus is armed with a distal spine on the upper border; the carpus is broadened and longitudinally channeled. All these segments are very densely covered with hairs, especially on anterior and posterior borders.

Material examined:

2 ♂♂, 3 ♀♀, Tateyama Bay, May 1928.
5 ♂♂, 6 ♀♀, between Ito and Hatusima, June 1934, "Misago".
2 ♂♂, 3 ♀♀, Simoda, various stations.
1 ♂, 1 ♀, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
2 ♂♂, 2 ♀♀, Nagasaki, Mr. I. KANEKO.

Measurements: Length of carapace in median line 28 mm., width 25 mm.

Habitat: Inhabits the bottoms of mud, sandy-mud or broken shells. Depth, 20 to 100 metres.

Distribution: Japan, from Tokyo Bay to Kyûsyû; this species widely ranges over the warmer regions in Indo-pacific, from Japan to the Red Sea and the east coast of Africa.

3. *Micippa philyra* (HERBST). Pl. XXXVIII, fig. 6.

A. M. EDWARDS 1872, p. 239, pl. 11, fig. 2; ALCOCK 1895, p. 249 (part); BALSS 1924, p. 36; 1929, p. 20; SAKAI 1934, p. 298; 1936, p. 104, text-fig. 48 (not pl. 28, fig. 1, it is probably *M. platipes*)

As in the former species, the carapace is subquadrate and the hepatic regions very strongly depressed. No spines in the median line of carapace. The pseudorostrum is almost vertically deflexed in both sexes, it is divided into four laminar lobes, the median two are larger and directed downwards and separated by a V-shaped median sinus, while the lateral lobes are curved outwards at the tip.

Text-fig. 45.
Micippa philyra (HERBST). Anterior portion of carapace viewed from in front. ×2.

The supraocular eaves have no spines. The intercalated spine is united with the postocular spine at the base. Behind the postocular spine follows a series of obtuse marginal spinules, of which there are sometimes as many as six, sometimes as few as three, and the one at the lateral angle of the branchial region is deviated to the dorsal surface. On the posterior margin, there are usually two very small teeth side by side. The basal segment of antenna is extremely broad, defining the tubular orbit anteriorly as well as ventrally; it has a terminal and a submedian tooth and its surface is smooth in basal half but covered with granules in distal half.

The first movable segment of antenna is flattened but not ovate in shape, its inner and outer borders being fringed with longish hairs. Chelipeds of male are stout, each segment being indistinctly granulated and the fingers widely gaping near the base; in the female, however, they are slender and smooth. On denudation, each segment of ambulatory legs is subcylindrical; carpus alone being somewhat depressed and longitudinally sulcated above. The merus has an indistinct distal spine on the upper border.

Material examined:

1 ♂, 2 ♀♀, Tateyama Bay, May 1928.
1 ♂, 2 ♀♀, Simoda, in front of the M. B. S.
1 ♂, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 30 mm., width 25 mm.

Habitat: Inhabits the hard beaches, littoral line to 20 metres deep.

Distribution: Tokyo Bay, Sagami Bay, Izu Peninsula, Kii Peninsula, Tosa Bay, Tomo (Bingo), Kagosima, Nagasaki, Loo Choo; this species

also widely ranges over warmer coasts of Indo-Pacific, from Japan to East Africa.

4. *Micippa platipes* RÜPPELL. Pl. XXXII, fig. 2, Pl. XXXVIII, fig. 4.

RÜPPELL 1830, Beschrib. und Abbild. 24 Krabben, p. 8, pl. 1, fig. 4, pl. 6, fig. 4 (not seen).
KLUNZINGER 1906, p. 37 (lit. and syn.).
Syn.: *M. spatulifrons* A. M. EDWARDS 1872.
M. hirtipes DANA 1852.
M. bicarinata AD. & WHITE 1848.
M. philyra var *latifront* RICHTERS 1880.
(These species are, though doubtfully, ranked as synoyms of *M. platipes* by KLUNZINGER).

This species closely resembles *M. philyra,* but the carapace appears somewhat more depressed. The pseudorostrum is deflexed at an angle of about 45°, and is, as in *M. philyra,* divided into four lobes, the median two being directed downwards and the lateral lobes, very acuminate at tip, projected outwards and backwards.

Text-fig. 46.
Micippa platipes RÜPPELL. Anterior portion of carapace viewed from in front. ×3.

The intercalated spine is fused with the post-ocular lobe at the base, the latter being broad and truncate along the lateral border. On the antero-lateral borders, there are eight or nine broad teeth, two or three of which belong to the hepatic margin, and the others to the branchial margin; the posterior two or three are acuminate, the last one being most prominent and placed near the junction of the antero-lateral and postero-lateral borders. The postero-lateral borders are also armed with a few erect tubercles and the posterior border with two tubercles.

Basal segment of antenna is quite smooth, its antero-external prolongation is gently bilobate, only forming the ventral floor of the orbit, not defining the anterior floor as in *M. philyra.* The first movable segment of antenna is very broad and subovate.

The chelipeds are only indistinctly granulated under the lens. The wrist and palm are flecked with dark green colouration. The merus and carpus of ambulatory legs are subprismatic, their upper surface flattish and their anterior and posterior borders densely fringed with hairs. The upper surface of merus of these pairs is canaliculated along the anterior and posterior borders, that of wrist also deeply canaliculated in the median line. The propodus and dactylus are very slender. Last two pairs of legs are slender and not markedly depressed.

Our specimens agree quite well with the figure of *M. spatulifrons* (cf. A. M. EDWARDS 1872) in slenderness of legs and in shape of terminal seg-

ment of male abdomen, which is somewhat differently figured by KLUNZINGER, who identified, although with some doubt, A. M. EDWARDS' species as synonymous with *M. platipes*.

Material examined:

2 ♂♂, 1 ♀, Simoda, obtained from the coast in front of the M. B. S.
1 ♂, 2 ♀♀, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 20 mm., width 16 mm.

Habitat: Same as that of *M. philyra*.

Distribution: Simoda, Kii Peninsula, Nagasaki; this species shows almost the same distribution as *M. philyra*.

5. *Micippa margaritifera* HENDERSON. Pl. XXXII, fig. 1.

HENDERSON 1893, p. 348, pl. 36, figs. 5–7; ALCOCK 1895. p. 253.

The dorsal surface of carapace extremely uneven, the protogastric and epibranchial regions being somewhat convex and nodular and the hepatic regions strongly depressed as usual. No spines in the median line of the carapace. The antero-lateral borders are coarsely granulated but not armed with spines as in its congeners excepting the two spines near the lateral angle of the branchial region (in Indian species, there is also another dorsal branchial spine). On the posterior border are three smooth pearl-like globules, which are characteristic of this species.

The pseudorostral spines are long and almost vertically deflexed, their tips indistinctly four-lobed, of which the median two are obtuse and directed downwards, while the outer ones are projected outwards. The basal segment of antenna much resembles that of *M. philyra*. Chelipeds are very slender and unarmed; the merus of the ambulatory legs is strongly depressed and foliaceous, having a terminal tooth on the posterior border.

Material examined: 1 ♂, harbour of Simoda. Oct. 1936, "Misago".

Measurements: Length of carapace 10.5 mm., width exclusive of lateral spines 8.5 mm.

Habitat: Inhabits the shelly ground, 10–20 metres deep.

Type locality: Gulf of Martaban (HENDERSON).

Distribution: Simoda (present paper), Gulf of Martaban (HENDERSON), Andaman Sea, Ceylon, Maldive Isls. (ALCOCK).

The record of its occurrence in Japan is new!

8. Subfam. MACROCOELOMINAE BALSS.

BALSS 1929, pp. 16, 20.

This subfamily is related to Hyasteniinae in having no intercalated spine. The orbits are quite complete and sometimes tubular, being formed by arched supraocular eave, postocular cup, and broad basal segment of antenna. Pseudorostrum very often ventrally deflexed.

Key to the Japanese genera of Macrocoelominae.

I. Orbits are deep, tubular, somewhat projecting beyond the general outline of the carapace. Pseudorostral spines slender, continuous and are weakly deflexed.
   1. Carapace anteriorly narrowed, interorbital width being less than half the branchial width. ..... *Tiarinia*
   2. Carapace not noticeably narrowed anteriorly, the interorbital width being more than half the branchial width. ..... *Leptopisa.*

II. Orbits are shallow and not projecting beyond the general outline of the carapace. The carapace and pseudorostrum subcylindrical, the latter being beak-shaped. .. .. *Xenocarcinus.*

Genus *Tiarinia* DANA 1852.

ALCOCK 1895, p. 256.

Key to the Japanese species of *Tiarinia*.

I. Pseudorostral spines not armed with accessory spines on the outer border.
   1. Dorsal surface of carapace covered with distant tubercles of various sizes.
      i. The tubercles found on the carapace and thoracic appendages are obtuse, preocular spine also very obtuse. Anterior male pleopod as shown in text-fig. 47. ..... *T. cornigera.*
      ii. The tubercles are sharply pointed, especially so in large branchial ones. Preocular spine long and acuminate. Anterior male pleopod as shown in text-fig. 48 b. ..... *T. spinigera.*
   2. Carapace depressed, not markedly tuberculated or if tuberculated, the tubercles are depressed and confluent. Ambulatory legs are thickly fringed with hairs.
      i. Carapace covered with confluent tubercles. Anterior male pleopod as shown in text-fig. 49 b. ..... *T. depressa.*
      ii. A prominent epibranchial spine at the lateral angle of branchial region, otherwise the carapace almost smooth to the naked eye, but unevenly tuberculated under the lens. ..... *T. tiarata.*

II. Pseudorostral spines armed with two or three accessory spinules on the outer border. Carapace covered with numerous coarse tubercles. ..... *T. angusta.*

1. *Tiarinia cornigera* LATREILLE. Pl. XXXII, fig. 4.

ALCOCK 1895, p. 256 (syn. and lit.); STIMPSON 1907, p. 12, pl. 3, fig. 1; BALSS 1924, p. 37 (part.); SAKAI 1936, p. 106, pl. 28, fig. 3 (coloured).

The carapace typically pyriform, the regions are well defined by deepish grooves; the entire dorsal surface is closely covered with granules and tubercles of various sizes, of which nine gastric, three cardiac, and one intestinal are somewhat larger. Of the branchial tubercles, three along the lateral margin, two on mesobranchial and one on metabranchial region are larger and somewhat erect. The pseudorostral spines are obliquely deflexed and in closest contact throughout their whole length, the tips only being slightly divergent. The preocular spine is very prominent and erect, although it is not at all acuminate. The orbits are tubular and laterally projecting beyond the general outline of the carapace. The curved supraocular eave, the prominent postocular cup and the dilated outer border of the basal segment of antenna are in close contact with one another and circumscribe the eye-peduncle.

Text-fig. 47.
Tiarinia cornigera LATREILLE.
Anterior pleopod of male. ×13.

The movable peduncular segments of antenna are flattish and fringed with long hairs on both sides; the following flagellum very small. There are two or three pterygostomian tubercles, which are very prominent. The antero-external angle of the external maxillipeds is noticeably expanded.

Chelipeds of male are very stout; arm and wrist are covered with tubercles, while the palm is smooth and glabrous and is slightly inflated on the inner surface, its upper and lower borders being rounded. Fingers gape widely at base, only their distal one fourth being in contact with each other. The fingers of male gape widely at the base, the movable finger is armed with a stout tooth near the base. The merus of the ambulatory legs is tuberculated, the tubercles being mainly arranged along the anterior and posterior borders; carpus is compressed and distally broadened and dorsally channelled, its outer and inner borders tuberculated. Dactylus is sensibly curved at tip.

Abdomen of both sexes consists of seven distinct segments.

Material examined:

3 ♂♂, 2 ♀♀, Tateyama, Bay, May 1928, SAKAI.
1 ♂, 1 ♀, Misaki, June 1928, SAKAI.
Many ♂♂, and ♀♀, various stations on the coasts of Simoda.
2 ♂♂, 1 ♀, Seto M. B. L., Mr. F. HIRO.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

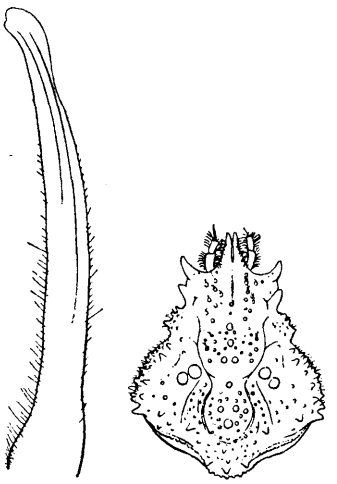
Measurements: Male from Simoda, length of carapace proper 34.2 mm., width 34 mm., length of pseudorostral spine 8 mm.

Habitat: Inhabits the rocky beaches; usually masked with various kinds of sea weeds.

Distribution: Commonly ranges from Bôsyû (Chiba-ken) southwards to Loo Choo; widely distributed on warmer coasts of Indo-Pacific.

2. *Tiarinia spinigera* STIMPSON. Pl. XXXVIII, fig. 5.

STIMPSON (1857) p. 217; 1907, p. 13, pl. 3, fig. 2; RATHBUN 1892, p. 277, pl. 11, fig. 2; BALSS 1924, p. 36 (no new record).



Text-fig. 48.
Tiarinia spinigera STIMPSON.
a. Do sal aspect of carapace.
b. Anterior male pleopod.
(a×1·3; b×12.)

The only points of difference between this species and *T. cornigera* are:

(1) The tubercles found on the dorsal surface of carapace are much smaller and sharper; of which, the three branchial tubercles placed on the metabranchial region along the postero-lateral margin, and also three found along the posterior border of carapace are conspicuously erect and spiniform, distinctly larger than the other tubercles.

(2) The pseudorostral spines are less markedly deflexed and the preocular spine larger and acuminate, projecting upwards and outwards, the postocular cup is also slenderer than those of *T. cornigera*.

(3) The telson of male abdomen is much longer than wide, while in *T. cornigera*, it is as long as wide. The first pleopod of male is as figured in text-fig. 48 b.

Material examined:

1 ♂, Wakayama-ken, Mr. S. SAKAGUTI.
1 ♂, 3 ♀♀, Okinosima, Tosa, Prof. T. KAMOHARA.

Measurements: Male from Tosa Bay, length of carapace measured from the base of the pseudorostrum, 21 mm., width of same 18 mm., length of pseudorostrum 5 mm.

Habitat: Inhabits the coral reef, above low water mark.

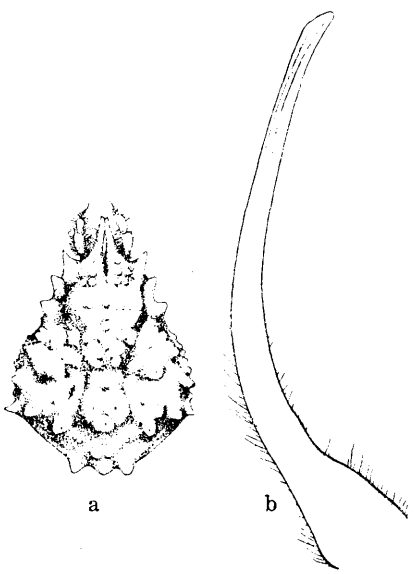
Type locality: Ohsima (or Tanegasima) (STIMPSON).

Distribution: Kii Peninsula, Tosa Bay, and above localities.

3. *Tiarinia depressa* STIMPSON.

STIMPSON 1857, p. 217; RATHBUN 1892, p. 276, pl. 11, fig. 1; STIMPSON 1907, p. 12, pl. 3, fig. 2.

Carapace markedly depressed and flattish, the tubercles found on the dorsal surface are also depressed and confluent, never erect as in the former two species, so that only the larger tubercles are perceptible. The branchial margin has about five rather prominent and flat tubercles, distributed along the antero-lateral and postero-lateral borders; at the junction of both borders is another small acuminate tooth. Along the postero-lateral borders, the submarginal surface is deeply channelled; the posterior border is armed with three obtuse teeth, of which the median one is very broad and the lateral ones more prominent.



Text-fig. 49.
Tiarinia depressa STIMPSON.
a. Dorsal aspect of carapace.
b. Anterior male pleopod.
(a×1·3; b×12.)

The pseudorostral spines are less markedly deflexed when compared with those of *T. cornigera*; the preocular tooth is also considerably pointed but the postocular cup is broader and subtruncate at tip. The pterygostomian regions and also the lateral surface of the branchial regions are covered with well-marked tubercles.

Chelipeds are like those of *T. cornigera*; the ambulatory legs are pronouncedly compressed and are fringed with hairs along the anterior and posterior borders. The merus is indistinctly tuberculated along the anterior and posterior borders, these tubercles are more remarkable in the first or first two pairs.

The terminal segment of male abdomen is distinctly shorter than its width.

Material examined:

2 ♂♂, Kawana-gun, Kagosima, Mr. MANKICHI HARADA.

Measurements: Male, length of carapace measured from the base of the pseudorostrum 25 mm., width 20.5 mm.

Habitat: Hard beaches, littoral.

Type locality: Ohsima (STIMPSON).

Distribution: Coast of Kagosima, Ohsima and Loo Choo.

4. *Tiarinia tiarata* (ADAMS & WHITE). Pl. XXXVIII, fig. 7.

Pericera tiarata ADAMS & WHITE 1848, 'Samarang' Crust. p. 17.
Tiarinia tiarata BALSS 1929, p. 20, text-fig. 9.

The carapace is depressed as in *T. depressa*; the dorsal surface is almost smooth to the naked eye but unevenly tuberculated under the lens. The gastric and cardiac regions are markedly convex, the former being rounded and indistinctly trituberculated. The hepatic regions of our specimen is scarcely tuberculated; the branchial regions are uneven and has three rather distinct tubercles along the antero-lateral borders and a long, acuminate spine at the lateral angle. One intestinal tubercle, and one on either side of the posterior border; these tubercles are erect and furnished with several hairs. The pseudorostral spines are deflexed; the preocular spine is acuminate and predominant in size, the postocular cup is not very broad and its tip subtruncate.

Chelipeds are similar to those of the former species. The ambulatory legs are sensibly compressed; the anterior and posterior borders are thickly fringed with longish hairs and the upper surface with a longitudinal row of curled hairs. The terminal segment of male abdomen very narrow and long, resembling that of *T. spinigera*.

Material examined:

2 ♂♂, 2 ♀♀, Tosa Okinosima, Prof. T. KAMOHARA.

Measurements: Male, length of carapace excluding pseudorostral spine, 11 mm., width 9.2 mm., length of pseudorostral spine 3.6 mm.

Habitat: Inhabits the rocky shore or reef, not far from the shore line.

Type locality: Philippine (ADAMS & WHITE).

Distribution: Hitherto known only from Philippine, New Guinea (BALSS) and above locality. This is the first record of occurrence of this species in Japanese waters!

5. *Tiarinia angusta* DANA.

DANA 1852, p. 113, pl. 3, fig. 7; CALMAN 1900, p. 41; DE MAN 1895, p. 491, fig. 2; 1902, p. 676, SCHENKEL 1902, p. 574; BALSS 1929, p. 21 (lit.); GORDON 1934, p. 69; SAKAI 1936a, p. 160, text-fig. 4; MIYAKE 1936, p. 511.

This species was figured in my previous paper dealing with the Brachyura from Palao Isls., so that the description and figure are here purposely omitted.

Distribution: Yaeyama (Miyake), Palao, Philippine, Celebes, Amboina, Sulu Sea, Ternate, Torres Str., Murray Isls., Banda Neira.

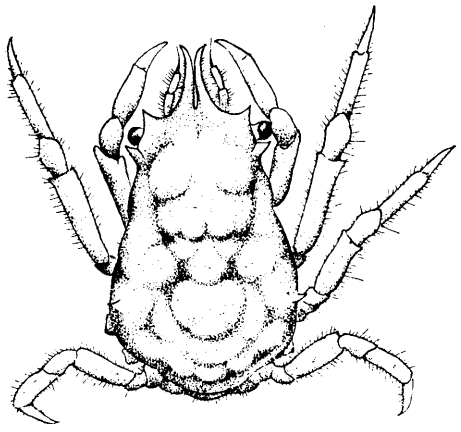
Genus *Leptopisa* STIMPSON 1871.

RATHBUN 1925, p. 375.

This genus has been represented only by one species, *L. setirostris* (STIMPSON), which ranges in Florida Keys, from Miani, west Indies to northern Brazil. The discovery of the following new species is the first record of occurrence of this genus in Indo-Pacific waters.

Leptopisa nipponensis sp. nov.

The carapace oblong, the regions faintly defined and indistinctly tuberculated. There is no spine on the dorsal surface of the carapace besides a small lateral spinule on either branchial region. The pseudorostral horns are deflexed and projecting from a lower level; they are almost continuous but leave a narrow median interspace near the base, their tips being divergent. The supraocular eave laterally dilated and the preocular spine well defined, the postocular cup also produced into a spine at tip but the upper orbital sinus entirely closed.



Text-fig. 50.
Leptopisa nipponensis sp. nov. Dorsal aspect of female holotype. ×3·5.

The basal segment of antenna very broad and laterally expanded, the antero-external angle being produced into a spine. The infraorbital lobe is rudimentary and is placed at the outer side of the green gland. The pterygostomian ridge has a curved row of two or three tubercles. The merus of the external maxillipeds is much broader than the ischium, and its antero-external angle extremely produced.

Chelipeds of the femal not stouter than the ambulatory legs, each segment being unarmed and covered with short hairs; the fingers are about half the length of the palm and do not gape.

The ambulatory legs are also unarmed and covered with hairs, the first pair is very slightly longer than the other pairs, which are not much unequal in length.

Abdomen of female distinctly seven-segmented.

Material examined: 1 ♀, holotype, coast of Wakayama, Mr. S. SAKAGUTI.

Measurements: Length of carapace excluding pseudorostral spine

10.5 mm., width 7.2 mm., length of pseudorostral spine 2.5 mm., length of cheliped 10 mm., length of first ambulatory leg 12 mm.

Habitat: Unknown.

Genus *Xenocarcinus* WHITE.

ALCOCK 1895, p. 191; GORDON 1934, p. 69.
Syn.: *Hucnioides* A. M. EDWARDS 1865.

Besides the three species to be described below, *X. depressus* MIERS, which is a commensal of *Melitodes*, was reported by me from Palao Islands (cf. SAKAI 1936a, p. 160).

As regards the structure of the orbit, *X. tuberculatus* has no intercalated lobe between the supraocular eave and the postocular cup, *X. depressus* has also no intercalated lobe but the postocular cup is obviously marked with a shallow notch (no mention was made on this point by GORDON (1934, loc. cit.) who figured the dorsal and profile view of this species); on the other hand, *X. nakazawai* mihi and *X. monoceros* mihi are provided with a distinct intercalated lobe. Thus, the genus *Xenocarcinus* is naturally divided into two groups on account of the presence or absence of the intercalated lobe, which, however, are connected by the intermediate form, *X. depressus*.

Key to the Japanese species of *Xenocarcinus*.

I. No intercalated lobe between supraocular eave and postocular cup. Carapace uneven and pronouncedly tuberculated, pseudorostrum bifid at tip. Ambulatory legs smooth and not tuberculated, dactylus armed with numerous denticles along the inner border. ..... *X. tuberculatus.*

II. Intercalated lobe almost completely fused with the postocular cup, the former only slightly indicated by a notch. Carapace depressed and the pseudorostrum deeply bifid and markedly deflexed. ..... *X. depressus.**

III. A distinct intercalated lobe between supraocular eave and postocular cup. Dorsal surface of carapace not remarkably tuberculated.
  1. Pseudorostrum bifid at tip. Carapace almost smooth excepting a few depressed tubercles. ..... *X. nakazawai* sp. n.
  2. Pseudorostrum ending into a pointed median style; dorsal surface of carapace with low indistict tubercles in regular arrangement. .... *X. monoceros* sp. n.

1. *Xenocarcinus tuberculatus* WHITE.

WHITE 1847, (P. Z. S.) p. 119; MIERS, Zool. "Erebus" and 'Terror' Crust. p. 1, pl. 2, fig. 1, le (not seen); HASWELL 1882, p. 8; SAKAI 1935, p. 71, text-fig. 5 (not all literature); GORDON 1935 text-fig. 37, b, c (p. 72); MIYAKE 1936, p. 511.

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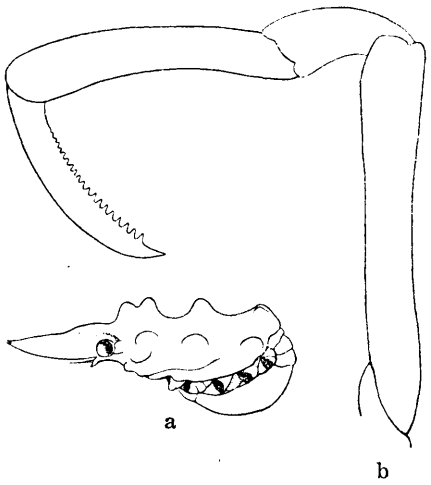
* MIERS 1874, p. 1; GORDON 1934, p. 70, text-fig. 36 (references); SAKAI 1936a. p. 160.



Text-fig. 51.
Xenocarcinus tuberculatus MIERS.
a. Profile view of carapace of ♀ from Aziro.
b. 1st ambulatory leg.
(a×1·4; b×17.)

This species was reported by me in the second volume of the Science Reports of the Tokyo Bunrika Daigaku, so that the descriptions are purposely omitted here; I will only give here a figure of carapace in profile view, and also of 1st ambulatory leg.

Material examined:

1 ♀, Aziro Primary School.

Measurements: Length of carapace 25 mm., width 11 mm.

Type locality: ?

Distribution: Aziro, Izu Peninsula (SAKAI), Yaeyama (MIYAKE), Hong Kong (HERKLOTS-GORDON); Cumberland Group (HASWELL).

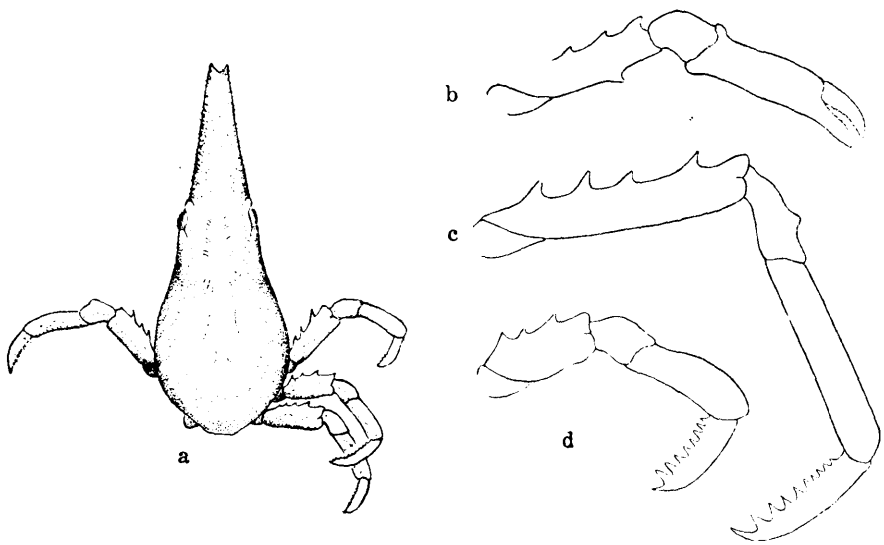
2. *Xenocarcinus nakazawai** sp. nov.

This curious crab, which I referred to a new species, was collected by Mr. F. HIRO of the Seto M. B. L., at Tanabe Bay as a commensal of *Antipathes japonica*. It is apparently related to *X. conicus* (A. M. EDWARDS 1865) but differs in having the merus of thoracic legs spinous and the pseudorostrum not so slender; it also resembles *X. tuberculatus alcocki* LAURIE 1906 but that species has a shorter legs and a characteristic projection on either side of the carapace just behind the orbit.

The carapace elongate oval and its dorsal surface somewhat depressed; the regions are not at all defined, median gastric and branchial regions are faintly inflated, the former with curled hairs on either side but without any tubercles contrary to the two related species aforementioned, the latter with an indistinct tubercle at the junction of the antero-lateral and postero-lateral borders. The cardiac region flat, without any tubercle at all (in A. M. EDWARDS' species, it seems to be mounted with two tubercles side by side). The posterior border is subtruncate, having an indistinct tubercle on either lateral angle.

The pseudorostrum is very long and beak-shaped, somewhat depressed and thickly covered with fine tomentum, its tip being bifurcated. The

* In "Figuraro de Japanai Bestoj" or Nippon Dobutsu Zukan edited in 1922, Dr. K. NAKAZAWA figured this species under the false name of *Huenia symplex* DANA, which he described as an inhabitant of Pacific side of Japan. His figure is not at all accurate but at any rate it is the first example of this species.



Text-fig. 52.

Xenocarcinus nakazawai sp. nov.

a. Dorsal aspect of ♀ holotype from Seto M. B. L.
b. Cheliped.
c. First ambulatory leg.
d. Fourth ambulatory leg.
(a×4·8; b–d×11.)

orbits are rounded, not very deep, eyes large; the intercalated lobe distinct. The basal segment of antenna is narrowed at tip and its antero-external angle armed with an indistinct tooth; the flagellum is very slender and short. The ridge of the pterygostomian region is armed with three tubercles. The merus of the external maxillipeds is produced at the antero-external angle; the exognath being broad and narrowed at tip.

Chelipeds are not stouter and longer than any of the ambulatory legs; the arm is armed with three spines on the anterior border, with one spinule on the posterior border near the distal end, wrist and palm unarmed and not much depressed; fingers not gaping, their prehensile edges indistinctly denticulated. First pair of legs is somewhat longer than the total length of carapace and rostrum; the merus is armed with four acuminate teeth placed along the superior border; carpus has an obtuse tooth in the middle of the superior border; the dactylus is slightly curved and its inner border has nine sharp teeth, of which three or four distal ones are especially larger. In other three pairs of legs, the merus has three more or less distinct teeth (in A. M. EDWARDS' species, the merus of these pairs seems to be unarmed); the teeth of the dactylus are eight in number and the distal three or four are prominent. (According to GORDON 1935, who examined the cotype of A. M. EDWARDS' species, the distal one or two teeth only are prominent in the dactylus of that species.).

Abdomen of female has the first and last segments freely movable, the second to sixth being fused together, although the suture line between 2nd and 3rd segments is distinct.

Material examined:

1 ♀, holotype, Seto M.B.L. (Tanabe Bay, Aug. 26th, 1928), Mr. F. HIRO.

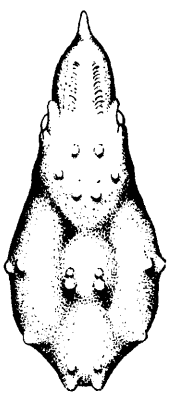
Measurements: Total length of carapace and rostrum 10 mm., width 4.5 mm.

Habitat: Attached to *Antipathes japonica*, depth unknown.

3. *Xenocarcinus monoceros* sp. nov.

A fragmentary specimen, the thoracic legs and abdomen being missing, but clearly different from any of its congeners, so that I regard it as new to science.

The general outline of carapace resembles that of *X. nakazawai*, but the tuberculation on the dorsal surface is more remarkable:—the gastric region markedly convex and mounted with six vestigeous granules, which are covered with hairs; the cardiac region is mounted with a pair of tubercles, each of which is again divided into two or three indistinct tubercles; the posterior margin of carapace is armed with two similar prominent tubercles one on either side; the hepatic region unarmed; the branchial region with two transversely approximated tubercles near the middle of the lateral border, the outer one being somewhat larger and projecting beyond the outline of the carapace; the postero-lateral border has an indistinct tubercle in the middle.



Text-fig. 53.
Xenocarcinus monoceros sp. nov. Dorsal view of carapace of holotype. ×3.

The pseudorostrum is beak-shaped, its proximal portion is much thicker and stouter than in any other species of this genus, but its distal portion rapidly tapers and forms a slender median style, which projects from a lower plane and is, unlike that of the other species, not at all bifurcated. As in the other species, the entire surface of pseudorostrum is covered with curled hairs.

The intercalated lobe, which occurs between the supraocular eave and the postocular cup, is well defined.

Material examined: Holotype, (probably male), abdomen and thoracic legs are missing, coll. by Mr. RYÔJIRÔ SAITO at Misaki; habitat unknown.

Measurements: Entire length of carapace including pseudorostrum 19 mm., width 8 mm.

Family PARTHENOPIDAE ALCOCK 1895.

ALCOCK 1895, p. 257; RATHBUN 1925, p. 510; FLIPSE 1930, pp. 11–28.

Carapace usually triangular or pentagonal, eyes are usually retractile within small, circular, well-defined orbits. Antenna small, imbedded between the inner angle of the orbit and the antennulary fossa, basal segment neither fused with the epistome nor with the front. Chelipeds not freely movable, usually much larger and stouter than the ambulatory legs. Male genital openings coxal. No hooked hairs.

Key to the Japanese subfamilies, genera and subgenera of Parthenopidae.

I. Subfamily **Parthenopinae:**

Carapace subpentagonal, ovate-pentagonal, equilaterally triangular or sometimes semicircular or semi-elliptical in outline; the dorsal surface exceedingly uneven and covered with tubercles of various sizes, the gastric and cardiac regions are usually deeply trenched from the branchial regions. Chelipeds monstrous in size, ambulatory legs slender.

A. Lateral margins of carapace not expanded.
   1. Carapace and chelipeds covered with tubercles of various sizes but not with hairs.
      i. Basal segment of antenna very short, not reaching the inner canthus of the orbit; fingers of chelipeds strongly incurved. ..... *Lambrus.*
         a. Carapace tuberculated, ovate-pentagonal. Rostrum not strongly projecting, buccal cavern anteriorly narrowed. ..... subgen. *Lambrus.*
         b. Carapace carinated or tuberculated, broadly triangular, with rounded sides and projecting rostrum but with no postocular constriction. ..... Subgen. *Platylambrus.*
         c. Carapace granulated and spiny, usually as long as broad, with projecting rostrum and very distinct postocular constriction. ..... Subgen. *Rhinolambrus.*
         d. Carapace granulated, broader than long; the postero-lateral angles produced into a large blade-like spine. Pterygostomian region deeply channelled, the channel being closed below by thick fringes of hairs. ..... Subgen. *Aulacolambrus.*
         e. Carapace almost semi-circular in outline, with the postero-lateral angles produced and the posterior border straight. No postocular constriction but a fairly distinct post-hepatic constriction. Chelipeds are short for this genus. ..... Subgen. *Pseudolambrus.*
      ii. Carapace rough, tuberculated and spiny, basal segment of antenna long and nearly but not completely reaching the inner canthus of the orbit; fingers of chelipeds slightly curved. ..... *Parthenope.*

iii. Near *Platylambrus*. Carapace not markedly tuberculated; basal segment of antenna long and entirely reaching the orbital hiatus, broadly in contact with the front. .....*Tutankhamen.*

2. Carapace covered with asteroidal granules, disposed symmetrically with eroded grooves. Rostrum tridentate, junction between antero-lateral and postero-lateral borders produced and armed with teeth. Basal segment of antenna very short and not reaching the inner canthus of the orbital hiatus. ....*Asterolambrus*. g. n.

3. Entire animal thickly covered with woolly hairs so that the surface and outline of body and appendages are not visible in natural condition. Chelipeds not much longer than the carapace, legs unarmed and stout for this family. Rostrum bilobate. .....*Zalasius.*

B. Lateral margins of carapace more or less expanded to form a vault, below which the ambulatory legs are concealed.

1. Carapace transversely oval, laterally expanded and its margins somewhat upturned. .....*Oethra.*

2. Carapace triangular or pentagonal.

i. Carapace transversely triangular, expanded both laterally and posteriorly. Pterygostomian region smooth. .....*Cryptopodia.*

ii. Carapace pentagonal, only expanded laterally but not posteriorly. Pterygostomian region with a ridge of granules. .....*Heterocrypta.*

II. Subfamily **Eumedoninae:**

Carapace sharply pentagonal, the junction of antero-lateral and postero-lateral borders being strongly produced, its upper surface usually not uneven. Chelipeds not monstrous in size.

A. Rostrum composed of two lobes or spines which are more or less divided by the median notch or sinus. Ambulatory legs with subequal and similar dactyli.

1. The spine of antero-lateral angle of carapace directed forwards. ....*Zebrida.*

2. The spine of antero-lateral angle directed straight outwards. ....*Eumedonus.*

B. Rostrum composed of two median lobes and two lateral spines. First pair of ambulatory legs usually thin and longer than the succeeding pairs, dactylus of former also very slender and long. .....*Harrovia.*
(Including *Ceratocarcinus.*)

Subfam. PARTHENOPINAE MIERS 1879.

Genus *Lambrus* LEACH.

ALCOCK 1895, p. 259; FLIPSE 1930, p. 29.
(= Parthenope WEBER—RATHBUN 1925.)

1. Subgenus *Lambrus* A. M. EDWARDS.

Lambrus (*Lambrus*) *longimanus* LEACH.

ALCOCK 1895, p. 260 (list of earlier lit.); BALSS 1922, p. 133; FLIPSE 1930, p. 29.

This species is the only Japanese representative of this subfamily which was reported by BALSS (1922) from Tansui in Formosa; it has not yet been obtained from Japanese Mainland.

Distribution: From Formosa to India, Australia and east coast of Africa.

2. Subgenus *Platylambrus* STIMPSON.

ALCOCK 1895, p. 261; RATHBUN 1925, p. 516; FLIPSE 1930, pp. 27, 31.

Key to the Japanese species of *Platylambrus*.

1. Carapace covered with coarse tubercles and granules; chelipeds with their anterior and posterior borders armed with conical jagged spines of various sizes. ..... *L.* (*P.*) *validus*.
2. Carapace covered with mushroom-like or paxilliform tubercles of good size.
   i. Chelipeds with their surface very strongly spinate or tuberculate. Ambulatory legs spiniferous. ..... *L.* (*P.*) *echinatus*.
   ii. Chelipeds with their surface thickly covered with mushroom-like granules, not with spines. Ambulatory legs only tuberculated along anterior and posterior borders. ..... *L.* (*P.*) *nummifera*.

1. *Lambrus* (*Platylambrus*) *validus* DE HAAN. Pl. XXXIII, fig. 4, Pl. XXXIX, fig. 1.

Parthenope (*Lambrus*) *validus* DE HAAN, 1839, F. J. C., p. 90, pl. 22, fig. 1; pl. 21, fig. 2.

Parthenope (*Lambrus*) *laciniatus* DE HAAN, ibid., p. 91, pl. 22, figs. 2, 3; ORTMANN 1893, p. 415; RATHBUN 1902, p. 29; STIMPSON 1907, p. 29; URITA 1926, p. 29.

Lambrus intermedius MIERS 1879, p. 29; 1886, p. 96, pl. 10, fig. 4.

Lambrus (*Oncodolambrus*) *praedator* DE MAN 1907, p. 389, pl. 1, figs. 1–3.

Lambrus laciniatus enoshimanus PARISI 1915, p. 259, pl. 7, fig. 3.

Lambrus validus ORTMANN 1893, p. 414; IVES 1891, p. 215; LANCHESTER 1900, p. 726; RATHBUN 1902, p. 29; PARISI 1915, p. 294; BALSS 1922, p. 134 (lit. and syn.): FLIPSE 1930, p. 92; SHEN 1932, p. 41, text-fig. 22; SAKAI 1934, p. 299; BALSS 1935, p. 127; SAKAI 1936, p. 107, pl. 29, fig. 2 (coloured).

Description of a full-grown male:

As the list of synonymy shows, the immature forms of this species have formerly been designated under various names, which are now duly united into a single species, *L. validus* (cf. BALSS 1922).

The carapace broadly ovoid, the branchial regions are deeply separated from the median elevation formed by the gastric and cardiac regions, the dorsal surface of the carapace being thus divided into three elevated lobes. These elevated regions are covered with tubercles of various sizes, of which about five in the median line of the gastric and cardiac regions and

also three or four on the branchial regions are especially prominent and conical. The rostrum produced beyond the general outline of the carapace, its median part narrowed and sometimes armed with a few spinules on either side at base. Orbits are circular, upper orbital fissure distinct, lower orbital tooth robust. The hepatic region separated from the branchial region by a wide interval; the former is armed with two or three teeth on the margin, the latter well arcuated and is armed with about seven laciniated teeth, which are fringed with hairs; a little behind the last of these teeth, the postero-lateral margin is also produced into a large tooth, which is followed by another small tooth. The posterior border moderately produced, its lateral angle marked with a small tooth. The epistome smooth and hollowed; the pterygostomian region weakly ridged and armed with tubercles. The buccal cavern very weakly narrowed anteriorly. The basal segment of antenna very short and not reaching the inner canthus of the orbit.

Chelipeds are monstrous in size: merus prismatic but weakly depressed, upper surface with a row of about four conical spines, the anterior and posterior borders armed with a row of triangular teeth which are unequal in size; wrist short and covered with tubercles of various sizes; palm prismatic and distally broadened, outer and inner dorsal borders armed with 11 or 12 triangular teeth which are unequal in size; lower surface is covered with fine granules which are arranged in longitudinal rows. The fingers are deflexed inwards to the longitudinal axis of the palm, the cutting edges are pigmented with black colouration and are armed with 4 or 6 stout teeth. Ambulatory legs are slender and cylindrical, but in the young specimen formerly called *L. laciniatus*, they are markedly compressed; merus with its anterior border tuberculated, the dactylus thickly covered with velvet-like tomentum, excepting the horny tip.

Abdomen of both sexes consists of seven distinct segments.

Material examined: There are many ♂♂, ♀♀ specimens from various localities in Japan—Tokyo Bay, Sagami Bay, Simoda, Ise Bay, Kii Peninsula, Tosa Bay, Nagasaki.

Measurements: Male from Sagami Bay, length of carapace measured from the tip of the rostrum 59 mm., greatest width 77 mm., length of cheliped 215 mm.

Habitat: Inhabits the bottoms of sand, mud or broken shells, depth 50 to 200 metres.

Type locality: Japan (DE HAAN).

Distribution: From Tokyo Bay to Kyûsyû, coast of Corea, China, Samoa, Singapore, Torres Strait, Queensland.

2. *Lambrus* (*Platylambrus*) *nummifera* RATHBUN. Pl. XLI, fig. 6.

RATHBUN 1906, p. 883, pl. 14, fig. 4; SAKAI 1935, p. 71, pl. 8, fig. 1; 1936, p. 109, pl. 29, fig. 1 (coloured).

The carapace rounded triangular in outline, very slightly longer than wide, the dorsal surface, like the entire surface of the chelipeds, mostly covered with mushroom-like tubercles of various sizes. Between gastric and cardiac regions, the intermediate surface is hollowed and not tuberculated, whence a deep groove extends obliquely forwards to the hepatic region and also backwards to the side of the intestinal region. There are three somewhat high conical processes, which are covered with mushroom-like granules, in the median line of the carapace, one, the largest of all, is placed on the gastric region and the others on the cardiac region. There are also two similar processes on the postero-lateral borders, the anterior is larger than the other which is small and deviates to the dorsal surface of the branchial region. The hepatic region produced into a lobe, which is covered with granules, the antero-lateral margin anteriorly armed with a row of about 5 or 6 large mushroom-like tubercles and posteriorly with 6 granulated teeth.

The rostrum produced and divided obscurely into three lobes, its dorsal surface depressed. The supra-ocular eave and the postocular tooth are covered with the said tubercles; the surface between the orbital margin and the hepatic region is hollowed.

The chelipeds of our two specimens are unequal in size; the merus has 2 or 3 spines on the dorsal surface, 14 to 16 teeth of unequal sizes on the anterior border and 3 or 4 large teeth on the posterior border; wrist has 1 or 2 teeth on the outer border; the palm has 4 or 5 large and 5 or 7 smaller teeth on the outer border, 3 or 4 larger and 7 or 8 smaller teeth on the inner border. The tip of fingers distally acuminate. The ambulatory legs are very slender and compressed, merus of all pairs, and carpus and propodus of the last pair, are armed with a row of tubercles on both anterior and posterior borders; propodus and dactylus are covered with tomentum.

Material examined:

1 ♂, 1 ♀, between Ito and Hatusima, "Misago", June, 1935.

Measurements: Length of carapace 13.5 mm., width also 13.5 mm.

Habitat: Inhabits the ground of mud or broken shells; depth 70 metres.

Type locality: Hawaii (RATHBUN).

Distribution: Known only from the two localities above mentioned.

3. *Lambrus* (*Platylambrus*) *echinatus* (HERBST).

ALCOCK 1895, p. 264 (list of earlier lit.): BALSS 1922, p. 135: MAKI & TSUCHIYA 1923, Rept. Dept. Agric. Govt. Research Inst. Taihoku, vol 3, p. 131, pl. 14, fig. 4; FLIPSE 1930, p. 31.

This species was reported from Formosa by MAKI and TSUCHIYA in 1923, it has not yet been obtained from the Japanese Mainland. No specimen was examined by me.

Distribution: Formosa, Hong Kong, Gulf of Siam; Singapore, coasts of India, Mauritius.

3. Subgenus *Rhinolambrus* A. M. EDWARDS.

ALCOCK 1895, p. 265, FLIPSE 1930, p. 34.

Key to the Japanese species of *Rhinolambrus*.

1. Carapace and chelipeds thickly covered with large jugged granules and sharp ramose spines. Rostrum longer than width at base.
   i. Chelipeds nearly three times the length of the carapace and rostrum. .... *L.* (*R.*) *contrarius*.
   ii. Chelipeds about two and a half times the length of the carapace and rostrum ..... *L.* (*R.*) *longispinis*.
2. Carapace with few depressed tubercles; chelipeds with blunt teeth or smooth granules, the length three times that of carapace and rostrum, the latter broader than long. ..... *L.* (*R.*) *pelagicus*.

1. *Lambrus* (*Rhinolambrus*) *longispinis* MIERS. Pl. XXXIX, fig. 2.

Lambrus longispinis MIERS 1879a, p. 18; 1884, pp. 182, 199; DE MAN 1887, p. 229; 1895, p. 492; WALKER 1890, p. 109; HENDERSON 1893, p. 350.
Rhinolambrus longispinis ALCOCK 1895, p. 266; LANCHESTER 1900, p. 726; RATHBUN 1902, p. 134; 1910, p. 319; 1911, p. 256; LAURIE 1906, p. 389; FLIPSE 1930, p. 36.
Lambrus spinifer HASWELL 1879, p. 451, pl. 27, fig. 1.
Lambrus latirostris MIERS 1879, p. 19.
Lambrus (*Rhinolambrus*) *lamelligera*, SAKAI 1932, p. 52, pl. 3, fig. 2, text-fig. 7; 1934, p. 299. (nec WHITE).

Carapace with rostrum distinctly longer than broad, regions deeply separated and everywhere covered with jugged granules and spines. There are four spines of predominant size in the median line of the carapace, one of which is placed on the gastric region and the others on the cardiac region; in front of the former are two smaller spines placed side by side; the posterior border armed with three low spines in the middle and a larger spine on either lateral side. The hepatic region produced anterolaterally into a large spine; the branchial region armed with 5 or 6 larger spines and many other small erect tubercles, the lateral border being

armed with eight jugged teeth. The postero-lateral border armed with two large spines, of which the anterior is most prominent. The rostrum is usually broad at base and narrowed at tip, armed with one or two teeth on the lateral margin, but in some specimens the margins are entire. The supraocular eave is jugged with tubercles and armed with a prominent spine inside the margin; the dorsal surface between both supraocular eaves is longitudinally grooved. The postocular lobe very long and denticulated, behind which the postocular constriction is strongly pronounced. The basal segment of antenna is very short, the inner orbital hiatus being loosely filled by the flagellum.

Chelipeds are 2.5 to 2.8 times the length of carapace plus rostrum; the arm is not much depressed, a row of about 5 spines on the dorsal surface and a row of 12–13 spines on the anterior border and 5 or 6 on the posterior border; wrist spinous, palm with a row of about 5 very long jagged teeth on the outer border and two erect spines inside this row; with 6 or 7 large jagged teeth on the inner border. The ambulatory legs are subcylindrical; merus, carpus and propodus are armed with a few tubercles, which are furnished with longish hairs on both anterior and posterior borders.

Material examined:

1 ♂, 1 ♀, Misaki M. B. S., Prof. M. YERI.
5 ♂♂, 3 ♀♀, Simoda, various stations, 1932–1935.
3 ♂♂, 2 ♀♀, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
1 ♂, Amakusa M. B. S., Prof. OHSHIMA and Mr. IKEDA. (1932).

Measurements: Male from Simoda, length of carapace including rostrum 55 mm., width 52 mm.

Habitat: Rocky bottoms, 10 to 30 metres deep.

Type locality: Australia (Stutchbury) (MIERS).

Distribution: Sagami Bay, Izu Peninsula, Kii Peninsula, Amakusa; this species widely ranges in Indo-Pacific, from Japan to India and Australia.

2. *Lambrus* (*Rhinolambrus*) *contrarius* HERBST.

ALCOCK 1895, p. 266 (list of earlier lit.); BALSS 1922, p. 135.

This species was recorded from Japan at Misaki by BALSS (loc. cit.). A large series of specimens before me from various localities of Japan, Misaki, Simoda, Kii Peninsula and Kyûsyû, are with some points of doubt, identified as *L.* (*R.*) *longispinis* as aforementioned. No specimen exactly corresponding to this species was comprised among our collections.

Distribution: Misaki(?), Mauritius, Ceylon, coast of India, Queensland.

3. *Lambrus* (*Rhinolambrus*) *pelagicus* RÜPPELL. Pl. XLI, fig. 4.

ALCOCK 1895, p. 267 (list of earlier lit.); BALSS 1922, p. 135 (recent lit.); FLIPSE 1931, p. 90.

Syn.: *Lambrus lamelliger* ADAMS & WHITE 1850.
Lambrus affinis A. M. EDWARDS 1872.
Rhinolambrus latifrons FLIPSE 1930.
? *Parthenope* (*Parthenope*) *melana* RATHBUN 1907.
Lambrus (*Lambrus*) *melanus*, SAKAI 1934, p. 299, text-fig. 12; 1936, p. 108, text-fig. 50.

Carapace including rostrum a little broader than long; the regions not pronouncedly convex as in the former two species; covered with depressed, smooth tubercles but with no spines. The rostrum very broad and short, declivous, outer margins divided into two or three lobes; anterior angle of the supraocular eave indistinctly dentate and is separated from the rostrum; the upper orbital sinus V-shaped; the postocular lobe broad and indistinctly trilobate, behind which the usual postocular constriction is distinct but the neck very short.

The hepatic region armed with three rounded teeth, the branchial margin with about six similar teeth; these teeth are furnished with several silky hairs. Near the middle of the postero-lateral border is a large conical tubercle; between this and the last branchial tooth are three or four small tubercles. The posterior border is lined with a few low tubercles.

The chelipeds of male are about three times the length of the carapace, those of female, however are only 2.5 times. The anterior margin of arm and palm is evenly and bluntly dentate, their posterior margin also evenly but much more indistinctly dentate, their lower margin being faintly beaded with granules. The ambulatory legs are smooth and rather stout. The sixth segment of male abdomen bears a spinule in the median line near base.

Material examined:

1 ♂, thoracic legs fallen off (this specimen was formerly identified as *L.* (*L.*) *melanus* RATHBUN in my previous papers, 1934, 1936).

Measurements: Length of carapace 25 mm., width of same 26.5 mm.
Habitat: ?
Distribution: Corea strait, Kagosima, Loo Choo, Takao (Southern Formosa); this species widely ranges in Indo-Pacific, from southern Japan to Red Sea and east coast of Africa and also to Australia.

4. Subgenus *Aulacolambrus* PAULSON.

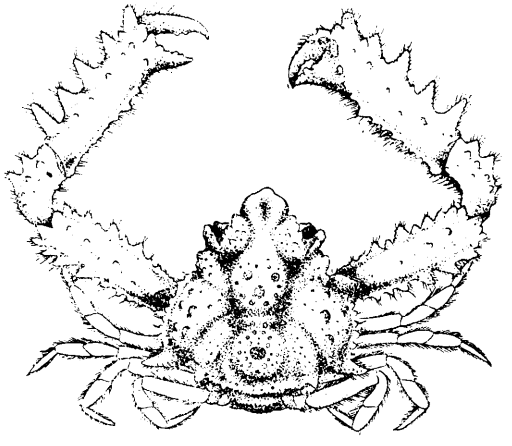
FLIPSE 1930, p. 47.

Lambrus (*Aulacolambrus*) *diacanthus* DE HAAN.

DE HAAN F. J. C., p. 92, pl. 23, fig. 1; ORTMANN 1893, p. 416; BALSS 1922, p. 133; SAKAI 1934, p. 299.

L. (*Aulacol.*) *hoplonotus* SAKAI 1932, p. 53, text-fig. 8 (nec ADAMS & WHITE).

A small species, the outline of carapace of which is triangular and the regions less deeply defined; the dorsal surface is sparingly tuberculated. There are three gastric tubercles, one cardiac and four or five of predominant size on the branchial regions; they are all covered with rasp-like granules as well. The rostrum very broad and indistinctly trilobate, the supraocular eave covered with rasp-like tubercles and the postocular lobe very large and divided into two lobules. The upper orbital sinus deep and V-shaped; the hepatic region granulated, produced into an obtuse lobe; the branchial margin armed with 8 or 9 teeth, of which the last one is of huge size, produced obliquely backwards from the postero-lateral angle of this region. The postero-lateral border armed with a somewhat large tooth, and the posterior border with 6 or 7 smaller granules. The pterygostomian region of this subgenus is peculiar in having a longitudinal deep channel extending from the orbit to the afferent branchial orifice, closed and converted into a tube by thick fringes of hairs.



Text-fig. 54.
Lambrus (*Aulacolambrus*) *diacanthus* DE HAAN.
♂ from Simoda. ×5·5.

Merus of chelipeds with a row of 4 or 5 tubercles on the dorsal surface, with 11 or 12 granulated teeth along the anterior border and with 5 or 6 larger and 2 or 3 smaller teeth on the outer border; the palm with about 5 huge obtuse teeth on the outer border, with 12 to 13 small teeth of nearly equal size along the inner border; these teeth are invariably fringed with hairs. Fingers sharply taper and are incurved at tip. Ambulatory legs are compressed and unarmed, both anterior and posterior borders of each segment fringed with long hairs.

Material examined:

1 ♂, Simoda, coast in front of the M. B. S.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.
1 ♀, Amakusa, M. B. S., Prof. OHSHIMA and Mr. IKEDA.

Measurements: Length of carapace 4.8 mm., width between tips of the lateral branchial teeth 5 mm.

Habitat: Sandy bottoms, not very far from the shore line.

Type locality: Japan (DE HAAN).

Distribution: Japan, Tokyo Bay, Izu Peninsula, Amakusa and Nagasaki; Philippine; Red Sea.

5. Subgenus *Pseudolambrus* PAULSON 1875.

FLIPSE 1930, p. 56.

Syn.: *Parthenolambrus* MIERS 1879.

Key to the Japanese species of *Pseudolambrus*.

1. The hepatic region entirely fused with the postocular angle; not projected into a lobe. Dorsal surface of carapace almost devoid of granules and tubercles. .....*L.* (*P.*) *harpax.*
2. The hepatic region not fused with the postocular angle and is projected into a lobe. Dorsal surface of carapace with tubercles and some granules. ....*L.* (*P.*) *beaumontii.*

1. *Lambrus* (*Pseudolambrus*) *beaumontii* ALCOCK. Pl. XXXIII, fig. 5.

Lambrus (*Parthenolambrus*) *beaumontii* ALCOCK 1895, p. 276; Illus. Zool. Invest. Crust. Pl. 23, fig. 2.

Lambrus (*Pseudolambrus*) *beaumontii*, FLIPSE 1931, p. 94; SAKAI 1936, p. 109, pl. 29, fig. 3 (coloured).

Carapace regularly triangular, the dorsal surface mostly smooth but scattered with a few granules near the postero-lateral borders; the regions are deeply delimited. There are two conical stout tubercles in the median line of the carapace, one of which occupies the centre of the gastric region and the other that of the cardiac region and is followed by a small tubercle immediately behind it; also a stout conical tubercle is found in the centre of the branchial regions. The intestinal region is marked with a small tubercle in the middle.

The rostrum trilobate, declivous, the supraocular eave sensibly thickened, the postocular lobe not projecting beyond the eyes, behind which the postocular constriction is somewhat pronounced. The hepatic lobe prominent, armed with a large tooth and two smaller ones. The antero-lateral border behind the hepatic lobe is closely festooned by a row of about 7 sharp laciniated teeth, the bases of which are fused together, and the last one is predominant in size, projecting obliquely backwards and bearing 4 or 5 laciniated teeth. The pterygostomian regions, as also the exposed surface of sternum and of external maxillipeds are covered with granules.

Chelipeds of our male specimen are unequal and indistinctly covered with granules; merus with its anterior border armed with three large and eight to nine smaller teeth, the posterior border irregularly granu-

lated; wrist unarmed excepting a few tubercles; palm distally thickened, its outer border with two or three obtuse processes and its inner border, together with the upper border of the movable finger, irregularly denticulated. Ambulatory legs are very slender and depressed; the merus with its anterior and two (upper and lower) posterior borders denticulated; carpus and palm are also denticulated along the anterior border only or both anterior and posterior borders.

Abdomen is thickly covered with granules, which are disposed in transverse series.

Material examined:

1 ♂, between Ito and Hatusima, June 1935, "Misago".

Measurements: Length of carapace 11 mm., width 11.5 mm.

Habitat: Inhabits the bottoms of sandy mud or broken shells; depth 50–80 metres.

Type locality: Off Ceylon (ALCOCK).

Distribution: Japan, Sagami Bay; Ceylon, Andaman Sea, Red Sea, Australia.

2. *Lambrus* (*Pseudolambrus*) *harpax* ADAMS & WHITE. Pl. XXXIII, fig. 6.

Lambrus harpax, ADAMS & WHITE, Samarang Crust., p. 25, pl. 6, fig. 3; HASWELL 1882, p. 32; MIERS 1884, pp. 182, 202; 1886, p. 99.
Lambrus (*Parthenolambrus*) *harpax*, ALCOCK 1895, p. 278.
Parthenope (*Pseudolambrus*) *harpax*, RATHBUN 1910, p. 320, pl. 1, fig. 7; 1911, p. 257.
Lambrus (*Pseudolambrus*) *harpax*, FLIPSE 1930, p. 95 (lit.); SAKAI 1936, p. 109, pl. 29, fig. 4 (coloured).

This species differs from *L.* (*P.*) *beaumontii* only in the following few characters:

1. Carapace regularly triangular, dorsal surface almost smooth and pitted but not granulated excepting a few granules scattered near the postero-lateral borders. No tubercles on gastric, cardiac and branchial regions.

2. Rostrum very obscurely and unevenly trilobate. The margins of supraocular eave and the postocular lobe are almost continuous and are finely denticulated. No postocular constriction, the postocular lobe being continuous with the hepatic margin. The antero-lateral border, including the hepatic margin, is armed with 14 to 15 denticulated teeth, of which the last one is not especially enlarged as in the former species. In other respects this species resembles *L.* (*P.*) *beaumontii*.

Material examined:

1 ♂, between Ito and Hatusima, June 1935, "Misago".

Measurements: Length of carapace 7 mm., width also 7 mm.
Habitat: Same as the former species.
Distribution: Sagami Bay, Gulf of Siam, Amirante, Ceylon, Andaman Sea, coast of India, Australia.

Genus *Tutankhamen* RATHBUN.

RATHBUN 1925, p. 530.

Besides the only American species of this genus, *T. cristatipes* (A. M. EDWARDS), the early known Japanese species *Parthenopoides pteromerus* ORTMANN is now duly referred to this genus on account of the agreement of general characters in both species, especially in the long basal segment of antenna. As BALSS (1935, p. 128) has pointed out, *Parthenopoides* MIERS is synonymous with *Pseudolambrus*, the type being *Lambrus massena* ROUX (=*Pseudolambrus massena*). Of the three species hitherto referred to *Parthenopoides*, *P. erosus* MIERS and *P. cariei* BOUVIER are now removed to the genus *Thyrolambrus* RATHBUN, while the other species, *P. pteromerus* ORTMANN is newly removed to *Tutankhamen* in the present opportunity.

Tutankhamen pteromerus (ORTMANN), new combination. Pl. XLI, figs. 1, 2.

Parthenopoides pteromerus ORTMANN 1893, p. 416, pl. 17, fig. 1; BALSS 1922, p. 135; FLIPSE 1930, p. 93 (in list); YOKOYA 1933, p. 166; SAKAI 1935, p. 72, text-fig. 6; 1936, p. 110, text-fig. 51.
Syn.: *Platylambrus stellata lacunosa* RATHBUN 1906.

The carapace very broadly triangular, the dorsal surface marked with three obtuse caninae, one in the median line and the other on the branchial region parallel to the antero-lateral border. There are three gastric tubercles, two being placed side by side in front of the posterior median one; the caradiac region with a high median tubercle, in front and in rear of which is a smaller tubercle. The branchial region has a tubercle on the said oblique carina near the postero-lateral border. The rostrum is medially produced into an obtuse tooth; the upper orbital sinus distinct. The hepatic region is fused with the postocular tooth and is produced into a lobe near the branchial margin; the latter is armed with 11 or 12 laciniated teeth, the last one being predominant in size, forming the lateral angle of the carapace. The postero-lateral border armed with a tooth in a line with the branchial carina; a tooth on either side of the posterior border. The basal segment of antenna is broad and large, filling, though somewhat loosely, the inner orbital hiatus. The pterygostomian region is markedly carinated.

The chelipeds are slightly unequal, the merus not much compressed, the upper surface being armed with two or three spines, its anterior border finely denticulated and the posterior border with four or five sharp spines. The inner border of wrist and palm is finely and irregularly denticulated, while the outer border of the latter segment bears five or six large obtuse teeth. Ambulatory legs are markedly depressed and crested on both borders. The dorsal surface of carapace is usually smooth but in some specimens covered with minute pits; hence I have admitted Hawaiian species, *Platylambrus stellata lacunosa* RATHBUN 1906 to be synonymous with this species.

Material examined:

2 ♂♂, 2 ♀♀, between Ito and Hatusima, June 1935, "Misago".

Measurements: Length of carapace 17 mm., width 24 mm.

Habitat: Inhabits the bottoms of sand, sandy-mud, mud or broken shells; depth 50 to 200 metres.

Type locality: Sagami Bay (ORTMANN).

Distribution: Commonly inhabits the coast around Japan, south of Inuboe-zaki to Kyûsyû and penetrates into Japan Sea northwards to Zyûsangata (YOKOYA). Also from Hawaii.

Genus *Parthenope* FABRICIUS 1798.

ALCOCK 1895, p. 279; FLIPSE 1930, p. 65.
Daldorfia RATHBUN 1906.

Parthenope horrida FABRICIUS. Pl. XXXIX, fig. 3.

Cancer horridus HERBST 1790, Krabben u. Krebse v. 1, p. 222, pl. 14, fig. 88.
Parthenope horrida ALCOCK 1895, p. 279 (list of earlier lit.); FLIPSE 1930, p. 66 (list of recent lit.), MAKI & TSUCHIYA 1923, Rept. Dept. Agric. Govt. Research Inst. Taihoku, vol. 3, p. 130, pl. 15, fig. 2.
Syn.: *Daldorfia horrida* (RATHBUN, LAURIE, EDMONDSON, URITA).

A large grotesque species, the carapace broadly pentagonal, and the dorsal surface pronouncedly uneven and deeply eroded, the convex surface of each region being thickly covered with tubercles and pits. A deeply trenched groove on either side of the gastric region and also a curved longitudinal groove on either side of the cardiac region, which is roughly eroded. The rostrum obtuse and thick, covered with tubercles and its dorsal surface deeply hollowed. Orbits are circular and small, upper orbital fissure entirely closed. The hepatic region convex, tuberculated; the antero-lateral border behind the hepatic lobe, armed with a row of 6 or 7 tuberculated teeth; behind this row, the lateral angle is obtusely produced and also tuberculated. A lobular process in the middle of the postero-lateral border and an obtuse process on either side of the straight posterior border.

The basal segment of antenna long and broad, completely filling up the inner orbital hiatus. The pterygostomian surface, the exposed surface of sternum and also that of abdomen are markedly granulated, tuberculated, and show eroded pits or excavations.

Chelipeds huge, asymmetrical, each segment covered with numerous tubercles and stout teeth. The ambulatory legs are less markedly compressed; merus trigonal, anterior and both (upper and lower) posterior borders with a row of obtuse spines; carpus and propodus are tuberculated and their anterior and posterior borders have obtuse teeth.

Abdomen of male composed of six segments; that of female of seven distinct ones.

Material examined:

1 ♀, Kagosima Bay, Mr. T. SAMEZIMA of the 2nd Kagosima Middle School.
1 ♂, Tansui, Formosa, the late Mr. S. TAKAHASI.

Measurements: Length of carapace 76 mm., width of same 102 mm.

Habitat: Inhabits the bottoms of mud or broken shells; depth 33–125 metres.

Distribution: Kagosima Bay, Yakujima, Formosa; this species widely ranges in Indo-Pacific, from southern Japan, Hawaii to Red Sea.

Asterolambrus gen. nov.

Carapace subpentagonal in outline, the dorsal surface uniformly covered with lace-work or asteroidal granules of equal size. On dorsal and ventral surfaces of the carapace, there are symmetrically disposed eroded grooves, within which are scattered some mushroom-shaped granules.

The antero-lateral border armed with two denticles placed at regular intervals, the postero-lateral border with one in the middle; the junction of the two borders being produced into a stout denticulated process. The posterior border marked on either side with a small denticle. Rostrum produced vertically and denticulated, invaginated on either side, communicating with the antennulary fossa.

Basal segment of antenna very short and the succeeding flagellum very thin, not filling up the inner orbital hiatus. Chelipeds stout but scarcely longer than the carapace; arm, wrist, and palm are armed with acuminate spines. Ambulatory legs flattish and with longitudinal grooves; merus, carpus, and propodus are provided with long acuminate spines.

Orthotype: *Asterolambrus kusei.*

Asterolambrus kusei gen. et sp. nov. Pl. XLI, figs. 5, 7.

The carapace subpentagonal in outline, the dorsal surface somewhat flattish and uniformly covered with lace-work or asteroidal granules of

equal size. There are 12 eroded grooves on the dorsal surface:—one in the median line just in front of the gastric region, extending toward the tip of the rostrum; one, which is very small, on either side, behind the supraocular eave; one, which is broad and oblique, on either hepatic region; a very long and outwardly curved one on either side of the cardiac and gastric regions, extending towards the middle of the branchial region; one, which is irregular in shape, on the antero-lateral border near the lateral angle; one, which is small and oblique, near the postero-lateral border; and finally, a transverse one on the intestinal region. Within these grooves are disposed some mushroom-shaped granules.

The rostrum is declivous, median lobe narrow, the tip being armed with three denticles and also with a smaller denticle on the dorsum immediately in front of the said median groove.

On either side of the median rostral lobe, the margin is excavated, communicating ventrally with the antennulary fossa. The anterior angle of the supraocular eave armed with a tooth; the orbits large, the eye-stalks with several spinules near the cornea. There are two teeth on the antero-lateral border, of which the anterior one is disposed on the hepatic margin and the other in the middle of the branchial margin. The lateral angle between the antero-lateral and postero-lateral borders is produced into a process, which is armed with four denticles. The postero-lateral border armed with a stout tooth in the middle, the posterior border with a smaller indistinct tooth on either side. The infraorbital lobe markedly produced, but the basal antennal segment very short and the succeeding segments very thin, so that the inner orbital hiatus is left in open communication with the orbit. The epistome with a series of confluent, flat tubercles. The subhepatic and the pterygostomian surfaces each with a large vermiculate groove, within which are disposed numerous mushroom-shaped granules. The external maxillipeds also eroded and tuberculated.

Chelipeds are stout but scarcely longer than the carapace; they are markedly unequal in size, the right being much stouter than the left. Arm trigonal, palm very high and distally broadened; all the segments have numerous spines on upper and outer surfaces, the inner surface, as also the interspace between the spines, are covered with mushroom-like granules. Fingers indistinctly armed with a few obtuse teeth, but in the smaller cheliped they have no gap and are not armed. Ambulatory legs are compressed, merus spiny along the anterior and posterior borders, having a longitudinal groove along the anterior border and also on the lower surface. Carpus and propodus with their anterior and ventral surfaces spiny; the dactylus almost straight and unarmed, covered with tomentum excepting the horny tip.

Abdomen of the type female distinctly seven-segmented and thickly

fringed with hairs on both margins; each segment traversed by a coarse pitted ridge but the depressed surface is scattered with granules.

Material examined: 1 ♀, holotype, coast of Tatugahama, Kii; coll. by Mr. Y. KUSE of the Yasuda Primary School.

Measurements: Length of carapace 34 mm., width between the tips of lateral branchial processes 41 mm.

Habitat: Unknown.

Distribution: Known only from the type locality.

Genus *Zalasius* RATHBUN.

Trichia DE HAAN 1841, F. J. C., p. 109. (nom. preoccup.).
Zalasius RATHBUN 1897, p. 166. (Proposed for *Trichia* DE HAAN; preoccup. by *Trichius* FABR. 1775)
Macneillena IREDALE, Austr. Zoologist., vi, 2, 1930. p. 175. (Proposed for *Trichia* DE HAAN; preoccup. by *Trichia* HARTMANN 1840.)
Zalasius MCNEILL & M. WARD 1930, p. 374, (references).

Zalasius dromiaeformis (DE HAAN). Pl. XL, figs. 1, 2.

Trichia dromiaeformis DE HAAN, F. J. C., 1841, p. 110, pl. 29, fig. 4; ORTMANN 1893, p. 419; BALSS 1922, p. 100.
Zalasius dromiaeformis, MCNEILL and WARD 1930, p. 375, pl. 59, figs. 5–7; SAKAI 1934, p. 300; BALSS 1935, p. 128.

The body and appendages entirely covered with a thick coat of woolly hairs, so that their surface and outline are not perceptible unless the animal is denuded. The carapace fairly well convex and uniformly covered with granules; regions are fairly well delimited by deepish grooves or series of pits. The rostrum is produced beyond the general outline of the carapace, its dorsal surface is longitudinally grooved and the free margin bilobate, each lobe being again indistinctly bilobate and ventrally excavated so as to be continuous with the antennulary fossa. The orbits are circular, the postocular lobes are bilobate. The hepatic margin is continuous with the branchial margin, forming a well arcuated antero-lateral margin, its posterior angle being obtusely produced into a lobe. The postero-lateral borders concave, the posterior border gently produced backwards.

The basal segment of antenna long and broad, entirely filling the inner orbital hiatus to enclose the orbit. The epistome short and hollowed; pterygostomian region evenly convex; the buccal cavern anteriorly narrowed and the merus and ischium of the external maxillipeds, unlike those of the usual *Lambrus*-form, do not completely close the buccal cavern.

Chelipeds are somewhat Xanthoid in form, the merus short and trigonal, unarmed; carpus very long and its outer surface uneven, the elevated portion mounted with a tubercle, which is red in life; its outer

surface presents three or four large tubercles and four or five longitudinal rows of granules. The immovable fingers much shorter than the movable finger, the former being not deflexed to the longitudinal axis of the palm; prehensile edges are thin and sharp. Ambulatory legs are, contrary to the other genera of the Parthenopidae, stout and unarmed, the merus very broad and compressed, dactylus longer than the propodus and straight.

Abdomen of both sexes composed of seven distinct segments; the first segment bears a large rounded process on either side, which is covered with granules as usual.

Material examined:

2 ♂♂, Kii Peninsula, Gobo, Mr. K. OKAMOTO.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.
1 ♂, Amakusa, the Primary School at Tomioka.

Measurements: Length of carapace 49 mm., width of same 55 mm.

Habitat: Inhabits the muddy bottoms, depth 100 metres.

Distribution: Tokyo Bay, Kii Peninsula, Amakusa, Nagasaki, Timor Isl., South Australia.

Genus *Oethra* LEACH 1816.

ALCOCK 1895, p. 284; RATHBUN 1925, p. 550.

This genus comprises only two species, which are very closely related with each other, the one inhabits the west coast of Mexico and the other Indo-Pacific. Many authors admitted that American species, *Oe. scutata* SMITH 1869, as a variety of the Indo-Pacific species, *Oe. scruposa* (LINNAEUS), but in his recent monograph (1930), FLIPSE listed them each as a valid species.

Oethra scruposa (LINNAEUS). Pl. XL, fig. 3.

Cancer scruposus, LINN. Mus. Lud. Ulr., p. 450 (not seen).
Cancer polynome, HERBST Krabben III, ii, p. 23, pl. 53, figs. 4, 5.
Oethra scruposa, ALCOCK 1895, p. 285 (lit.); STIMPSON 1907, p. 32; FLIPSE 1930, p. 89 (in list).

The carapace transversely elliptical; the dorsal surface uneven and sparingly covered with granules. The gastric region pronouncedly convex, divided into two lobes by the median channel, each lobe being forwardly continuous with the supraocular eave and postero-laterally with the convex ridge in the middle of the branchial region. The surface on either side of the metagastric area and inside the antero-lateral borders is sensibly depressed and concave.

The rostrum markedly produced, its anterior margin eroded and pitted, the dorsal surface being markedly depressed. The antero-lateral and postero-lateral borders are entirely continuous and somewhat upturned, they are indistinctly divided into six or seven broad lobes by deeply marked closed fissures, each lobe being again divided into two lobes by a marginal crest. The posterior border concave.

The basal segment of antenna broad and long, completely filling the inner orbital hiatus. The pterygostomian region flattish, the external maxillipeds entirely close the buccal cavern and their merus and ischium are smooth and very flat, being almost in the same plane with that of the pterygostomian regions. The exposed surface of sternum and that of abdomen are rugose or sculptured with eroded grooves or pits.

Chelipeds and ambulatory legs are entirely concealed beneath the expansion of the carapace when they are retracted; the inner surface of arm and wrist very flat. The lower and upper borders of each segment crested and denticulated and their outer surface uneven and rugose. Ambulatory legs are exceedingly compressed; the anterior and posterior borders being cristate and dentate.

Material examined:

1 ♂, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
1 ♂, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, Tosa Bay, Mr. M. MITIHIRO.

Measurements: Male from Seto, length of carapace 52 mm., width 77 mm.

Habitat: Inhabits the rocky bottoms, 100–200 metres deep.

Distribution: Kii Peninsula, Tosa Bay, Ceylon, coast of India, coast of East Africa. The record of occurrence of this species in Japanese waters is new!

Genus *Cryptopodia* MILNE EDWARDS.

MILNE EDWARDS 1834, H. N. C. I, p. 360; ALCOCK 1895, p. 281; RATHBUN 1925, p. 553; FLIPSE 1930, p. 70.

The only known Japanese species of this genus is:

Cryptopodia fornicata FABRICIUS.

DE HAAN F. J. C., p. 90, pl. 20, figs. 2, 2a; ORTMANN 1893, p. 418; ALCOCK 1895, p. 282 (list of earlier lit.); FLIPSE 1930, p. 72.

This species, although it seems to be common in Indo-Pacific, is not comprised among our collections. It was formerly figured in Fauna Japonica Crustacea by DE HAAN and also reported by ORTMANN from Sagami Bay.

Distribution: Sagami Bay, Hong Kong, Singapore, coast of India, Persian Gulf, Australia.

Genus *Heterocrypta* STIMPSON 1874.

ALCOCK 1895, p. 283; RATHBUN 1925, p. 554; FLIPSE 1930, p. 76.

The only species known from Japanese waters is:

Heterocrypta transitans ORTMANN. Pl. XXXIII, fig. 2.

ORTMANN 1893, p. 417, pl. 17, fig. 2; BALSS 1922, p. 135 (name only); FLIPSE 1930, p. 91 (in key); SAKAI 1934, p. 300; 1936, p. 111, pl. 30, fig. 1 (coloured).
Cryptopodia fornicata, ADAMS & WHITE 1847, pl. 6, fig. 4 (nec FABRICIUS).

The carapace broadly pentagonal in outline, the posterior border almost straight but in the juvenile stage it is concave. The central gastric region and also the surface inside the antero-lateral margin are deeply hollowed, the former is triangular in outline, being bounded on either side by a raised carina leading from the raised mesogastric region toward the centre of the branchial region, where a conical spine is developed. The cardiac region is also convex, bearing a conical spine. The posterior and lateral slopes of the clypeiform expansions are marked with beaded tubercles.

The rostrum is broad and triangular, obtusely angular at tip and depressed on the upper surface. Behind the orbits, the hepatic margins are entire, while the antero-lateral border behind the hepatic margin is cut into about nine triangular teeth. The postero-lateral and posterior borders are indistinctly crenulated. The basal segment of antenna is short and broad, filling the base of the inner orbital hiatus; the epistome is smooth, a characteristic of this genus.

Arm of chelipeds depressed and its anterior and posterior borders denticulate, two or three teeth being larger; the wrist very small; palm distally thickened, its outer border has only one or two teeth, while the inner upper border has about eight erect triangular teeth; the fingers gaping at base and markedly incurved at tip. Ambulatory legs are pronouncedly depressed and cristate on both borders; the posterior border of merus of all pairs and also that of carpus and propodus of last pair are sharply denticulated.

I admit *Cryptopodia fornicata* figured by ADAMS & WHITE 1847 (nec Fabricius) to be identical with this species. I am also convinced that ORTMANN's type many probably be a juvenile form.

Material examined:

1 ♂, Misaki, M. B. S., Prof. YERI.
Many specimens of both sexes in various developmental stages, Simoda, "Misago" and "Amagi".
2 ♂♂, Gobô, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 16 mm., width of same 21.5 mm.

Habitat: Inhabits the bottoms of sand or shells, depth 50 to 150 metres.

Type locality: Sagami Bay (DÖDERLEIN-ORTMANN).

Distribution: Sagami Bay, Izu Peninsula, Kii Peninsula.

Subfam. EUMEDONINAE MIERS.

MIERS 1879, p. 670; ALCOCK 1895, p. 286; GORDON 1934, pp. 62–67. (cf. also p. 329 of this paper.)

Genus *Zebrida* ADAMS & WHITE.

ADAMS & WHITE 'Samarang' Crust. p. 23; MIERS 1879, p. 670; ALCOCK 1895, p. 286.

This genus comprises only two species ranging in Indo-Pacific, viz., *Z. adamsii* WHITE and *Z. paucidentata* FLIPSE 1930; the former also occurs in Japan in Kagosima Bay.

Zebrida admsii WHITE.

ADAMS & WHITE 'Samarang' Crustancea, p. 24, pl. 7, fig. 1; HENDERSON 1893, p. 351; ORTMANN 1893, p. 419, pl. 17, fig. 3; LAURIE 1906, p. 393; RATHBUN 1910, p. 321; BALSS 1922, p. 136; URITA 1926, p. 29; FLIPSE 1930, p. 98.
Syn.: *Z. longispina* HASWELL 1880.

This species is not comprised in our collections. It is well-known as a commensal of Sea-urchin, *Acanthocidaris crassispina*.

Distribution: Japan, Kagosima Bay (ORTMANN, URITA), Gulf of Siam, Ceylon, coast of India, Australia.

Genus *Eumedonus* H. M. EDWARDS.

H. M. EDWARDS 1834, H. N., I, p. 349; MIERS 1879b, p. 670; ALCOCK 1895, p. 287.

This genus comprises about six species ranging in Indo-Pacific, three of which are now known from Japanese waters.

Key to the Japanese species of *Eumedonus*.

1. Lateral angles of the carapace produced into a large spine. Regions of the carapace fairly well delimited. Life colours are characterized by longitudinal liver-coloured stripes.
   a. Rostrum narrowly produced and the tip not bifurcated or very slightly so. Carapace and chelipeds thickly covered with vesiculous granules. Ambulatory legs subcylindrical and covered with granules...*E. granulosus*.
   b. Rostrum deeply bifid at tip, carapace and chelipeds are smooth and pitted. Ambulatory legs cristate along the anterior border. .....*E. zebra*.
2. The lateral angles of carapace not produced into a spine or tooth. Regions not defined, surface glabrous and pitted. Colour purplish, with a pair of elongate flecks of whitish colouration on the carapace. Rostrum not bifurcated. .....*E. pentagonus*.

1. *Eumedonus granulosus* MACGILCHRIST.

MACGILCHRIST 1905, p. 253; Illus. Invest, Crust. pl. 77, fig. 2; RATHBUN 1911, p. 259; SAKAI 1932, p. 55, pl. 2, fig. 3; 1936, p. 111, text-fig. 52.

Carapace elongate pentagonal, the dorsal surface uneven and the regions well delimited. The entire carapace, as also the thoracic appendages, are thickly covered with vesiculous granules. The rostrum horizontally produced and as long as two thirds the length of carapace; its dorsal surface longitudinally sulcated, but its tip usually not bifid. The orbits are circular, with no orbital tooth or sinus. The lateral angle of the carapace laterally produced into a sharp stout tooth, behind which the postero-lateral border is weakly convex; the posterior border almost straight. The inner angle of the wrist of chelipeds is armed with a stout tooth, fingers are short and their cutting edges armed with 3 or 4 indistinct teeth; the other segments of chelipeds and ambulatory legs are unarmed.

Abdomen of both sexes composed of seven distinct segments.

The carapace is longitudinally traversed by five parallel liver-coloured stripes.

Material examined:

1 ♂, 1 ♀, Simoda, coll. by Dr. K. Nakazawa of the Surugawan Marine Biol. Station.

Measurements: Length of carapace including rostrum 14 mm., width 12 mm.

Habitat: Muddy or sandy bottoms, 47–49 fathoms (MACGILCHRIST).

Type locality: Persian Gulf (MACGILCHRIST).

Distribution: Simoda, Amirante, Persian Gulf.

2. *Eumedonus zebra* ALCOCK. Pl. XLI, fig. 3.

ALCOCK 1895, p. 288; Illus. Zool. Invest. Crust. pl. 23, fig. 5.

Eumedonus vicinus RATHBUN 1918, p. 28, pl. 13, fig. 2; SAKAI 1934, p. 300, text-fig. 14; 1936, p. 112, text-fig. 53.

Carapace broader than that of the former species and the regions less distinctly delimited, the dorsal surface smooth and everywhere pitted but not granulated. The rostrum, when compared with that of *E. granulosus* is broader and shorter, and its tip deeply bifurcated, each lobe being directed forwards or rather outwards in full-grown specimen. The lateral angles produced into a stout pointed tooth.

The chelipeds are stouter than that of *E. granulosus*, the merus compressed and its anterior and posterior borders medially armed with a lobule; the inner angle of wrist is armed with a blade-like tooth, the upper border of palm cristate and is cut into two lobular teeth. The anterior border of merus, carpus, and propodus and the posterior border of merus of the ambulatory legs are sharply cristate. In my previous paper I identified the Japanese specimens with RATHBUN's species, considering it to be a valid species, but now I am of opinion that RATHBUN's species is identical with *E. zebra* ALCOCK.

Material examined:

1 ♂, 1 ♀, East China Sea, coll. by the Osyoro-maru, sent by prof. OHGAKI of the Hokkaido Imperial University.

Measurements: Length of carapace measured from the tip of the rostrum 7 mm., width also 7 mm.

Habitat: (Trawled up from 108 fathoms deep.)

Type locality: Ceylon (ALCOCK).

Distribution: East China Sea, Malacca, Ceylon, Zanzibar, Queensland.

3. *Eumedonus pentagonus* (RATHBUN). Pl. XXXIII, fig. 3.

Echinoecus pentagonus RATHBUN 1894, p. 66; 1906, p. 880, text-fig. 37.
Eumedonus pentagonus, BALSS 1922, p. 137 (syn. and lit.); SAKAI 1936, p. 113, pl. 30, fig. 2 (coloured).
Syn.: *Eumedonus convictor* BOUVIER & SEURAT (1905).
Liomedon pentagonus KLUNZINGER (1906).

Carapace as long as broad, the dorsal surface even and glabrous but everywhere pitted, the regions being entirely obliterated. The rostrum almost half as long as the width at base, its tip very faintly marked by an indentation. The antero-lateral border is rather concave and shorter than the postero-lateral border; no produced tooth between the two borders.

The arm of chelipeds compressed and its dorsal and ventral borders medially armed with a lobule, the wrist with a minute denticle on the upper surface near the base and a larger tooth at the inner angle. The

upper border of palm is not markedly carinated. Ambulatory legs are less markedly compressed and unarmed, the surface of each segment being minutely pitted.

The life colours will best be recognized in pl. XXXIII, fig. 3.

Material examined:

1 ♂, 1 ♀, Simoda, the coast in front of the M. B. S.

Measurements: Length of carapace 6.5 mm., width also 6.5 mm.

Habitat and habit: Inhabits the shoal waters, not far from the shore line; it is a commensal of the sea-urchin *Echinothrix calamaris* (PALLAS) (cf. RATHBUN) or *Acanthocidaris crassipes*. (A. AGASSIZ).

Type locality: Port Lloyd, Bonin Islands. (RATHBUN).

Distribution: Simoda, Bonin Isls., Hawaii, Red Sea.

Genus *Harrovia* ADAMS & WHITE.

BALSS 1922, p. 136; GORDON 1934, pp. 66, 67.
Syn.: ? *Ceratocarcinus* ADAMS & WHITE.

As already frequently mentioned by previous authors (STIMPSON 1907, BALSS 1922, GORDON 1934), the difference between *Harrovia* and *Ceratocarcinus* is superficial. In dealing with two Japanese species to be described below, one of which is new to science, I have also confirmed the opinion, that *Ceratocarcinus* is identical with *Harrovia*. FLIPSE (1930, p. 28) defined in his key *Harrovia* as "Chelipeden bewaffnet. Gehfüsse kompress" and *Ceratocarcinus* as "Chelipeden nicht bewaffnet. Gehfüsse nicht kompress"; this discrimination seems to me unsatisfactory to accommodate all the known species.

Key to the Japanese species of *Harrovia*.

1. Antero-lateral borders with two confluent lobes and two salient lateral spines. Merus of ambulatory legs spinulated along the anterior border. ....*H. elegans*.
2. Antero-lateral borders with three confluent lobes and one salient lateral spine. Merus of ambulatory legs not spinulated. .....*H. trilobata* sp. nov.

1. *Harrovia elegans* DE MAN. Pl. XXXIII, fig. 1.

Harrovia elegans DE MAN 1887, p. 21, pl. 1, figs. 5, 6; URITA 1926, p. 30; SAKAI 1932, p. 54, pl. 2, fig. 2; 1934, p. 300, text-fig. 13; 1936, p. 114, pl. 30, fig. 3 (coloured); YOKOYA 1936, p. 142, text-fig. 8.
Syn.: *Harrovia japonica* BALSS (1922).

The carapace broadly hexagonal, dorsal surface moderately convex and covered with a dense coat of tomentum. There are two large elevations placed side by side on the gastric region. The metagastric and branchial regions are faintly defined but the cardiac and intestinal regions

are scarcely delimited. The rostrum composed of two median subtruncate lobes and two lateral acuminate teeth, the former are granulated on the anterior margin and divided by a median notch, the latter are pronouncedly produced beyond the former and basally divided from the former by a deep notch. The antero lateral borders are armed with two anterior lobes and two posterior teeth, the former are subequal, confluent, and granulated; the latter salient, well divergent and somewhat project upwards. The postero-lateral borders are convex and the posterior border is straight.

The infraorbital lobe is rather prominent and granulated, a small tooth, which is not markedly granulated, is placed between the infraorbital lobe and the first antero-lateral lobe. The anterior boundary of the buccal cavern is defined by four smooth lobes, which are almost confluent; the antero-external angle of the buccal cavern is rather thick and granulated.

Chelipeds of male are much longer than the ambulatory legs, the palm is much longer than the merus and is indistinctly sulcated along the upper border. The first pair of ambulatory legs are much slenderer and longer than the succeeding pairs, which are equally thick and subequal in length; merus of all pairs is spinulated along the anterior border. The dactylus of the first pair is by far the longest of all the dactyli of the legs. The life colour will best be recognized in Pl. XXXIII, fig. 1.

Material examined:

2 ♂♂, 3 ♀♀, Tateyama Bay, Nov. 1929, Prof. YAICHIRO OKADA.
1 ♂, 1 ♀, Misaki, Prof. M. YERI.
3 ♂♂, 2 ♀♀, Simoda, various stations.
1 ♂, 1 ♀, Seto M. B. L., Prof. Yô OKADA and Mr. SHIINO.
2 ♂♂, Gobo, Kii Peninsula, Mr. K. OKAMOTO.
1 ♂, 1 ♀, Nagasaki, Mr. I. KANEKO.

Measurements: Male from Simoda, length of carapace 10.5 mm., width 15 mm.

Habitat and habit: Inhabits the shoal waters as a commensal of *Comanthus japonicus*.

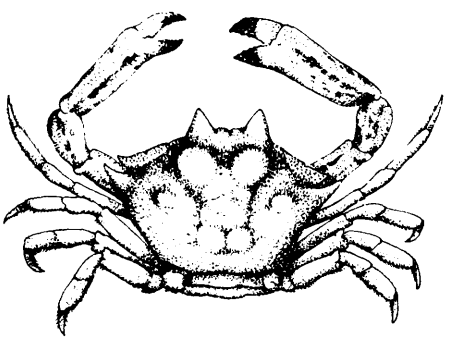
Type locality: Elphinstone Is., Mergui Archipelago (DE MAN).

Distribution: Tokyo Bay, Sagami Bay, Izu Peninsula, Kii Peninsula, Kagosima, Nagasaki and Mergui Archipelago.

2. *Harrovia trilobata* sp. nov.

The new species here described apparently approaches *Ceratocarcinus intermedius* ZEHNTNER and also somewhat *Ceratocarcinus dilatatus* A. M. EDWARDS, so that the comparison of some points of difference among them will suffice to recognize the new species.

1. The elevations of the dorsal surface of carapace almost identical with those of *C. dilatatus*, i.e., a pair of large obtuse and granulated ones placed on the anterior surface of the gastric region, a pair of very small ones each on metagastric and cardiac region, also a pair of similar ones in front of the said gastric pair, and lastly, a medium-sized one on each branchial region.



Text-fig. 55.
Harrovia trilobata sp. nov. Dorsal view of female holotype. ×1·8.

2. The rostrum resembles that of *C. dilatatus*, the median lobes being subtruncate and marked by a median notch; while the outer spines are separated from the former by a distinct notch and pronouncedly project forwards. In the case of *C. intermedius* (if the figure of ZEHNTNER be reliable) the rostral lobes are composed of two widely separated spines, the median truncate lobe and the lateral acuminate tooth being confluent and not divided by a notch.

3. The antero-lateral borders much resemble those of *C. intermedius*, being composed of three confluent and granulated lobes and one salient lateral spine; the first lobe very small, the second and third lobes subequal but the latter is salient at the posterior angle which is divided from the lateral spine by a very narrow V-shaped sinus. The postero-lateral borders are slightly convex; the posterior border is almost straight.

4. The inferior inner orbital tooth is long and tuberculated, between it and the first lobe of the antero-lateral border is a large elevation which is also granulated. The anterior boundary of the buccal cavern of this species is composed of four granulated lobes, while that of *C. intermedius* is almost entirely confluent (if the figure of ZEHNTNER be reliable).

5. Chelipeds are thickly granulated under the lens, the arm, wrist, and palm are roughly sulcated along the upper border. The first ambulatory leg distinctly slenderer and longer than the succeeding ones, which are thick and subequal in length. Merus of all pairs not armed.

Material examined:

1 ♀, holotype, Simoda, found among the specimens of *H. japonica*.
1 ♀, Tateyama Bay, also found among the specimens of *H. japonica*.

Measurements: Female holotype, length of carapace measured from the tip of the lateral rostral spine, 13 mm., width 14.5 mm.

Habitat and habit: Same as those of *H. japonica*.

Distribution: Tokyo Bay, Izu Peninsula.

Distribution of the Japanese species of Oxyrhyncha.

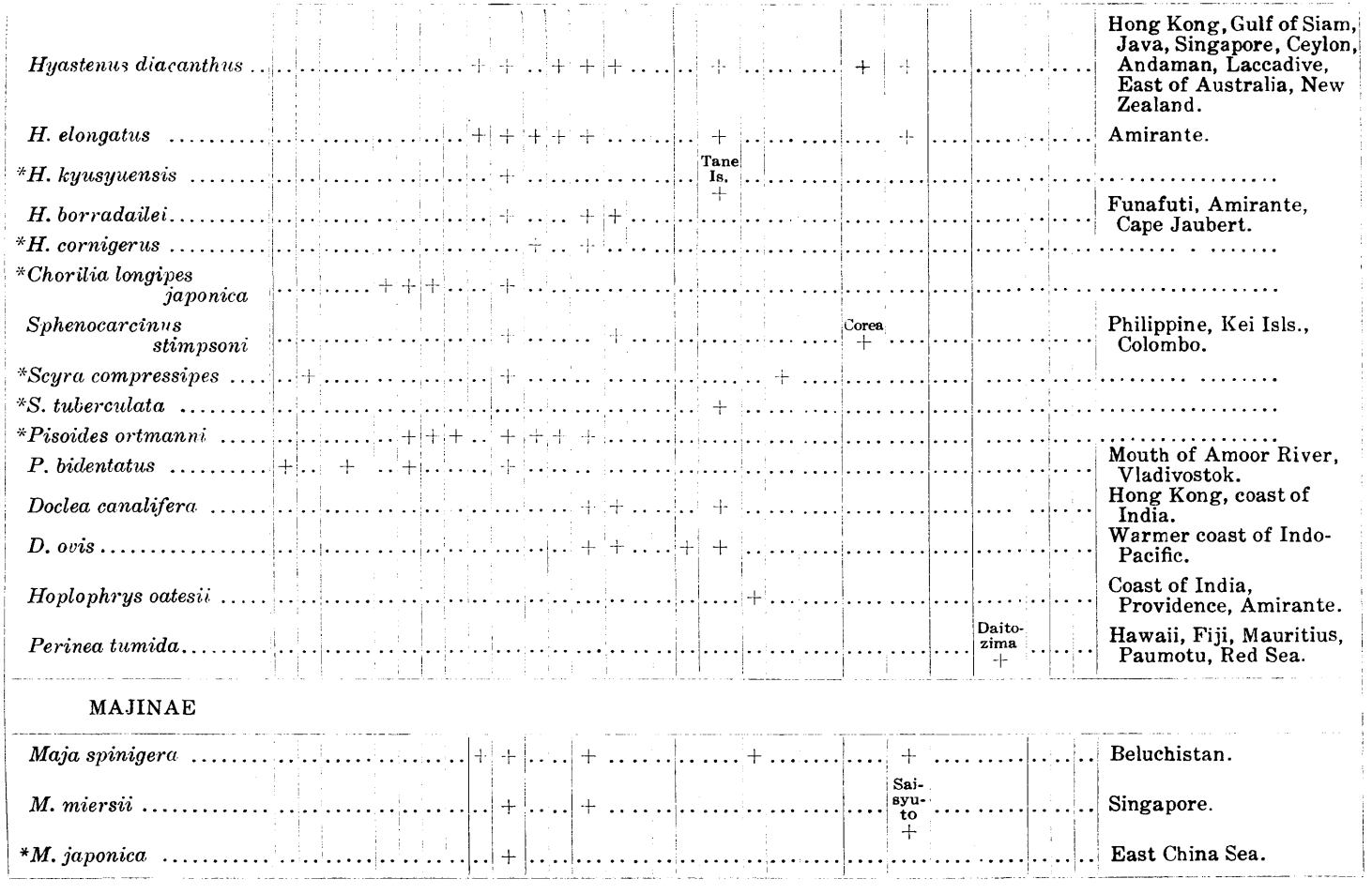
(The Japanese endemic species are marked with an asterisk.)

Localities. / Families, subfamilies, and species.	Japan, Pacific side.													Japan, continental side.									Foreign lacalities.
	Akkeshi.	Hakodate.	Mutsu Bay.	Coast of Iwate.	Sendai Bay.	Siwoya-zaki.	Inuboe-zaki.	Tokyo Bay.	Sagami Bay.	Izu Peninsula.	Ise Bay.	Kii Penisula.	Tosa Bay.	Onomiti.	Bungo Strait.	Coast of Miyazaki.	Kagosima.	Amakusa.	North.	Middle.	South.	Nagasaki.	Amami Ohsima.	Loo Choo.	Formosa.	Bonin Isls. (Palao Isls.)	
HYMENOSOMIDAE																										
**Halicarcinus orientalis*								+	+	+	+															
**Rhynchoplax messor*			+					+	+	+																
R. setirostris								+	+		+															North China, Hong Kong.
R. coralicola			+					+	+	+															+	Singapore.
Elamena truncata								+		+	+										+	+				Warmer coasts of Indo-Pacific, South Australia.
Trigonoplax unguiformis			+					+	+	+	+	+	+				+				+					Andaman, Gulf of Martaban, Singapore, Ternate.
MAJIDAE—INACHINAE																										
Oncinopus aranea								+	+	+	+	+	+				+				+					Philippine, coast of India, Mollucca, Arafura Sea, South Australia.
Paratymolus pubescens								+	+	+	+	+					+				+					Thursday Isl., Gulf of Siam, Kilwa.
P. sexspinosus										+																India, Australia.

*Achaeus japonicus							+	+	+	+	+	+			+					+							
*A. robustus														+													
*A. spinifrons								+			+									+							
*A. trituberculatus							+																				
*A. tuberculatus			Siriya-zaki +				+	+	+	+	+							+	+	+							
*A. brevidactylus									+																		
A. spinosus								+	+		+									+							Persian Gulf, Maldives.
A. suluensis									+																		Sulu Archipelago.
A. superciliaris								+	+																		Hawaii.
*A. pugnax								+	+						Kosi-ki Is. +					+							
*A. elongatus								+																			
*A. akanensis									+																		
*Pseudocollodes demani							+		+					+													
*Achaeopsis rostrata								+																			
Camposcia retusa							+	+	+		+	+			+					+							Warmer coasts of Indo-Pacific.
*Macrocheira kaempferi							+	+	+		+	+			+					+							
Oregonia gracilis	+		+	+	+		+											+	+	+							California, Alaska, Behring Sea, Coast of Manchoukuo, North China.
*O. mutsuensis			+		+	+																					
*Pleistacantha sancti-johannis							+	+	+		+				Kosi-ki Is. +			+		+							
P. moseleyi							+		+		+	+		+	Kosi-ki Is. +					+							Philippine, Port Nias, Great Nicobar, Andaman, Da-es-Salaam.
*P. simplex								+												+							
*P. nipponensis						+				+		+															
*P. terribilis																				Ohse-zaki +							

*P. (Parapleisticantha) japonica								+		+										+					
Platymaja wyville-thomsoni											+									+					Admiralty Is., between Bali and Kangeang, North of Batan Is., Australia.
*Cyrtomaja owstoni						+	+		+	+					+				+	+					
*C. intermedia							+?																		
C. horrida								+																	Philippine.
*C. platypes										+	+		+						+	+	Tane Is. +				
OPHTHALMIINAE																									
*Zewa nipponica						+	+	+	+	+					+					+		+?			
*Z. okamotoi										+					+										
Picrocherus armatus										+															New Caledonia.
Ophthalmias cervicornis										+															Hawaii, Tuticorin, East coast of Africa.
Criocarcinus superciliosus																						Yaku-jima +			Andaman Sea, New Caledonia.
ACANTHONYCHINAE																									
*Pugettia sagamiensis							+	+			+														
P. incisa		+	+			+	+	+	+	+										+					Amoy.
P. quadridens			+	+	+	+	+	+	+	+	+			+	+		+	+	+	+					Manchoukuo, North China.
*P. q. pellucens							+	+		+															
*P. q. intermedia								+	+	+															
*P. kagoshimensis							+			+?			+												
*P. minor			+			+	+	+	+	+															
*P. similis								+		+										Ohse-zaki +					

*P. elongatus					+													
*P. nipponensis		+		+	+	+	+	+										
*Mimulus cristatus				+														
*Menaethiops okai				+	+													
Menaethius monoceros			+	+	+	+	+		+	+					+		+	Warmer coasts of Indo-Pacific.
Huenia proteus			+	+	+	+	+	+	+	+	+				+			Warmer regions of Indo-Pacific.
Simocarcinus camelus pinnirostris								+								+		Red Sea, Madagascar.
PISINAE																		
Naxioides hystrix			+	+	+	+	+	+			+			+	+			Amboina, Andaman Sea.
N. mammillata							+			+					+			Salomon Bank.
N. hirta							+											Philippine, Amirante, Salomon Bank, Andaman Sea.
Tylocarcinus styx								+								+		Warmer regions of Indo-Pacific.
*Choniognathus reini				+	+								+	+				
Chionoecetes opilio elongatus	+			+?								+	+	+				Kamchatka.
Ch. japonica												+						Northern part of Japan Sea.
Hyas coarctatus alutaceus												+	+	+				Okhotsk Sea, Eastern China Sea, Shanghai.
H. c. ursinus												+	+	+				Okhotsk Sea, Shanghai.
HYASTENIINAE																		
Rochinia pulchra							+	+										Andaman Sea, Saya de Malha, Seychelles.
*R. debilis				+														
R. veltina					+													Ki Island.


Hyastenus diacanthus
Hong Kong, Gulf of Siam, Java, Singapore, Ceylon, Andaman, Laccadive, East of Australia, New Zealand.
H. elongatus
Amirante.
*H. kyusyuensis
Tane Is.
H. borradailei
Funafuti, Amirante, Cape Jaubert.
*H. cornigerus
*Chorilia longipes japonica
Sphenocarcinus stimpsoni
Corea
Philippine, Kei Isls., Colombo.
*Scyra compressipes
*S. tuberculata
*Pisoides ortmanni
P. bidentatus
Mouth of Amoor River, Vladivostok.
Doclea canalifera
Hong Kong, coast of India.
D. ovis
Warmer coast of Indo-Pacific.
Hoplophrys oatesii
Coast of India, Providence, Amirante.
Perinea tumida
Daito-zima
Hawaii, Fiji, Mauritius, Paumotu, Red Sea.
MAJINAE
Maja spinigera
Beluchistan.
M. miersii
Sai-syu-to
Singapore.
*M. japonica
East China Sea.

**Maja nipponensis*						+		+	+	+			+			+	Tane Is. +				
**M. kominatoensis*																Tori-sima +					
**Majella brevipes*						+															
**Leptomithrax edwardsi*					+	+	+	+	+	+		+		+	+	+					
**L. bifidus*					+	+	+		+	+					+	+					
**Schizophroida simodaensis*							+														
**S. manazuruana*						+	+														
Schizophrys aspera						+	+		+	+	+	+				+					Entire warmer regions in Indo-Pacific.
**Acanthophrys harmandi*						+			+												
A. longispinus					+	+	+	+		+	+	+				+					Ceylon, Andaman, coast of Madras, Providence, Queensland.
A. spinosus						+															Andaman, Ceylon, Providence, Maldive, Laccadive, Amirante, Saya de Malha, Seychelles, North of Australia.
A. aculeatus						+			+		+										Warmer coasts of Indo-Pacific.
**A. brevispinosus*									+								Tane Is. +				
MITHRACINAE																					
Micippa thalia					+	+	+	+	+	+		+				+					Warmer regions of Indo-Pacific.
M. cristata granulipes																Sai-syu-to +				+	Amboina.
M. philyra					+	+	+		+	+		+				+					Warmer coasts of Indo-Pacific.
M. platipes							+		+							+					Warmer coasts of Indo-Pacific.
M. margaritifera							+														Gulf of Martaban, Andaman, Ceylon, Maldive.

MACROCOELOMINAE																												
Tiarinia cornigera								+	+	+	+	+	+			+	+	+				+						Warmer coasts of Indo-Pacific.
**T. spinigera*												+	+										+					
**T. depressa*																	+						+	+				
T. tiarata													+															Philippine, New Guinea.
T. angusta																								+			+	Philippine, Celebes, Amboina, Sulu Sea, Ternate, Torres Str., Murray Is., Banda Neira.
**Leptopisa nipponensis*												+																
Xenocarcinus tuberculatus										+														+				Hong Kong, Cumberland Group.
**X. nakazawai*												+																
**X. monoceros*									+																			
PARTHENOPIDAE: PARTHENOPINAE																												
Lambrus (Lambrus) longimanus																									+			North China, Samoa, Singapore, Torres Strait.
L. (Platylambrus) validus								+	+	+	+	+	+			+	+	+				+						India, Australia, East of Africa.
L. (P.) nummifera									+																			Hawaii.
L. (P.) echinatus																									+			Hong Kong, Gulf of Siam, Singapore, India, Mauritius.
L. (Rhinolambrus) longispinis									+	+		+						+										Indian Ocean, Australia.
L. (R.) contralius									+?																			Mauritius, Ceylon, Coast of India, Queensland.
L. (R.) pelagicus																	+					Sai-syu-to +						Warmer regions of Indo-Pacific, Red Sea, Australia.
L. (Aulacolambrus) diacanthus								+		+								+				+						Philippine, Red Sea.

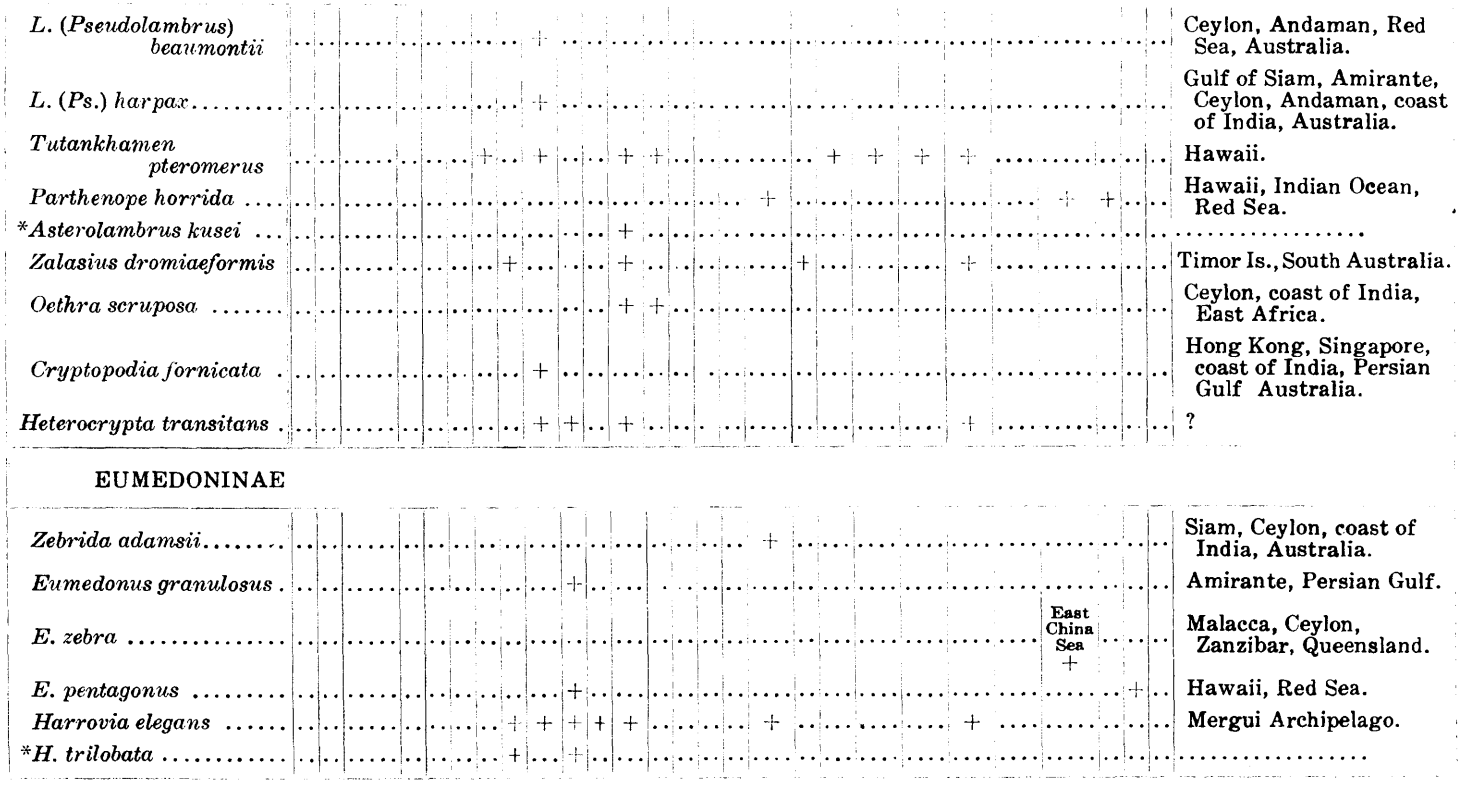

L. (Pseudolambrus) beaumontii
Ceylon, Andaman, Red Sea, Australia.
L. (Ps.) harpax
Gulf of Siam, Amirante, Ceylon, Andaman, coast of India, Australia.
Tutankhamen pteromerus
Hawaii.
Parthenope horrida
Hawaii, Indian Ocean, Red Sea.
*Asterolambrus kusei
Zalasius dromiaeformis
Timor Is., South Australia.
Oethra scruposa
Ceylon, coast of India, East Africa.
Cryptopodia fornicata
Hong Kong, Singapore, coast of India, Persian Gulf Australia.
Heterocrypta transitans
?
EUMEDONINAE
Zebrida adamsii
Siam, Ceylon, coast of India, Australia.
Eumedonus granulosus
Amirante, Persian Gulf.
E. zebra
East China Sea
Malacca, Ceylon, Zanzibar, Queensland.
E. pentagonus
Hawaii, Red Sea.
Harrovia elegans
Mergui Archipelago.
*H. trilobata

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PLATE XX

Explanation of the Plate XX

Fig. 1. *Halicarcinus orientalis* SAKAI. ♂ from Simoda, × 3.

Fig. 2. *Rhynchoplax messor* STIMPSON. ♂ from Simoda, × 4.

Fig. 3. *Elamena truncata* STIMPSON. ♂ from Simoda, × 3.

Fig. 4. *Trigonoplax unguiformis* DE HAAN. ♀ from Simoda, nat. size.

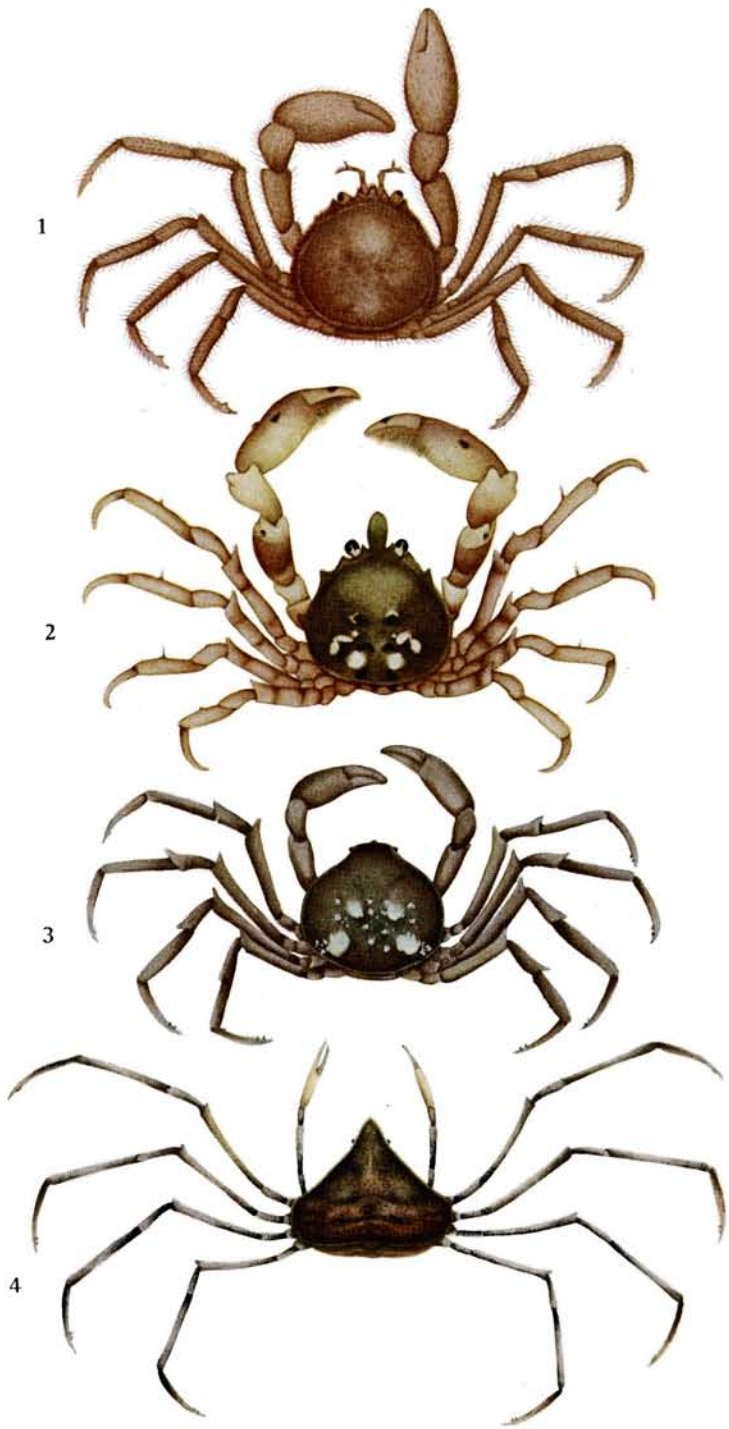

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PLATE XXI

Explanation of the Plate XXI

Fig. 1. *Paratymolus pubescens* MIERS. ♂ from Simoda, × 2.

Fig. 2. *Paratymolus sexspinosus* MIERS. ♂ from Simoda, × 1.5.

Fig. 3. *Oncinopus aranea* DE HAAN. ♀ from Simoda, × 1.

Fig. 4. *Achaeus brevidactylus* sp. nov. Male holotype from Simoda, ×2.1.

Fig. 5. *Achaeus superciliaris* (ORTMANN). ♂ from Sagami Bay, × 2.5.

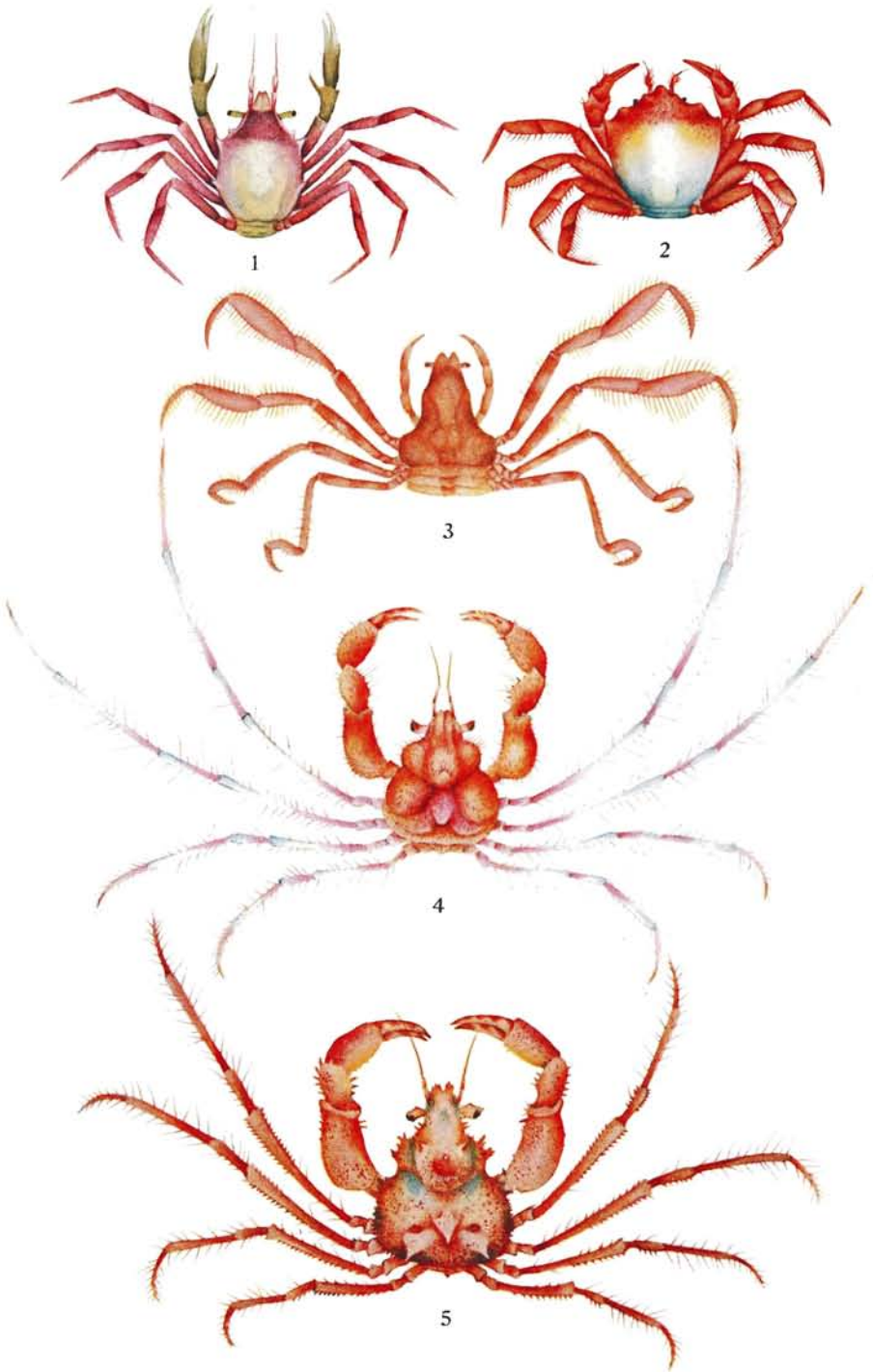

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PLATE XXII

Explanation of the Plate XXII

Fig. 1. *Achaeus japonicus* DE HAAN. ♂ from Simoda, × 1.

Fig. 2. *Achaeus suluensis* (RATHBUN). ♂ from Simoda, × 4.

Fig. 3. *Achaeus tuberculatus* MIERS. ♂ from Tokyo Bay, × 1.5.

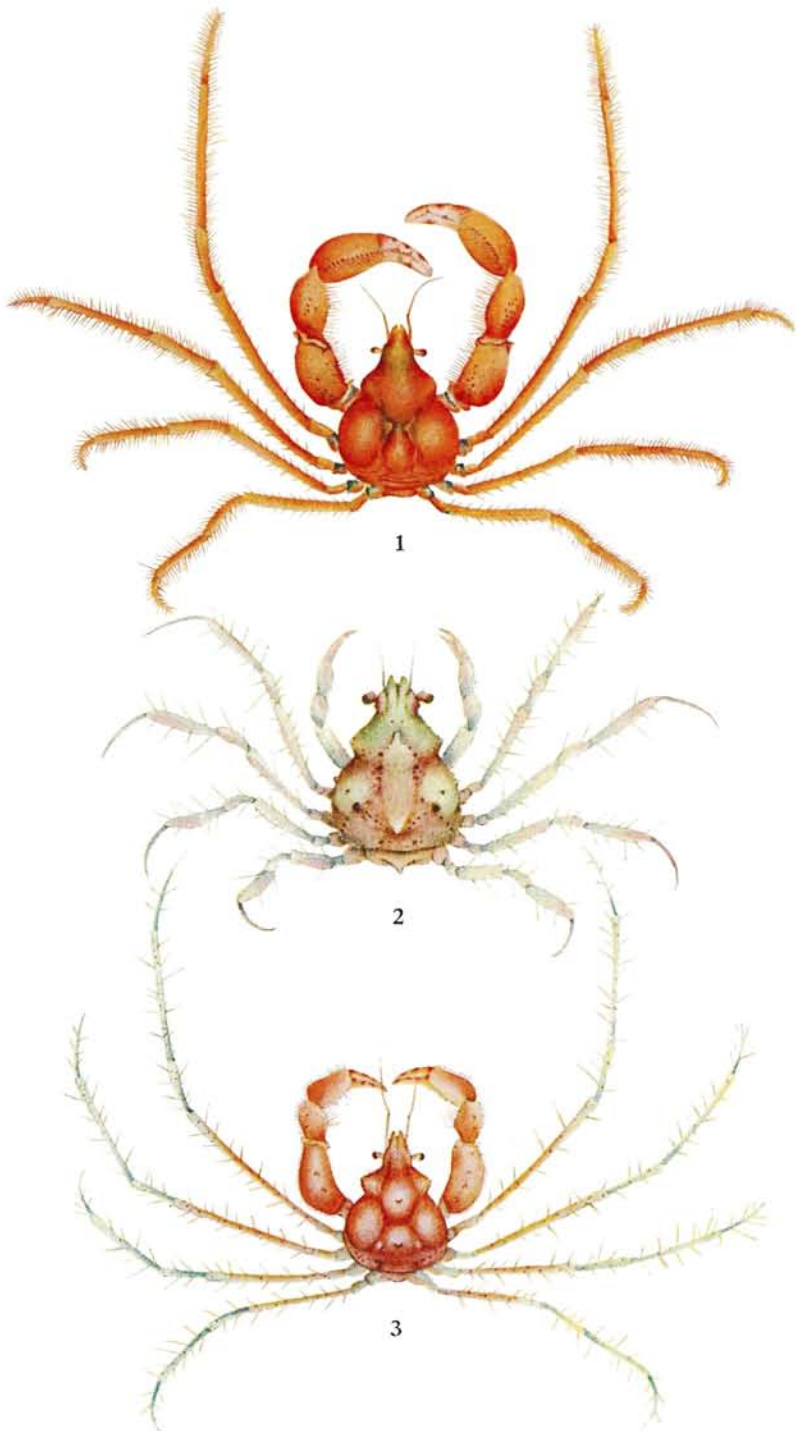

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PLATE XXIII

Explanation of the Plate XXIII

Fig. 1. *Pleistacantha sancti-johannis* MIERS. ♂ from Sagami Bay, × 1.2.

Fig. 2. *Achaeus pugnax* (DE MAN). ♂ from Sagami Bay, × 1.5.

Fig. 3. *Camposcia retusa* LATREILLE. ♂ from Simoda, × ¾.

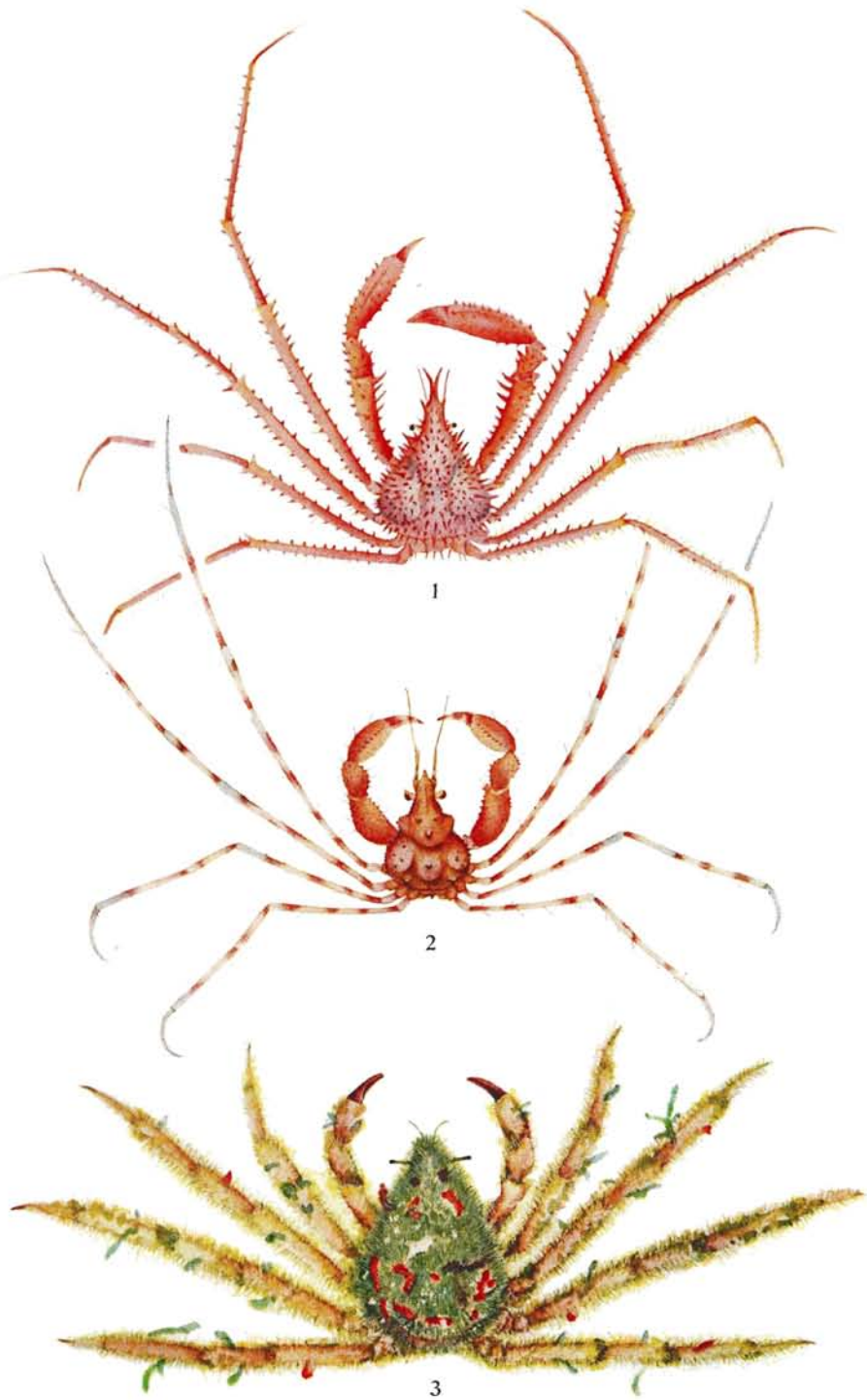

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PLATE XXIV

Explanation of the Plate XXIV

Fig. 1. *Macrocheira kaempferi* DE HAAN. Immature female from Izu Peninsula, × ½.

Fig. 2. *Platymaja wyville-thomsoni* MIERS. ♂ from Tosa Bay, × 4/5.

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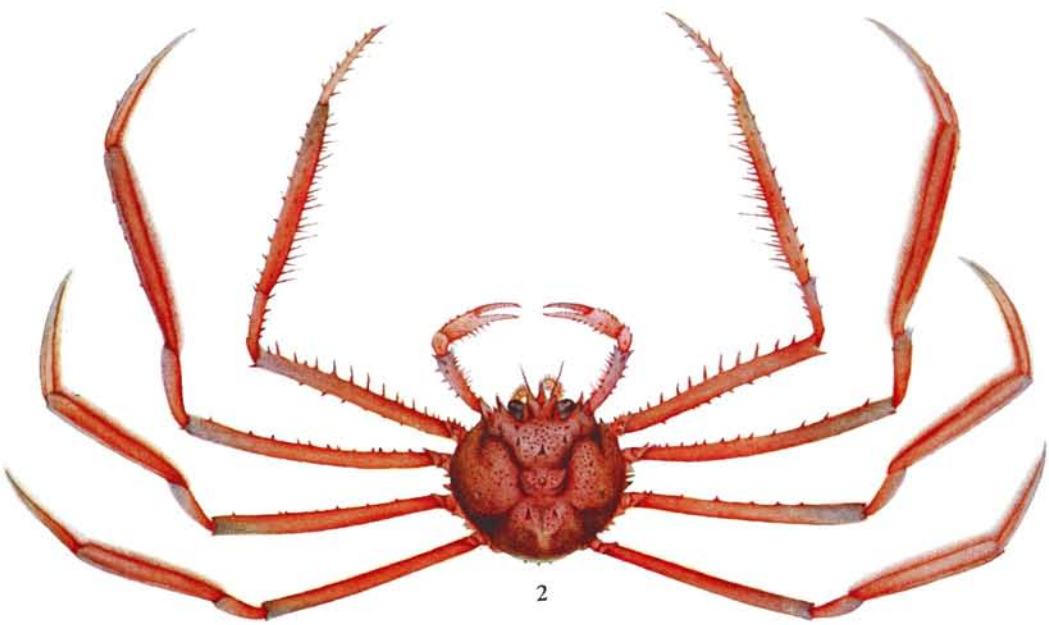

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PLATE XXV

Explanation of the Plate XXV

Fig. 1. *Zewa nipponica* nom. nov. ♂ from Simoda, × 1.

Fig. 2. *Pugettia minor* ORTMANN. ♂ from Sagami Bay, × 1.5.

Fig. 3. *Pugettia sagamiensis* GORDON. ♂ from Tosa Bay, × 1.

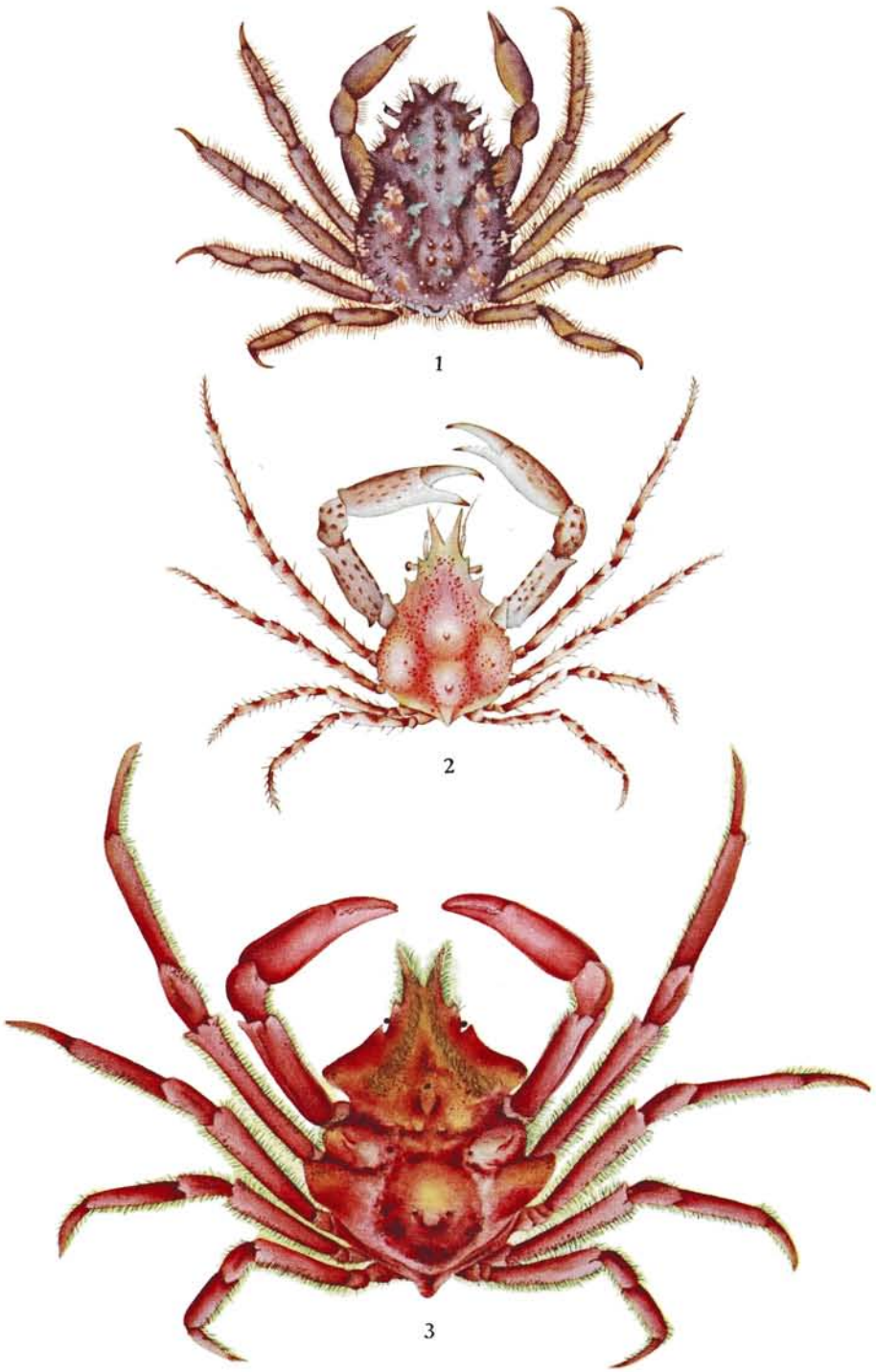

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PLATE XXVI

Explanation of the Plate XXVI

Fig. 1. *Pugettia quadridens* DE HAAN. ♂ from Simoda, × 1.

Fig. 2. *Pugettia nipponensis* RATHBUN. ♂ from Simoda, × 1.5.

Fig. 3. *Menaethius monoceros* LATREILLE. ♂ from Simoda, × 1.7.

Fig. 4. *Huenia proteus* DE HAAN. ♂ from Simoda, × 1.2.

Fig. 5. *Huenia proteus* DE HAAN. ♀ from Simoda, × 1.2.

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PLATE XXVII

Explanation of the Plate XXVII

Fig. 1. *Naxioides mammillata* ORTMANN. ♂ from Gobo, Kii Peninsula, × 2.8.

Fig. 2. *Choniognathus reini* (BALSS). ♂ from Sagami Bay, × 3.

Fig. 3. *Naxioides hystrix* (MIERS). ♂ from Simoda, × 1.

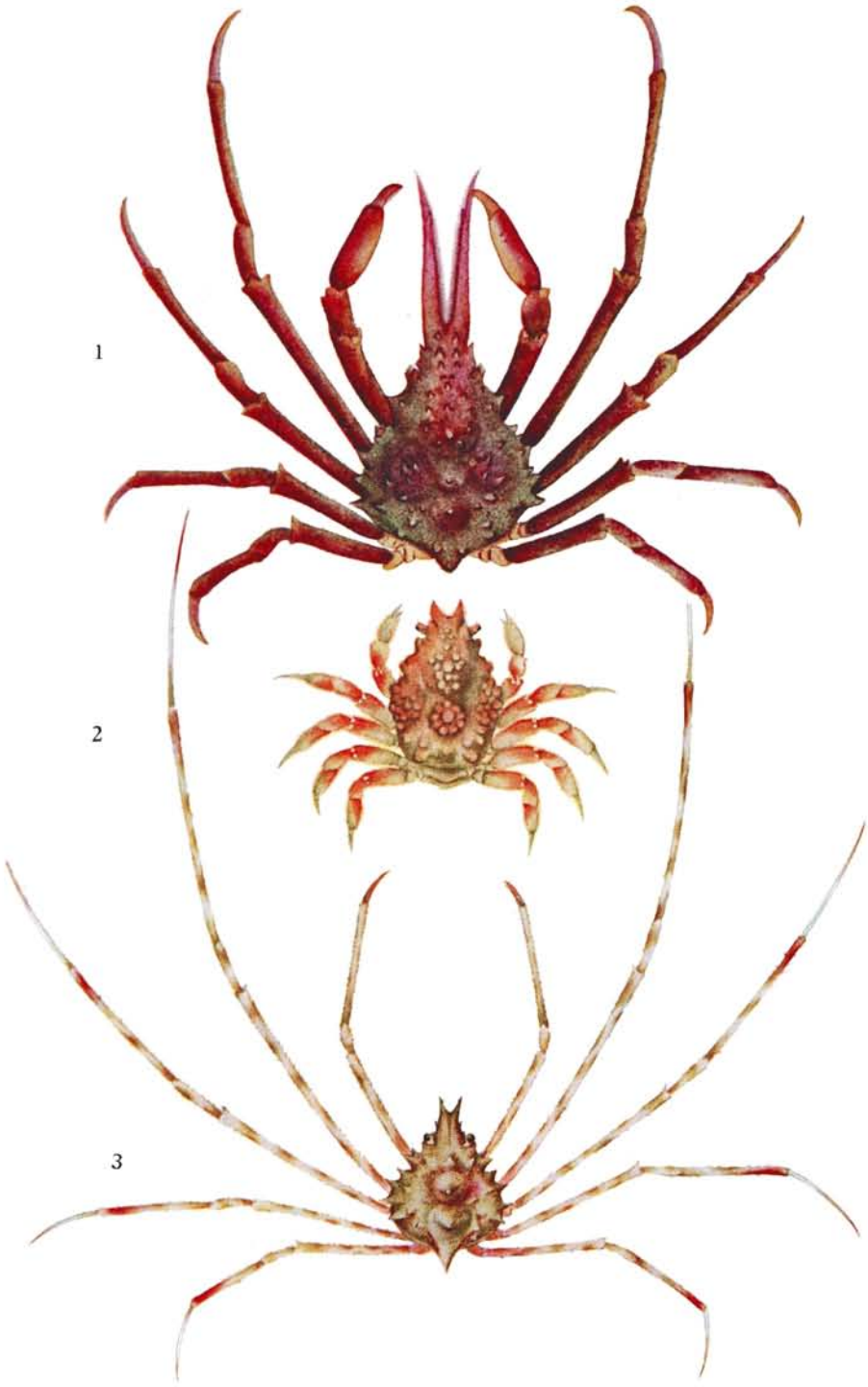

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PLATE XXVIII

Explanation of the Plate XXVIII

Chionoecetes opilio elongatus RATHBUN. ♂ from Hukui-ken, × 1/3.

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PLATE XXIX

Explanation of the Plate XXIX

Fig. 1. *Hyastenus kyusyuensis* (YOKOYA). ♂ from Hatusima, Sagami Bay, × 3.

Fig. 2. *Hyastenus diacanthus* DE HAAN. ♂ from Ise Bay, × 4/5.

Fig. 3. *Sphenocarcinus stimpsoni* (MIERS). ♀ from Tosa Bay, × 1.8.

Fig. 4. *Pisoides ortmanni* (BALSS). ♂ from Simoda, × 2.

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PLATE XXX

Explanation of the Plate XXX

Fig. 1. *Maja spinigera* DE HAAN. ♂ from Manazuru, × ½.

Fig. 2. *Maja japonica* RATHBUN. ♂ from Hatusima, Sagami Bay, × 1.7.

Fig. 3. *Schizophroida manazuruana* SAKAI. ♀ from Sagami Bay, × 2.

Fig. 4. *Leptomithrax edwardsi* DE HAAN. ♂ from Sagami Bay, × ½.

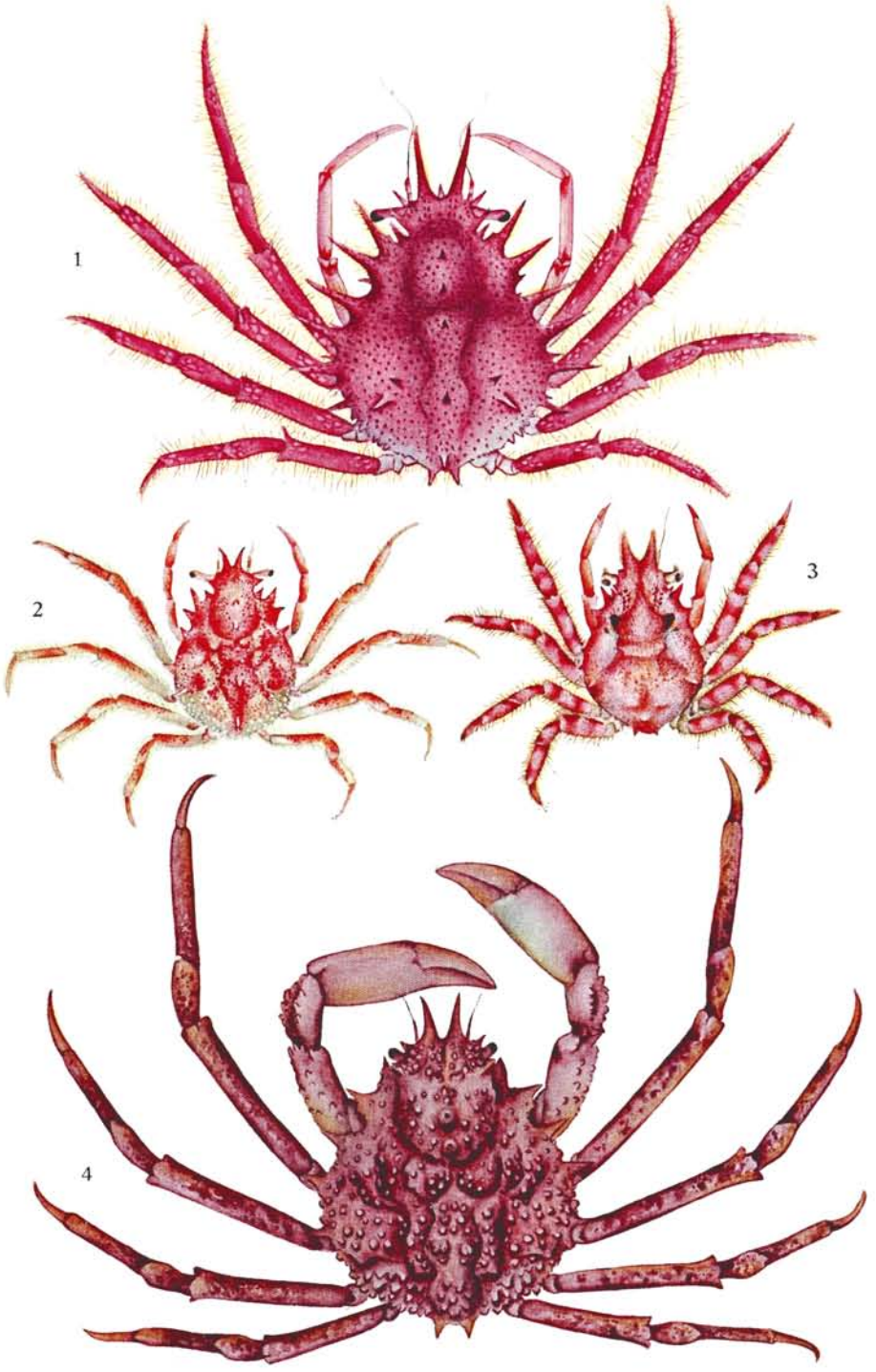

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PLATE XXXI

Explanation of the Plate XXXI

Fig. 1. *Leptomithrax bifidus* ORTMANN. ♂ from Sagami Bay, × 1.1.

Fig. 2. *Acanthophrys longispinus* (DE HAAN). ♂ from Simoda, × 1.

Fig. 3. *Acanthophrys spinosus* (MIERS). ♂ from Sagami Bay, × 1.

Fig. 4. *Schizophrys aspera* (MILNE EDWARDS). ♂ from Simoda, × 4/5.

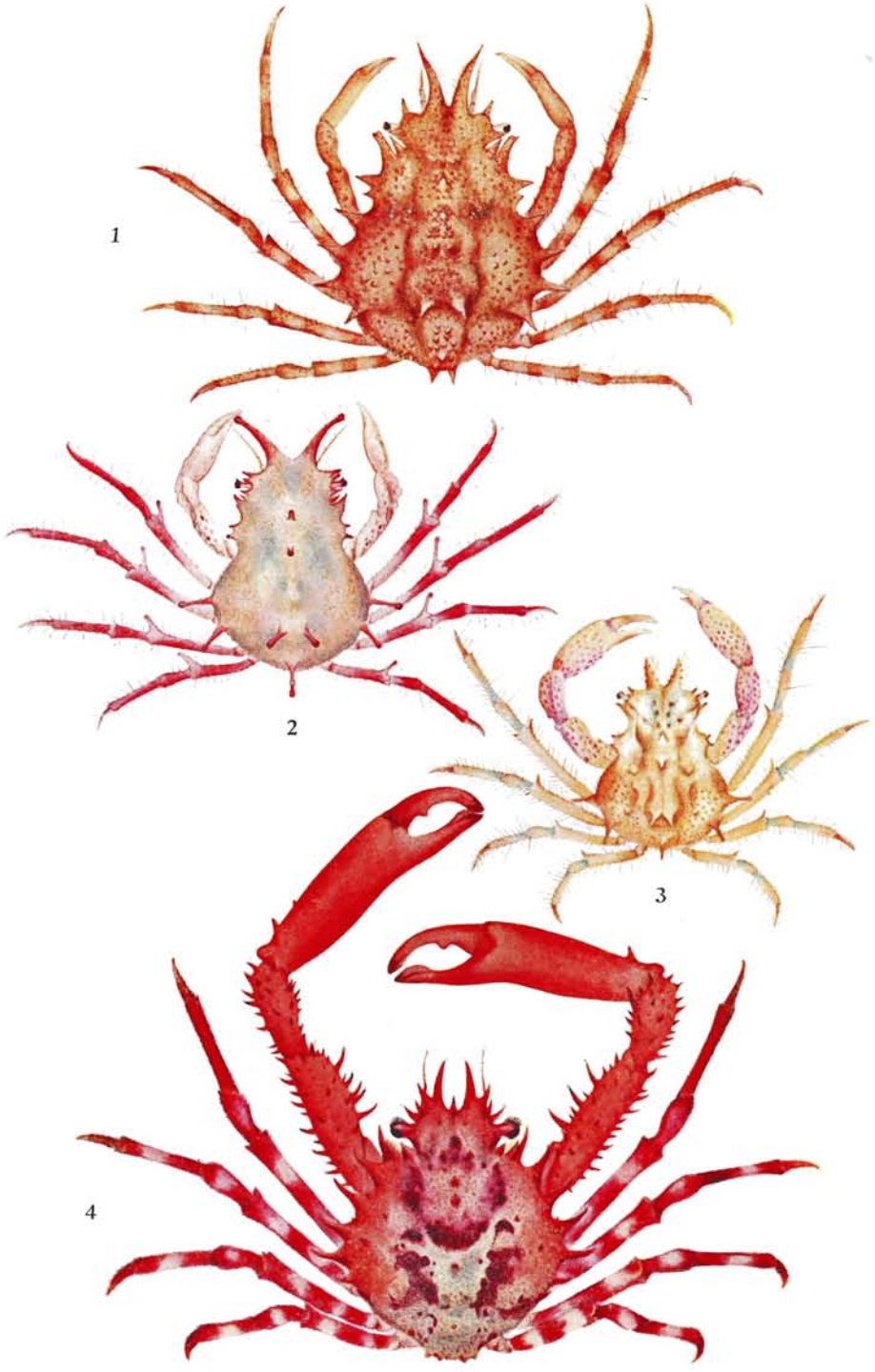

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PLATE XXXII

Explanation of the Plate XXXII

Fig. 1. *Micippa margaritifera* HENDERSON. ♂ from Simoda, × 2.5.

Fig. 2. *Micippa platipes* RÜPPELL. ♂ from Simoda, × 1.5.

Fig. 3. *Micippa thalia* HERBST. ♂ from Sagami Bay, × 1.1.

Fig. 4. *Tiarinia cornigera* LATREILLE. ♂ from Simoda, × 1.

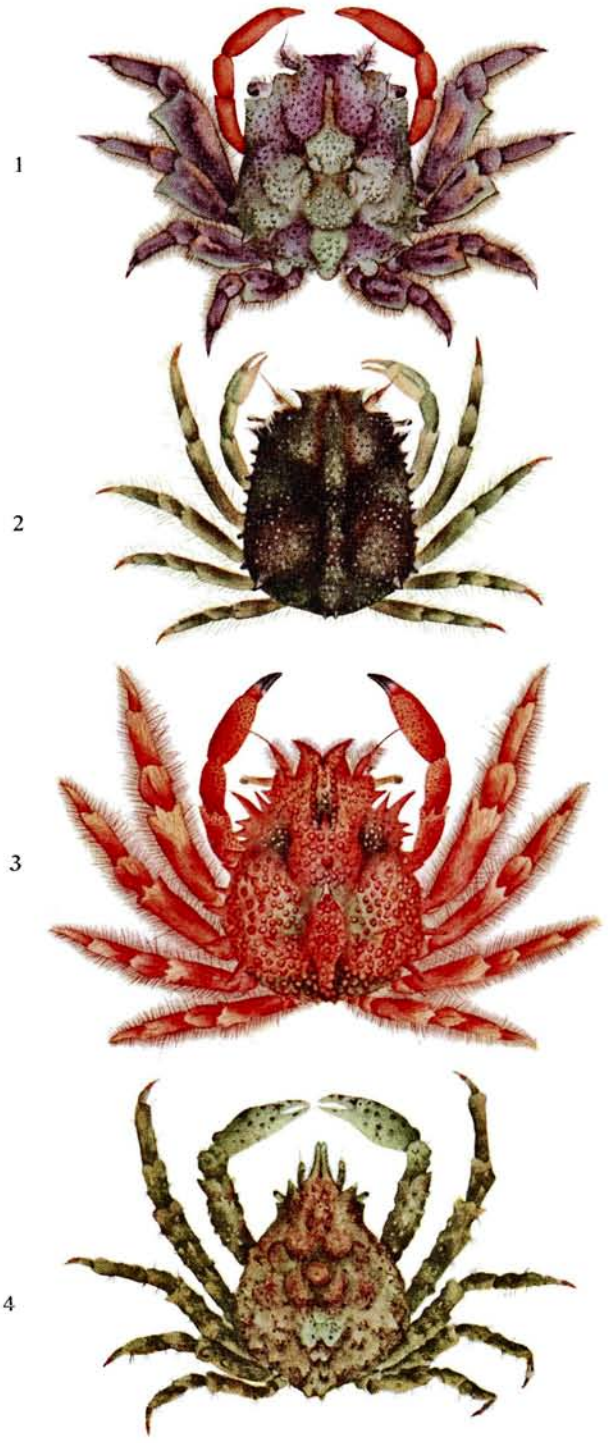

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PLATE XXXIII

Explanation of the Plate XXXIII

Fig. 1. *Harrovia elegans* DE MAN. ♂ from Tokyo Bay, × 1.5.

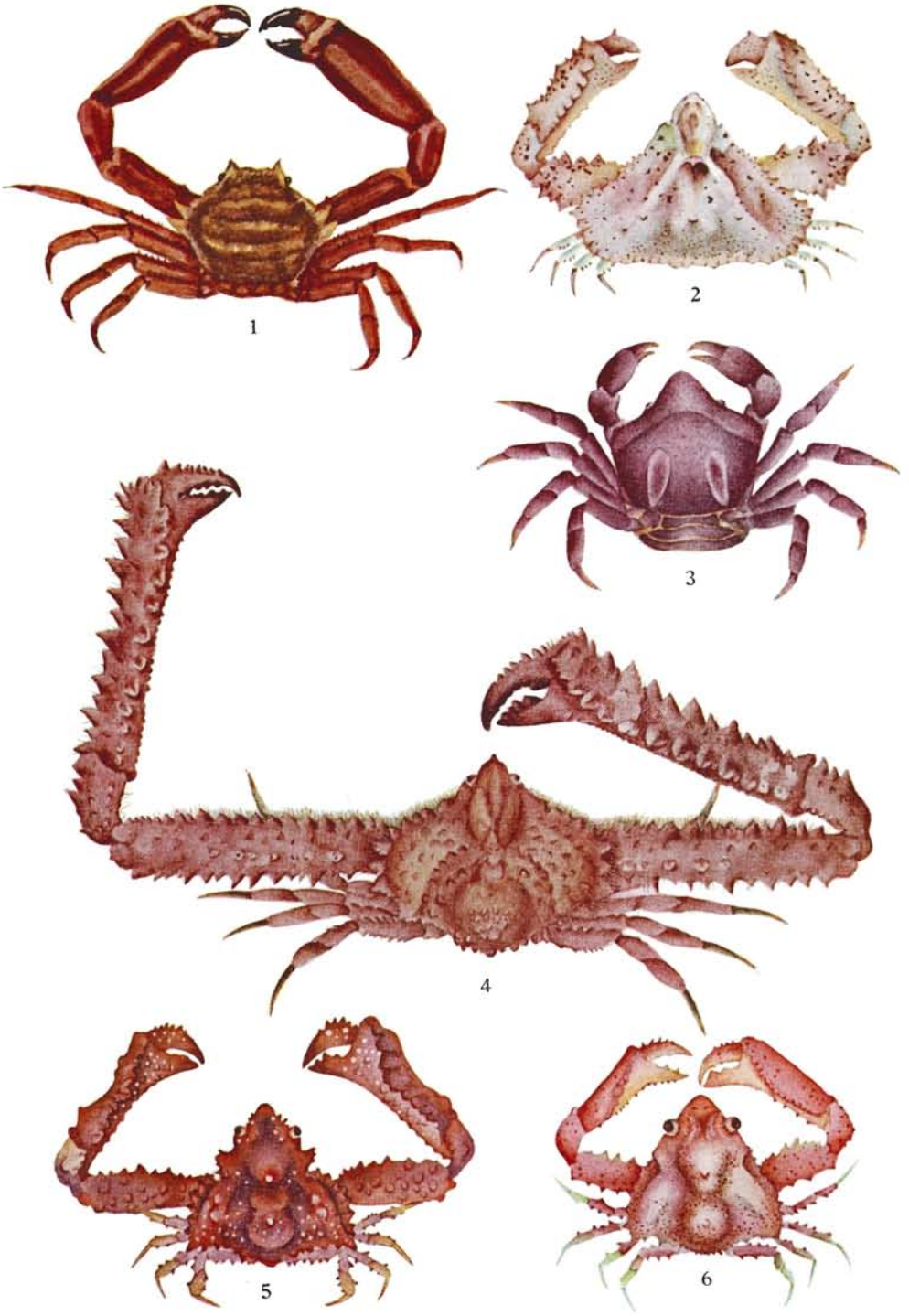
Fig. 2. *Heterocrypta transitans* ORTMANN. ♂ from Simoda, × 1.5.

Fig. 3. *Eumedonus pentagonus* RATHBUN. ♀ from Simoda, × 3.

Fig. 4. *Lambrus* (*Lambrus*) *validus* DE HAAN. ♂ from Simoda, × 1.

Fig. 5. *Lambrus* (*Pseudolambrus*) *beaumonti* ALCOCK. ♂ from Sagami Bay, × 2.

Fig. 6. *Lambrus* (*Pseudolambrus*) *harpax* ADAMS & WHITE. ♂ from Sagami Bay, × 3.



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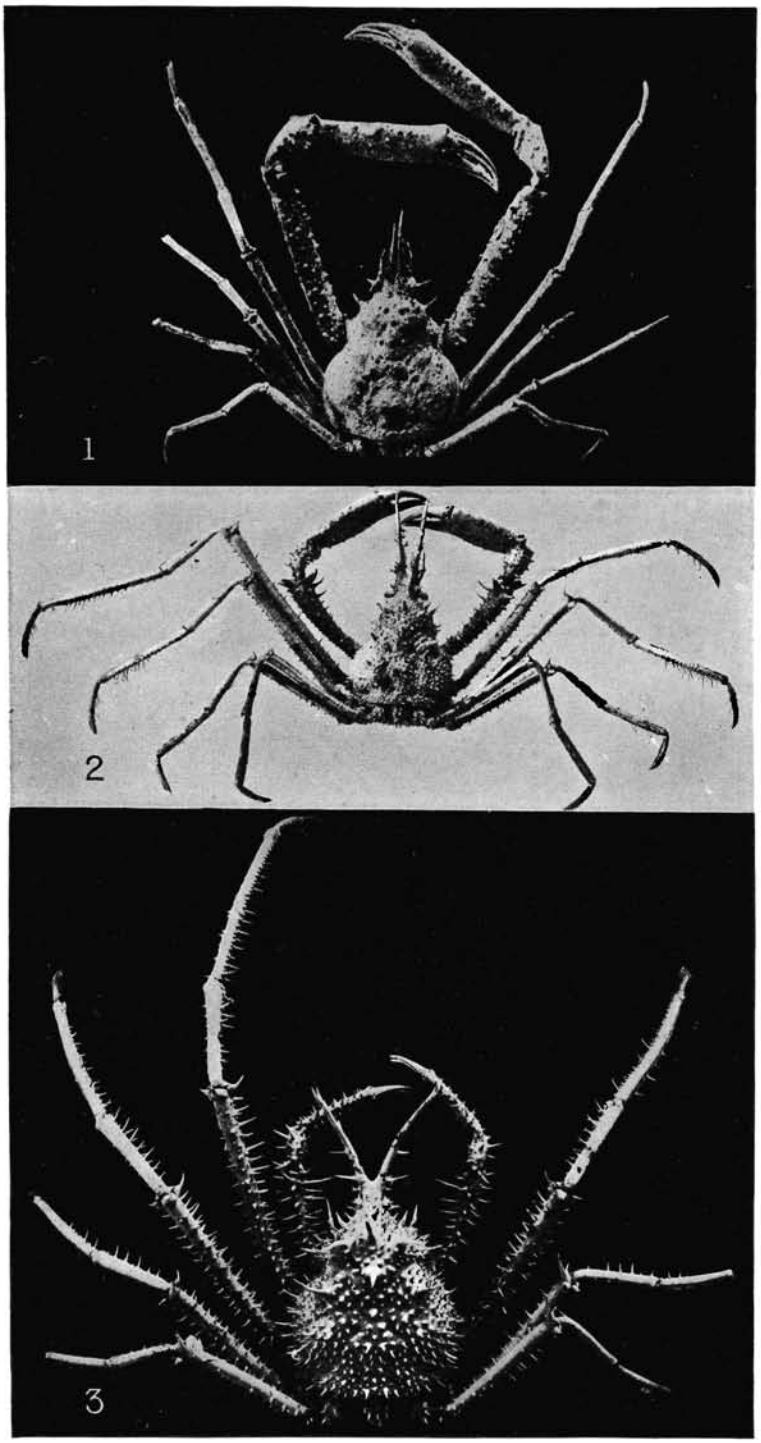


Fig. 1. *Oregonia gracilis* DANA.
♂ from the coast of Iwate-ken, ×½

Fig. 2. *Pleistacantha moseleyi* (MIERS).
♂ from Sagami Bay, ×⅗.

Fig. 3. *Pleistacantha moseleyi* (MIERS).
♀ from the coast of Miyazaki-ken, ×½

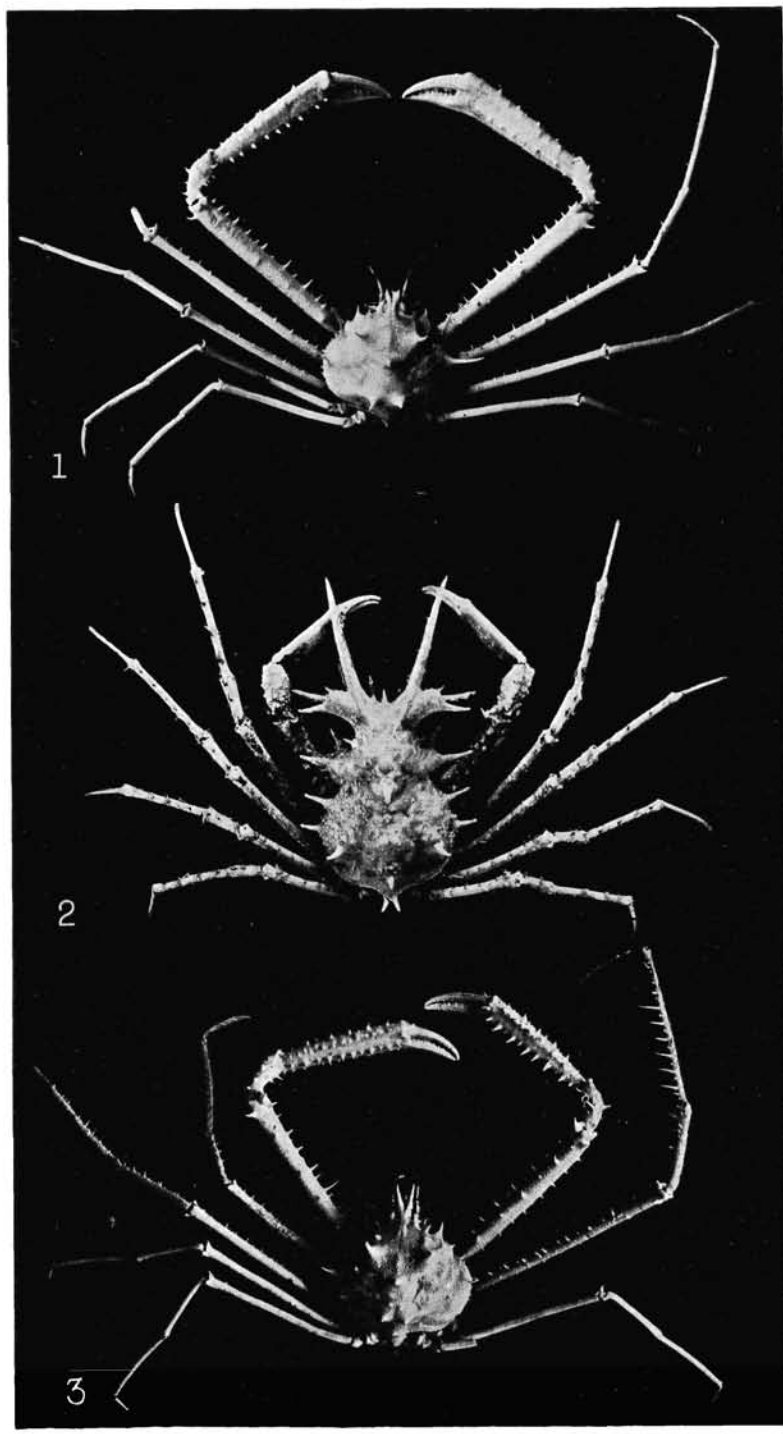


Fig. 1. *Cyrtomaja owstoni* TERAZAKI.
♂ from Sagami Bay, ×$\frac{3}{5}$.

Fig. 2. *Picrocerus armatus* A. M. EDWARDS.
♂ from Kii Peninsula, ×$\frac{1}{2}$.

Fig. 3. *Cyrtomaja intermedia* sp. nov.
Male holotype, ×$\frac{1}{2}$.

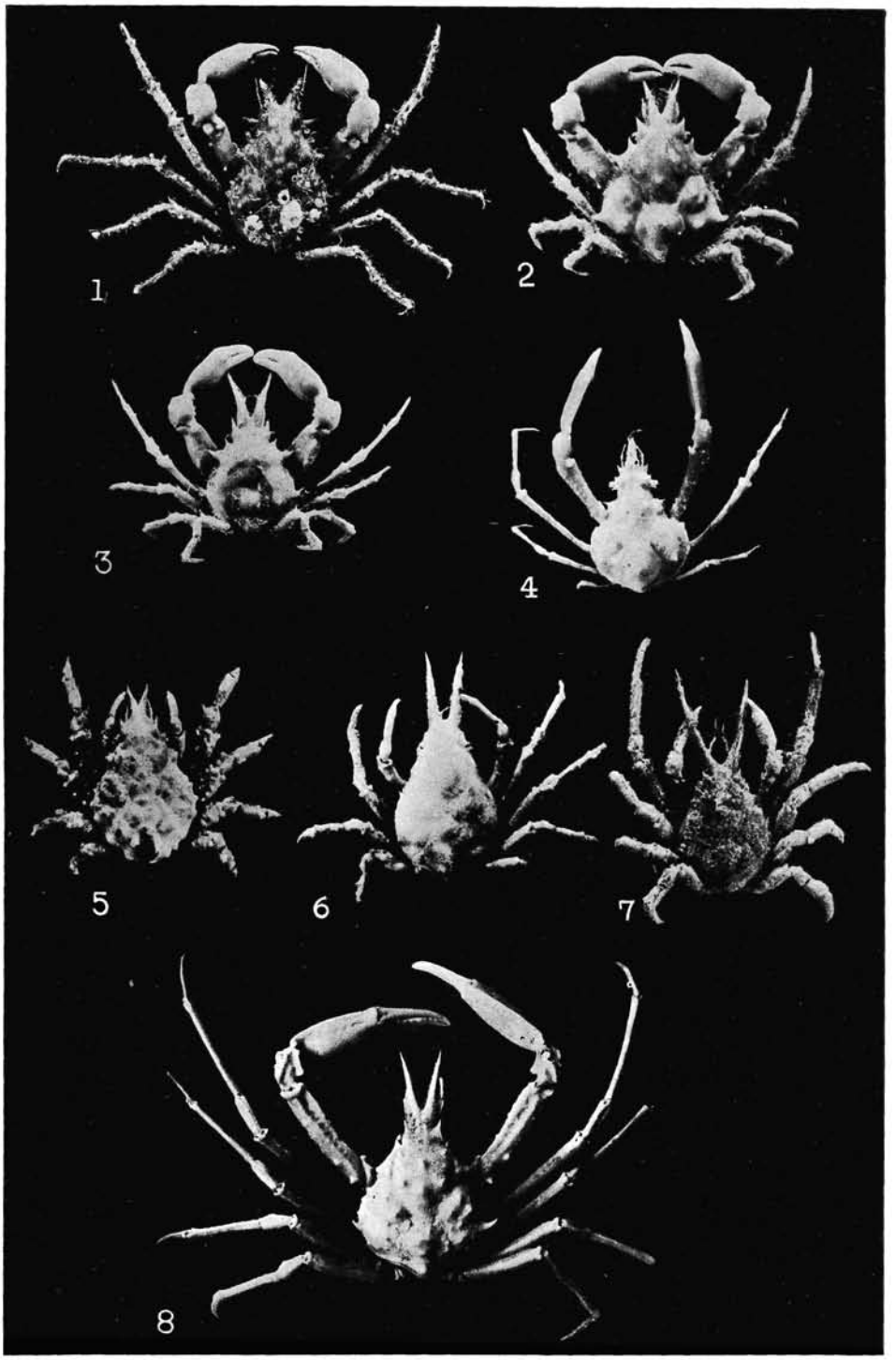


Fig. 1. *Zewa okamotoi* sp. nov.
♂ from Kagosima Bay, ×$\frac{4}{5}$.

Fig. 2. *Pugettia quadridens intermedia* subsp. nov.
♂ male holotype, ×1.

Fig. 3. *Pugettia quadridens pellucens* RATHBUN.
♂ from Simoda, ×1.3.

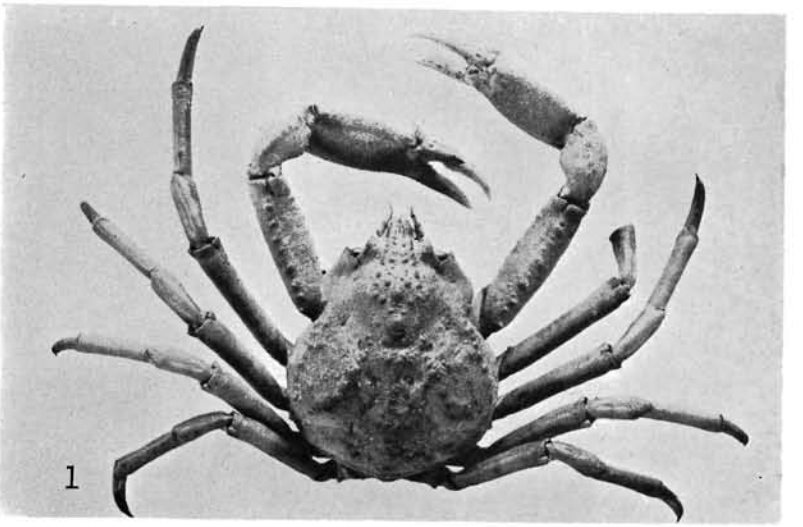
Fig. 4. *Menaethiops okai* SAKAI.
♂ from Hatusima, Sagami Bay, ×2.

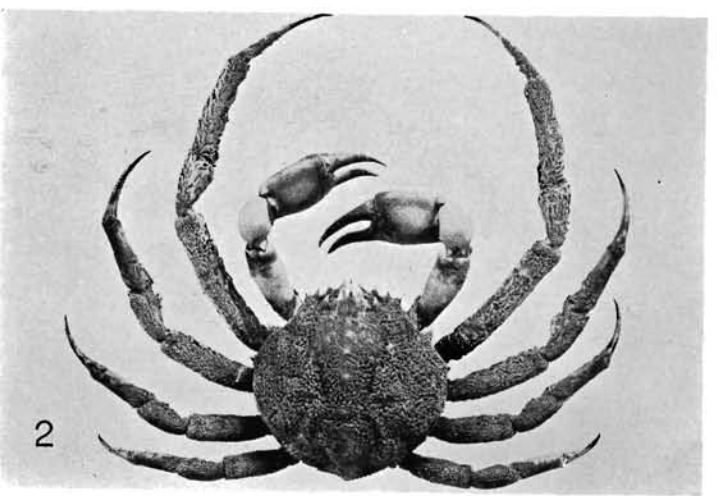
Fig. 5. *Tylocarcinus styx* (HERBST).
♀ from Tasa Bay, ×1.3.

Fig. 6. *Hyastenus elongatus* ORTMANN.
♀ from Tokyo Bay, ×1.

Fig. 7. *Hyastenus borradailei* RATHBUN.
♂ from Sagami Bay, ×1.

Fig. 8. *Chorilia longipes japonica* MIERS.
♂ from Sagami Bay, ×$\frac{3}{4}$.





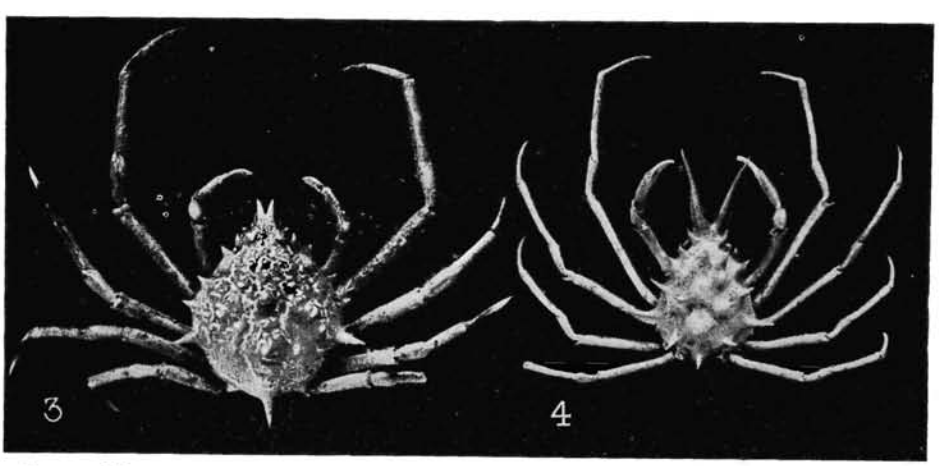


Fig. 1. *Hyas coarctatus alutaceus* BRANDT.
♂ from Kamchatka, ×½.

Fig. 2. *Doclea ovis* HERBST.
♂ from Kagosima Bay, ×½.

Fig. 3. *Doclea canalifera* STIMPSON.
♂ from Kii Peninsula, ×½.

Fig. 4. *Rochinia pulchra* (MIERS).
♂ from Kii Peninsula, ×1.

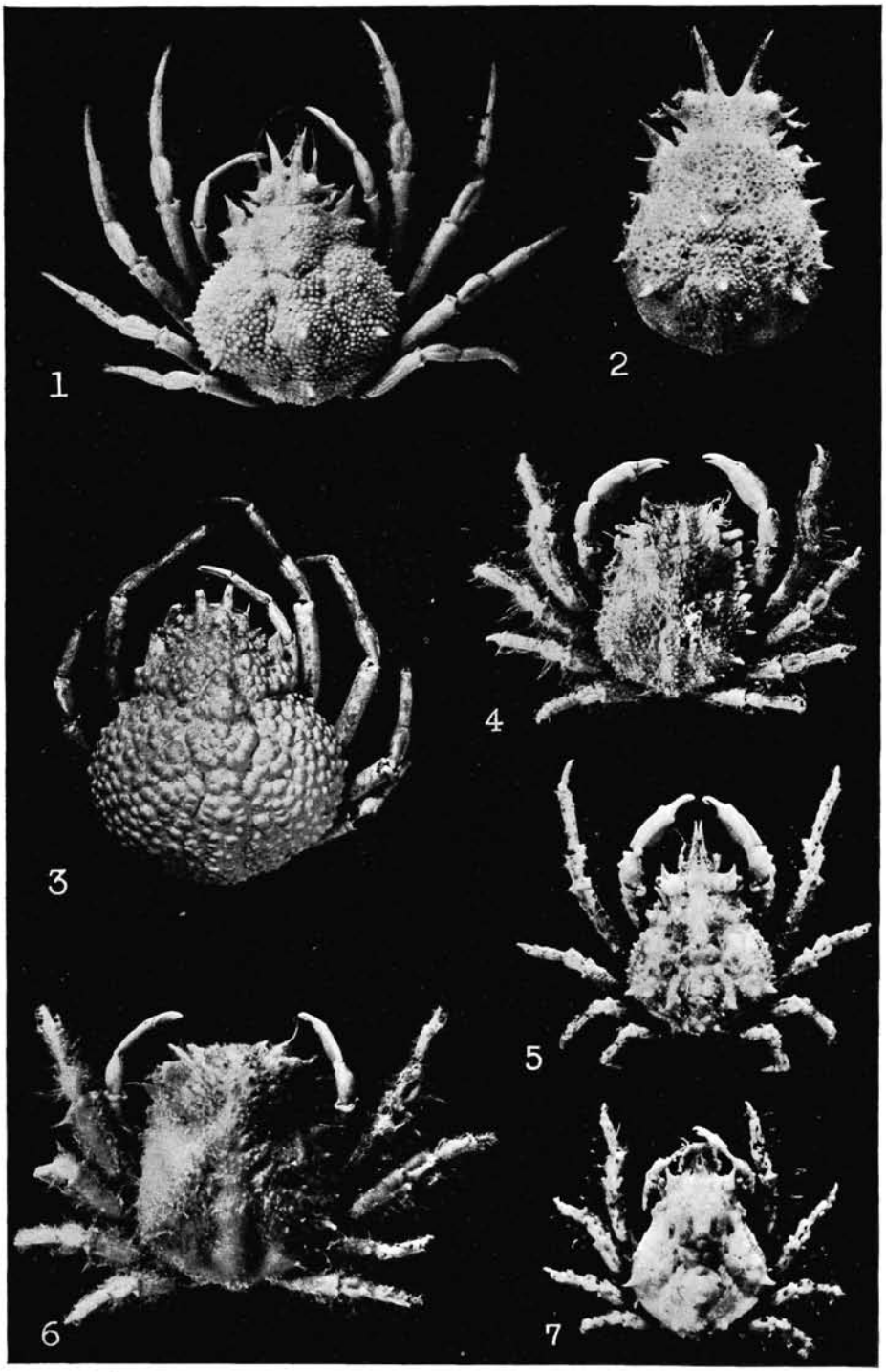


Fig. 1. *Maja nipponensis* SAKAI.
♀ from Nagasaki, ×1.5.

Fig. 2. *Maja miersi* WALKER.
Carapace of ♀ from Kii Peninsula, ×1.2.

Fig. 3. *Maja kominatoensis* (KUBO).
♀ from the coast of Kyûsyû, ×$\frac{6}{7}$

Fig. 4. *Micippa platipes* RÜPPELL.
♂ from Simoda, ×1.3.

Fig. 5. *Tiarinia spinigera* STIMPSON.
♂ from Tosa Bay, ×1.2.

Fig. 6. *Micippa philyra* (HERBST).
♂ from Simoda, ×1.2.

Fig. 7. *Tiarinia tiarata* (ADAMS & WHITE).
♂ from Tosa Bay, ×2.

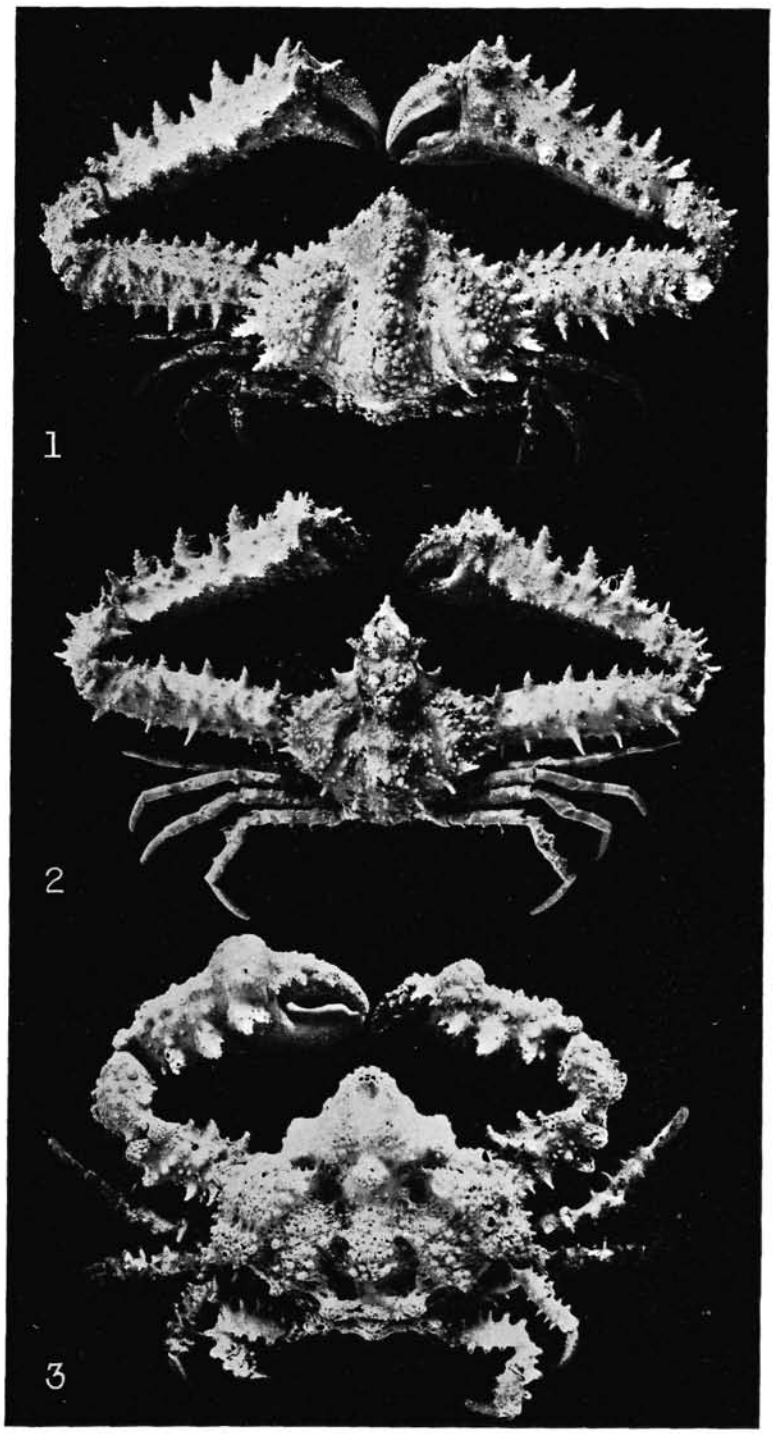


Fig. 1. *Lambrus* (*Lambrus*) *validus* DE HAAN.
♂ from Sagami Bay, ×½.

Fig. 2. *Lambrus* (*Rhinolambrus*) *longispinis* MIERS.
♂ from Simoda, ×½.

Fig. 3. *Parthenope horrida* FABRICIUS.
♀ from Kagosima Bay, ×½.

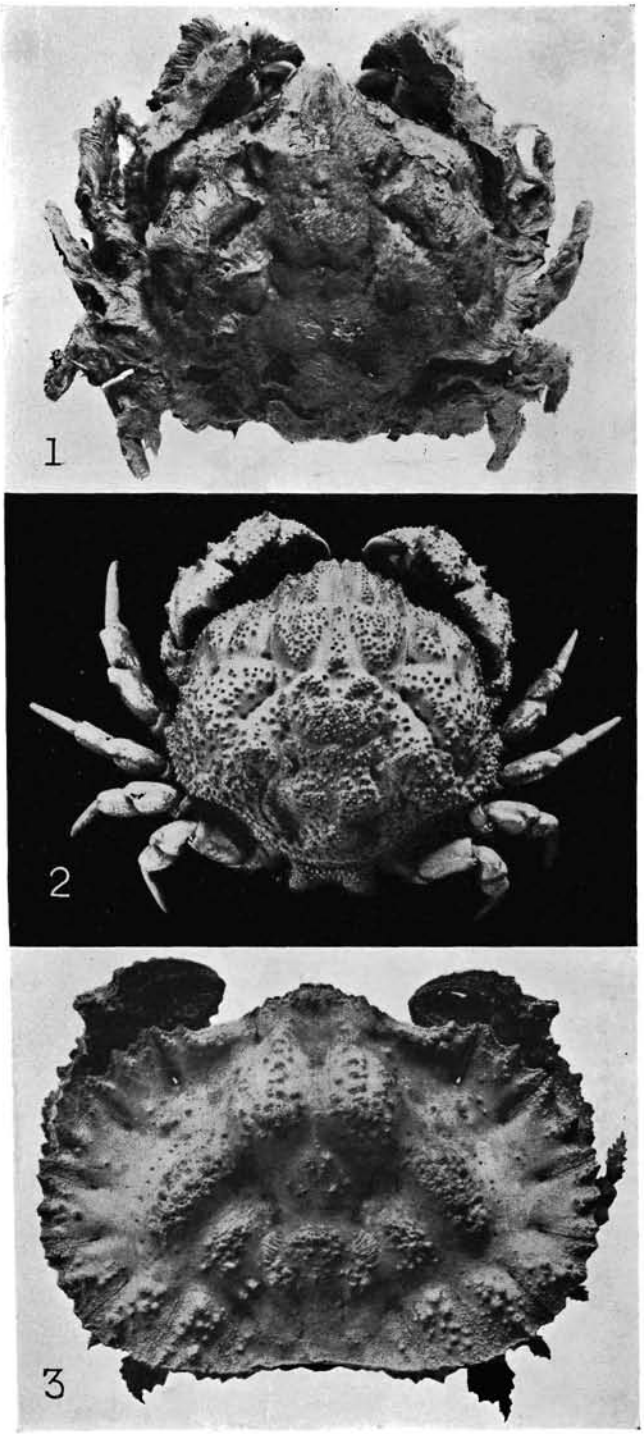


Fig. 1. *Zalasius dromiaeformis* (DE HAAN). ♂ from Kii Peninsula, ×1.

Fig. 2. *Zalasius dromiaeformis* (DE HAAN). Same specimen, denuded.

Fig. 3. *Oethra scruposa* LINNAEUS. ♂ from Tosa Bay, ×1.

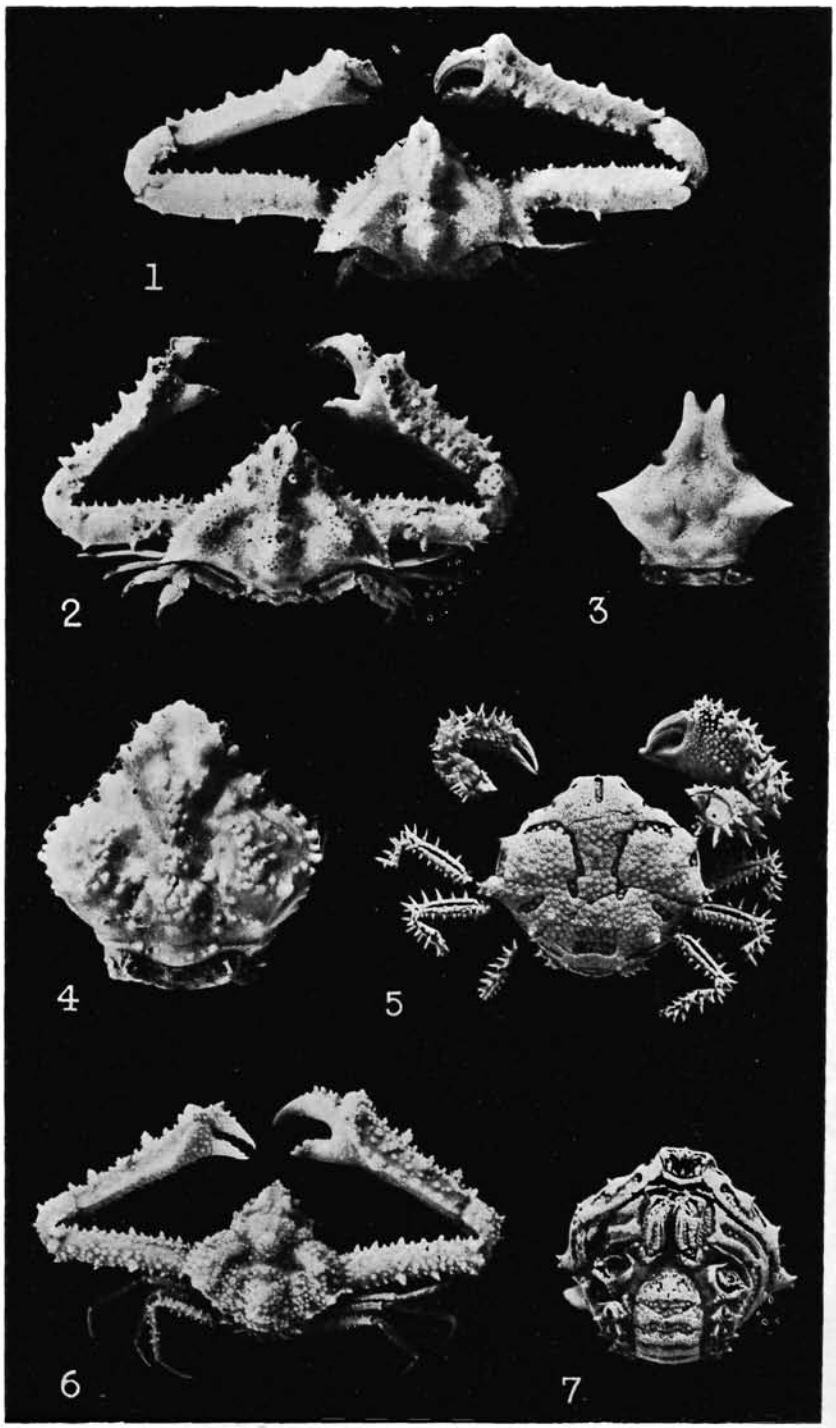


Fig. 1. *Tutankhamen pteromerus* (ORTMANN). ♂ from Hatusima, Ito, ×1.

Fig. 2. *Tutankhamen pteromerus* (ORTMANN). ♀ from the same locality, ×1.

Fig. 3. *Eumedonus zebra* ALCOCK. Carapace of ♂ from East China Sea, ×3.

Fig. 4. *Lambrus* (*Rhinolambrus*) *pelagicus* RÜPPELL. Carapace of ♂ from Saisyu-to, ×1.3.

Fig. 5. *Asterolambrus kusei* gen. et sp. nov. Dorsal aspect of female orthotype, ×$\frac{3}{4}$.

Fig. 6. *Lambrus* (*Platylambrus*) *mummifera* RATHBUN. ♂ from Hatusima, Sagami Bay, ×1.5.

Fig. 7. *Asterolambrus kusei* gen. et sp. nov. Ventral aspect of carapace of orthotype, ×$\frac{3}{4}$.