

Notes on some New Cirripedia from Japan

By

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With Plates XI-XIV and eleven Text-figures.

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Of altogether more than hundred species which have come under my examination in my study of the cirripedian fauna of Japan, nine species and one subspecies seem to be new to science. These belong to the five genera: *Oxynaspis* (1 species), *Heteralepas* (2 species), *Acasta* (5 species), *Pyrgoma* (1 species), and *Tetracrita* (1 subspecies). Here I propose to give the diagnoses of those forms, deferring detailed descriptions of them to another paper in which I shall enumerate all the forms of the group known from the Japanese waters.

Suborder LEPADOMORPHA

Genus **Oxynaspis** DARWIN, 1851.

1. **Oxynaspis pacifica** n. sp.

(*Plate XI, Figs. 1 to 10.*)

Diagnosis: Capitulum with five plates, covered by chitinous horny bark. Scutum fairly well developed, with protuberant umbo in the middle of the occludent margin; its carinal margin straight, forming a right angle with the basal margin. Tergum triangular, slightly arched upward, with broad basal point. Carina rectangularly bent at the umbo near the base, with the lower part expanded into a large, oblong disc; the upper part being more than twice of the lower part in length. Carina separated from scutum with broad interval. Peduncle narrow, a little shorter than the capitulum, and covered by chitinous horny bark. Colour yellowish-brown, plates white. Caudal appendages wanting. Labrum with teeth.

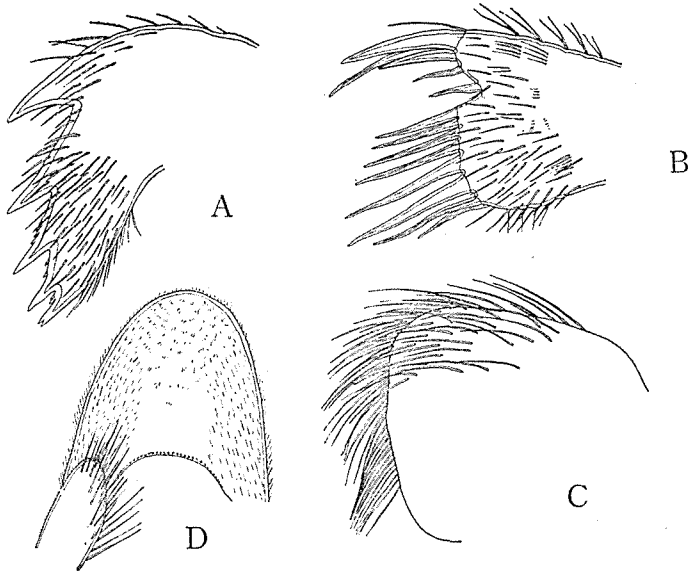


Fig. 1.

Oxyiaspis pacifica n. sp. A, mandible. B, maxilla I. C, maxilla II. D, labrum and palpus.

Size (mm.):

	Capitulum		Peduncle	
	Length	Breadth	Length	Breadth
Specimen 1.	9.5	7.5	7.5	4
" 2.	7	5	5	2

Localities: Seto, Prov. Kii; Toba, Prov. Shima; Misaki, Prov. Sagami. 70-200 fathoms. Attached to *Antipathes* sp.

Remark: This species is closely related to *Oxyiaspis celata* DARWIN and *O. Aurivilli* STEBBING, but may be distinguished from either by the shape of the valves. Also the lack of the caudal appendages is a characteristic feature of this species. This is a species rather abundant throughout the Pacific coast of Japan.

Genus **Heteralepas** PILSBRY, 1907.

Subgenus **Heteralepas** PILSBRY, 1907.

2. **Heteralepas (Heteralepas) percnonicola** n. sp.

(Plate XI, Fig. 2).

Diagnosis: Capitulum ovoid, moderately flattened, covered by comparatively hard chitinous integument. Scutum hidden under the integument, hardly recognizable from outside; sometimes entirely missing. Orifice not protuberant, somewhat exceeding one-third of the length of the capitulum; its edges sinuous. Occludent margin below the orifice convex. Peduncle very short, one-fifth as long as the capitulum, slightly wrinkled transversely. Colour: carinal margin beautiful purple, tinged with pinkish hue, fading towards the flattened portion of the surface; occludent margin beautiful dark red; the remaining portion pale or whitish. In specimens in alcohol, these colours fade away.

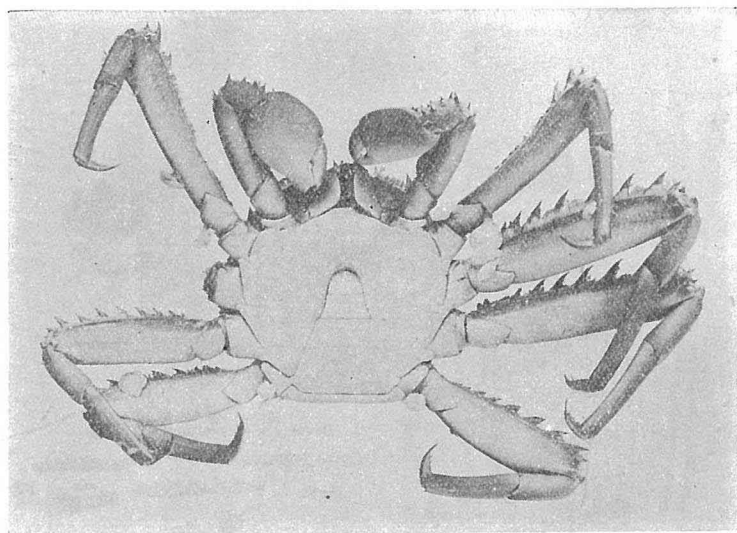


Fig. 2.

Heteralepas (Heteralepas) percnonicola n. sp. Several specimens attached to *Percnon tenuifrons* (M.-EDWARDS). Natural size.

Cirri, except the first pair, nearly equal together, with rami consisting of 14 or 15 segments which are armed each with a pair of very long spines and three or two minute ones at the anterior distal

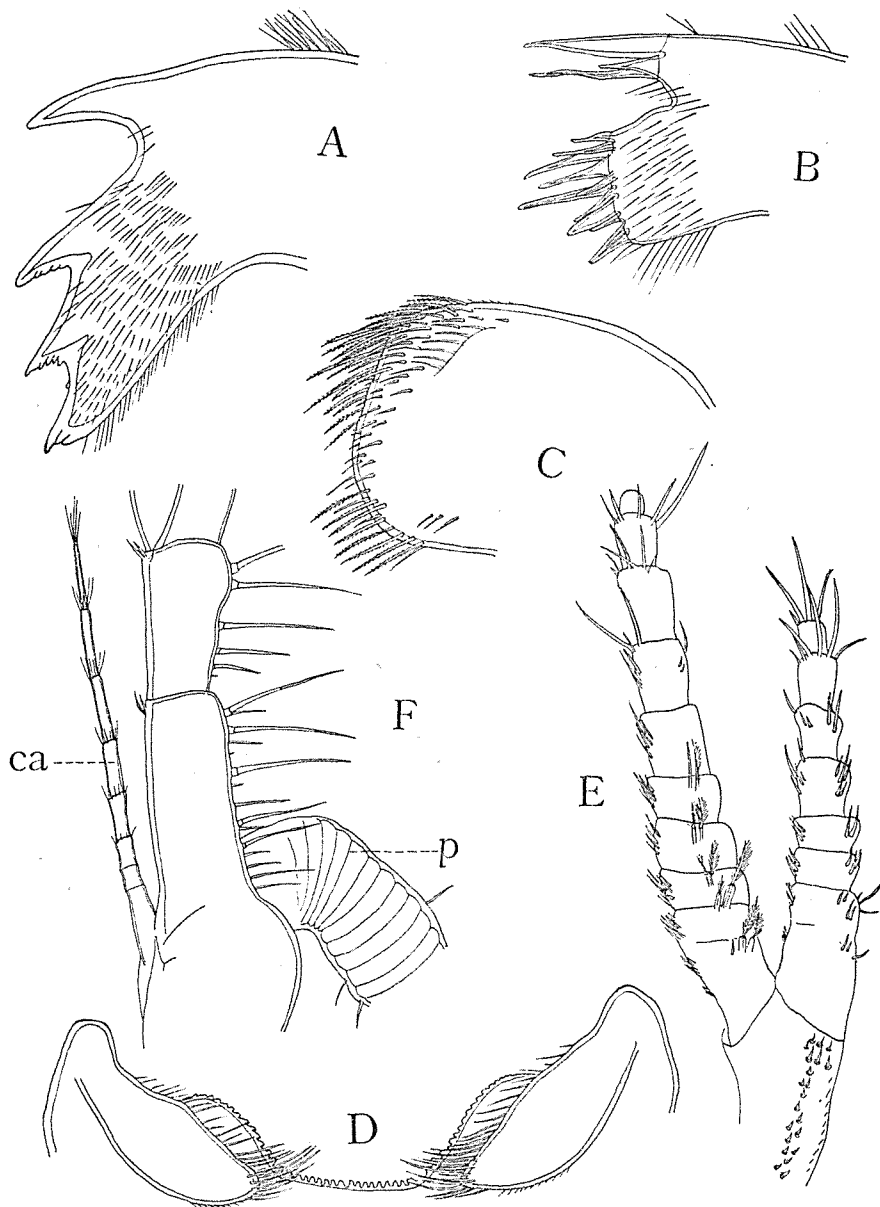


Fig. 3.

Heteralepas (Heteralepas) percnonicola n. sp. A, mandible. B, maxilla I. C, maxilla II. D, labrum and palpi. E, cirrus I. F, lower part of cirrus VI and penis (p) with caudal appendage (ca).

angle. Caudal appendages long, with 8-9 segments. Penis thick, rather short. Labrum with chitinous teeth. Mandible with three teeth, of which the second and third ones pectinated. Maxilla II quadrangular, provided with serrated bristles arranged in two groups.

Size of the largest specimen (mm.):

Capitulum		Peduncle	
Length	Breadth	Length	Breadth
5	4.5	1.5	1

Locality: Seto, Prov. Kii. Near the low tidal mark, attached to a crab, *Percnon tenuifrons* (M.-EDWARDS).

Remark: Evidently this species shows some resemblance with *Heteralepas quadrata* (AURIVILLIUS), but differs from that in the following points: (1) the characteristic beautiful colour, (2) the hardness of the chitinous integument, (3) the non-protuberant orifice, (4) the extreme shortness of the peduncle, (5) the penis having a smooth surface, and so on.

3. *Heteralepas* (*Heteralepas*) *avis* n. sp.

(Plate XI, Figs. 3 & 3a.)

Diagnosis: Capitulum distinct from peduncle, oval and somewhat resembling a bird-head, furnished with a prominent ridge extending dorsally from the orifice to two-thirds of the length of the capitulum; integument delicately wrinkled transversely. Scutum narrow, largely hidden. Orifice protuberant, with two triangular valves, not tubular. Peduncle very long, about three times as long as capitulum, cylindrical. Colour, light yellow, slightly brownish on the capitulum.

All cirri not well developed, nearly straight and short; rami slightly shorter than the corresponding pedicels; spines sparse except the upper part of rami. Caudal appendages very short. Penis short, transparent. Mouth-parts very characteristic: Labrum with teeth. Palpus triangular. Mandible with three characteristic pectinated teeth. Maxilla II somewhat quadrangular, with rounded edge scattered with short bristles.

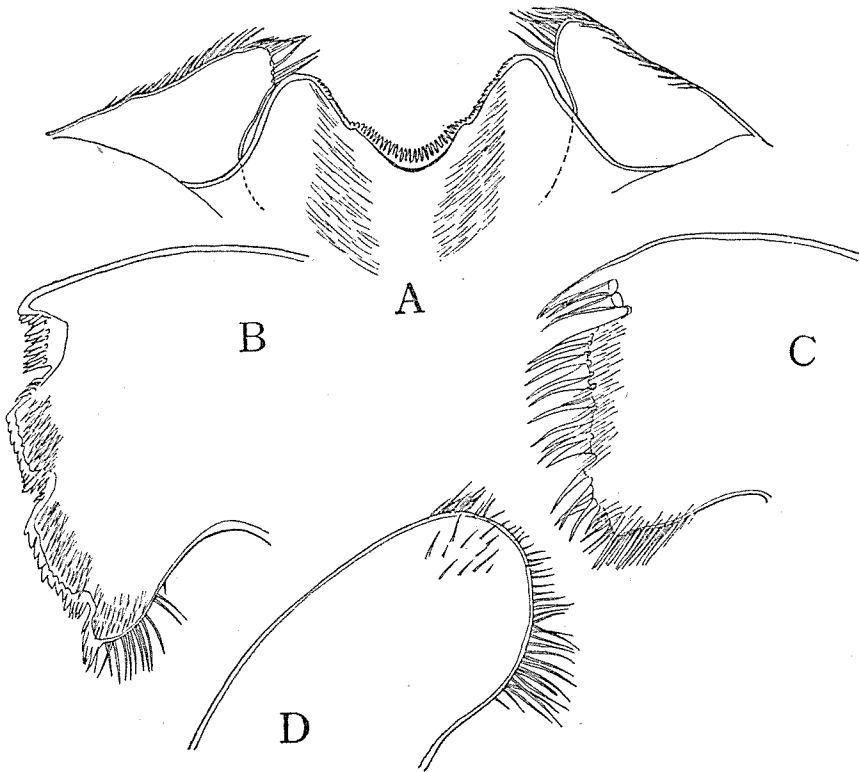


Fig. 4.

Heteralepas (Heteralepas) avis n. sp. *A*, labrum and palpi. *B*, mandible. *C*, maxilla I. *D*, maxilla II.

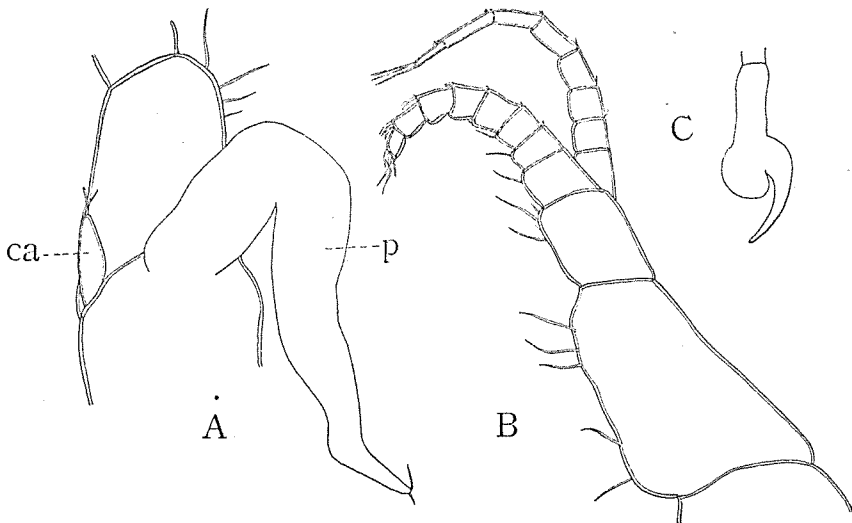


Fig. 5.

Heteralepas (Heteralepas) avis n. sp. *A*, pedicel of cirrus VI and penis (*p*) with caudal appendage (*ca*). *B*, cirrus V. *C*, filamentary appendage.

Size (mm.):

	Capitulum		Peduncle	
	Length	Breadth	Length	Breadth
Specimen 1	7	5.5	20	3
" 2	3.5	2.5	11.5	1.5

Locality: Misaki, Prov. Sagami. Depth unknown. Two specimens attached to a *Dolium*-shell inhabited by a hermit-crab.

Remark: This is a well-defined species with many points of distinction separating it from other species of the same genus.

Suborder BALANOMORPHA

Genus *Acasta* LEACH, 1817.

4. *Acasta Komaii* n. sp.

(Plate XII, Figs. 1 to 1d.)

Diagnosis: Shell variable in shape, generally deep cup-like, white, with the apex dark bluish-green owing to minute algae growing on the surface. Parietes smooth, strongly ribbed internally; the apices obtuse, curved inwards towards the orifice. Carino-lateral parietes narrow, about one-fifth as wide as lateral parietes. Orifice very small. Basis smooth internally with the edge finely crenated. Scutum broad, without longitudinal striae, with short but strongly developed articular ridge; the basal margin nearly as long as the occludent margin. Tergum triangular, very small, with prominent short articular furrow; the surface sculptured with longitudinal striae; spur short, but broadly pointed. Cirrus IV with three to five nail-like teeth on the lower segments of the anterior ramus; upper segment of its pedicel with many (about 16) teeth. Labrum without teeth.

Size (mm.):

	Height	Carino-rostral diameter
Specimen 1	11.5	7.5
" 2	11.5	6
" 3	11	8
" 4	10	9
" 5	10	6
" 6	9.5	8

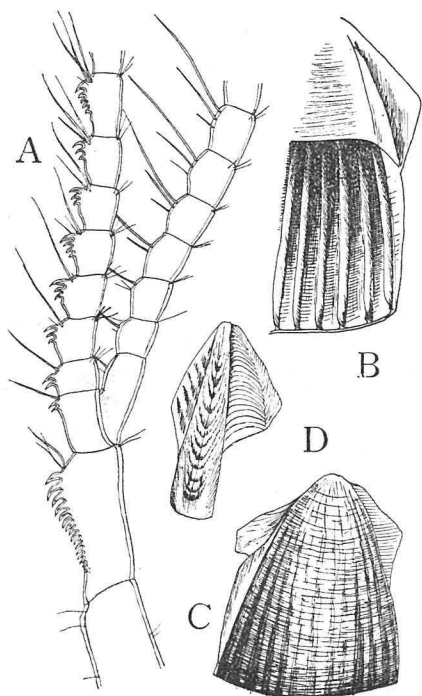


Fig. 6.

Acasta Komaii n. sp. A, cirrus IV. B, internal view of half of lateral parietes. C, external view of lateral parietes. D, external view of carino-lateral parietes.

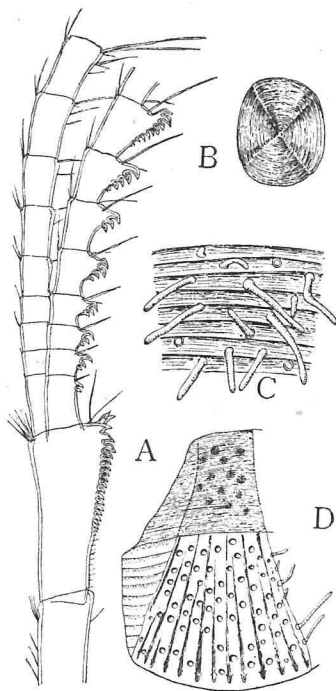


Fig. 7.

Acasta aperta n. sp. A, cirrus IV. B, basis of square formed. C, external view of a portion of parietes, much magnified. D, internal view of half of lateral parietes, showing many pores.

Locality: Seto. Prov. Kii. Imbedded in *Reniera okadai* KADOTA and *R. japonica* KADOTA.

Remark: In general appearance this species differs from *Acasta sporillus* DARWIN in having moderately narrow carino-lateral parietes, and from *A. sulcata* LAMARCK in the apices of all parietes being curved strongly inwards towards a very narrow orifice. The opercular valves show close resemblance to HOEK's figure of *A. pectinipes* PILSBRY (= *A. nitida* HOEK).

This species is quite common in those species of *Reniera*, found in the vicinity of the Seto Marine Biological Laboratory.

5. *Acasta aperta* n. sp.

(Plate XII Figs. 2, to 2c.)

Diagnosis: Shell white, tinged with light purplish colour in the upper part. External surface of parietes provided with long flexible spines along lines of growth; internal surface marked with longitudinal ribs, the interspaces between them perforated by small pit at each of the bases of the spines on the external surface; radii and alae broad. Carino-lateral parietes missing, retaining rather broad radii and alae only. Basis shallow cup-shaped, round or somewhat square as in *A. dofleini* KRÜGER, with the edge feebly crenated. Orifice extremely large. Scutum elongated, without longitudinal striae; internally with feeble articular ridge; adductor ridge missing, in older specimens, however, feebly developed. Tergum without longitudinal striae, with prominent articular ridge internally; spur very short, about half as wide as the basal margin. Cirrus IV with three to ten nail-like teeth on the lower segments of the anterior ramus; upper segment of its pedicel with many (about 20) teeth. Labrum with teeth.

Size:

Carino-rostral diameter, 5 mm.

Height, 5 mm.

Localities: Seto, Prov. Kii; Toba, Prov. Shima; Misaki, Prov. Sagami. Imbedded in *Reniera okadai* KADOTA and *R. japonica* KADOTA, associated with *Acasta dofleini* KRÜGER and *A. Komaii* n. sp.

Remark: This species is closely related to *A. dofleini* KRÜGER in various points, but may be distinguished from it in the extremely large orifice and in the feature of cirrus IV. This is a form apparently as distinct as several others which are ranked as species, instead of being a mere variety of *A. dofleini* KRÜGER, because the differential characters are all constant. This also is very common in the coast of Japan.

6. *Acasta cancellorum* n. sp.

(Plate XIII, Figs. 1 to 1d.)

Diagnosis: Shell white, subglobular. Parietes inflected above, externally furnished with prickly longitudinal ribs, studded with short calcareous projections, which are corroded in places; internally, slightly ribbed near the lower edges. Carino-lateral parietes one-third as wide as lateral parietes. Basis cup-shaped, smooth internally, with slightly crenated edge. Orifice rather small. Opercular valves covered external-

ly with yellowish chitinous integument; very characteristic in form as following: Scutum covered by cancellated sculpture, with the tergal margin nearly half as wide as the occludent margin. Tergum with strongly cancellated sculpture; apex beaked; longitudinal furrow very

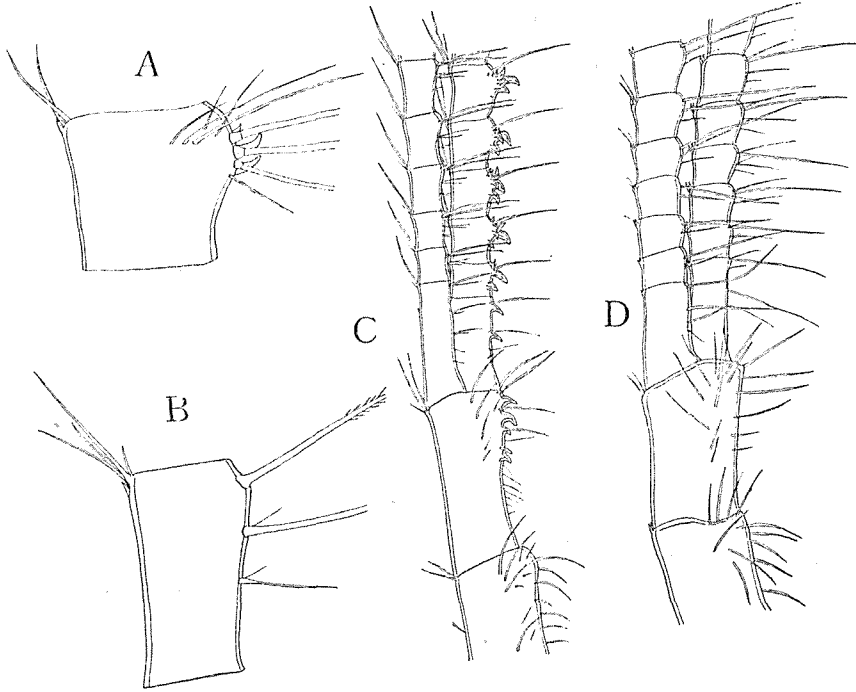


Fig. 8. A—C.

Acasta cancellorum n. sp. A, 6th segment of the anterior ramus of cirrus III. B, intermediate segment of cirrus V. C, cirrus IV. D, *Acasta denticulata* n. sp. cirrus IV.

deep; spur about one-fourth of the length of the basal margin. Cirrus III and IV with about eleven teeth on each of the lower segments of the anterior ramus; upper segment of the pedicel of cirrus IV with about five teeth. Labrum with teeth.

Size:

Carino-rostral diameter, 7.5 mm.

Height, 9 mm.

Locality: Seto, Prov. Kii. Imbedded in sponges in association with *Acasta sulcata* LAMARCK.

Remark: This species seems to be more closely related to *Acasta scuticosta* WELTNER than to *A. pectinipes* PILSBRY, but the complicated

structure of the tergum of this species seems to afford a sufficient ground for separating it from either of those two species.

7. *Acasta amakusana* n. sp.

(Plate XIII, Figs. 2 to 2f.)

Diagnosis: Shell, tinged with reddish-purple especially on the upper part. Parietes very long and sharp, curved towards the rostrum, furnished with regular lines of growth, smooth internally; radii and alae narrow. Carino-lateral parietes about two-fifths as wide as lateral parietes. Orifice rather small. Basis cup-shaped; its edge not crenated. Scutum small, without adductor ridge; articular ridge very feeble. Tergum with very feeble articular ridge; spur short, about half as wide as the basal margin. Cirrus IV with a row of teeth along the dorsal side of the first segment of the anterior ramus; its frontal side and the pedicel having no teeth. Labrum without teeth.

Size:

Carino-rostral diameter, 8 mm.

Height, 12 mm.

Locality: Tomioka, Prov. Amakusa.

Imbedded in a tetraxon sponge with coarse texture, collected by Mr. H. IKEDA.

Remark: This is a peculiar species. There can be hardly any doubt as to its being different from any of the species described by DARWIN and by the later authors.

8. *Acasta denticulata* n. sp.

(Plate XIV, Figs. 1 to 1d.)

Diagnosis: Shell white, thin, fragile, with cup-shaped basis. Parietes marked with prominent lines of growth, with calcareous projections longitudinally; slightly ribbed internally; radii and alae broad. Carino-lateral parietes about one-third of the width of lateral parietes.

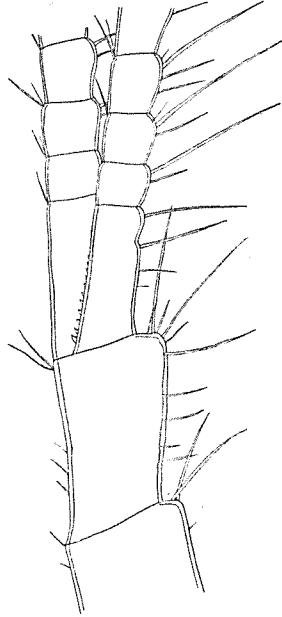


Fig. 9.

Acasta amakusana n. sp.
Cirrus IV.

Orifice rather large. Scutum without adductor ridge; pit for adductor muscle shallow but prominent; articular ridge feeble. Tergum triangular, with feeble articular ridge; spur short, about one-third as wide as the basal margin; its lower end armed with two minute teeth. In cirrus I, the anterior ramus nearly double the length of the posterior ramus. Cirrus IV having no teeth on the frontal sides of both rami. Labrum with teeth.

Size:

Carino-rostral diameter, 8 mm.

Height, 10 mm.

Locality: Misaki, Prov. Sagami. One specimen imbedded in a monaxon sponge growing on a fish, collected by Mr. K. AOKI.

Remark: This species seems to be allied to *Acasta spongiles* (POLI); however, it can be distinguished from the latter in that the spur of the tergum has two minute teeth and cirrus IV has no nail-like teeth.

Genus **Pyrgoma** LEACH, 1817.

9. **Pyrgoma elongatum** n. sp.

(Plate XIV, Figs. 2 to 2b.)

Diagnosis: Shell flat, regularly oval, white, with many projections along the rather obscure ridges radiating from the moderately large oval orifice. Basis deep. Scutum and tergum much elongated, calcified together without any external suture, curved rather abruptly inwards; its basal margin generally sinuous. Scutum, represented internally by a long adductor ridge parallel and close to the basal margin; tergum extremely narrow.

Size (mm.):

	Shell	Orifice
Carino-rostral diameter	7	3
Lateral diameter	4	1.5

Locality: Seto, Prov. Kii. 2-30 fathoms. Imbedded in *Madrepora* sp., associated with *Pyrgoma dentatum* DARWIN and *Creusia spinulosa* LEACH.

Remark: As far as I know, of all the forms belong to the genus *Pyrgoma*, those having the scutum and tergum calcified together are the following four species: *P. conjugatum* DARWIN, *P. grande* (G. B.

SOWERBY, junr), *P. monticulariae* (J. E. GRAY) and *P. kuri* HOEK. But none of these except *P. monticulariae* has elongated opercular valves. The present new species shares this feature with *P. monticulariae*, but may easily be separated from the latter by the difference in external form.

Genus **Tetraclita** SCHUMACHER, 1817.

10. **Tetraclita purpurascens nipponensis** n. subsp.

(Plate XIV, Figs. 3 to 3d.)

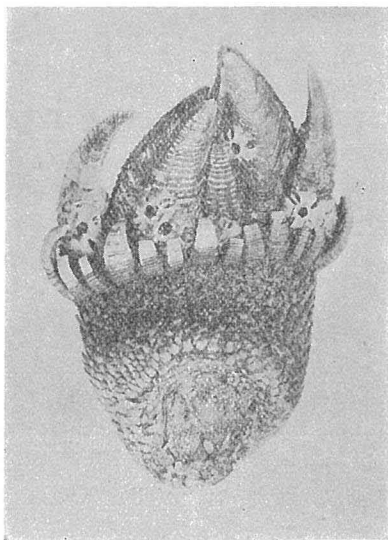


Fig. 10.

Tetraclita purpurascens nipponensis n. subsp. Some specimens having corroded shell, on *Mitella mitella* (LINNÉ). Natural size.

Diagnosis: Shell depressed, whitish-purple or dirty white; with twelve or fourteen well developed longitudinal ribs; radii well developed and broad, with their summits parallel to the basis. Basis membranous; its wall wide, with many small pores. Scutum transversely elongated with a longitudinal fold, having a deep articular furrow internally; adductor ridge strong and extending close to base; upper margin of the cavity for adductor muscle produced into a few crests. Tergum small, with extremely short and rounded spur; crests for depressor muscles well developed. Labrum hairly, deeply notched, with minute traces of teeth.

Size:

Carino-rostral diameter, 7 mm.

Height, 1.5 mm.

Localities: Seto, Prov. Kii; Tomioka, Prov. Amakusa; Misaki, Prov. Sagami. Attached to *Mitella mitella* (LINNÉ) and rarely on rocks.

Remark: In its external appearance, this small species resembles *Tetraclita costata* DARWIN somewhat, but may be separated from the latter by its membranous basis. NILSSON-CANTELL has described a subspecies *T. purpurascens chinensis* as the Chinese form of *T. pur-*

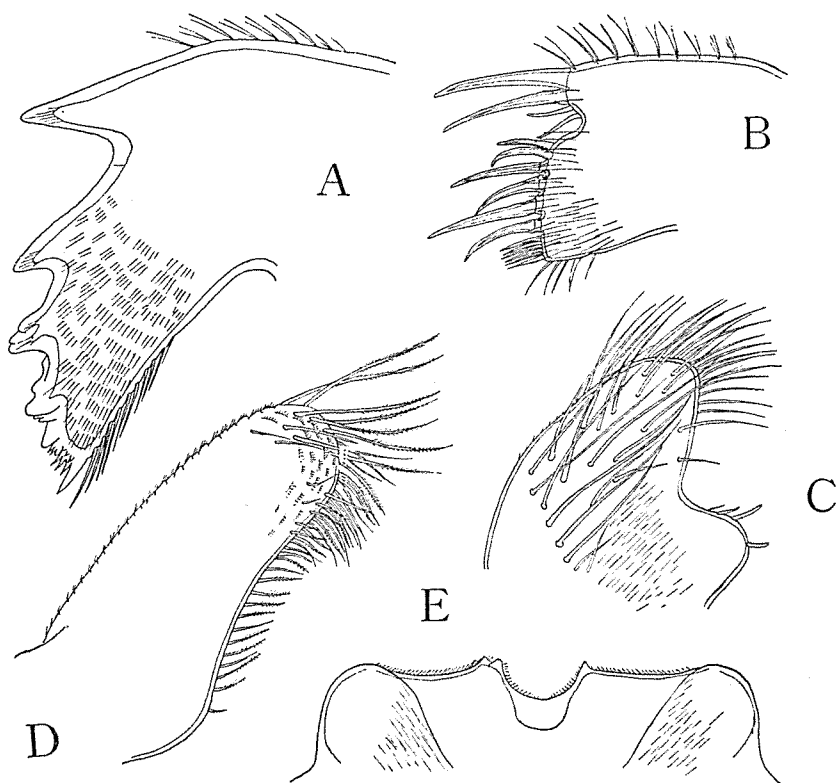


Fig. 11.

Tetractita purpurascens nipponensis n. subsp. A, mandible. B, maxilla I. C, maxilla II. D, palpus. E, labrum.

purascens (Wood). After examining many specimens in my collection, I have found that rather sharp differences in the opercular valves apparently differentiate the Japanese form from the Chinese as described in his paper. Thus the Japanese form seems to represent a new subspecies.

(August, 1931).

LITERATURE

- AURIVILLIUS, C. W. S. 1894 Studien über Cirripeden. Kungl. Svenska Vetenskaps-Akad. Handlingar. Bd. 26. No. 7. Stockholm.
- BROCH, HJ. 1922 Studies on Pacific Cirripeds. in Papers from Dr. Th. Mortensen's Pacific Expedition 1914-16. X. Vidensk. Medd. fra Dansk naturh. Foren. Bd. 73. Odense.
- DARWIN, Ch. 1851-1854 A Monograph on the subclass Cirripedia. Vol. I, II. London.
- GRUVEL, A. 1901 Sur quelques Lépadides nouveaux de la collection du British Museum. Trans. Linn. Soc. Ser. 2. Vol. VIII. London.
- 1905 Monographie des Cirripèdes ou Thecostracés. Paris.
- HOEK, P. P. C. 1883 Report on the Cirripedia collected by H. M. S. Challenger 1873-1876. Rep. scient. Res. Challenger, Zoology. Vol. VIII. London.
- 1907 The Cirripedia of the Siboga-Expedition. A. Cirripedia pedunculata. Siboga-Expeditie. Mon. XXXIa. Leiden.
- 1913 The Cirripedia of the Siboga-Expedition. B. Cirripedia sessilia. *ibid.* Mon. XXXIb. Leiden.
- KRÜGER, P. 1911 Beiträge zur Cirripedenfauna Ostasiens. Beiträge zur Naturgeschichte Ostasiens. Abhandl. math.-phys. Kl. d. K. B. Akad. d. Wiss. II. Suppl.-Bd. 6. Abh. München.
- NILSSON-CANTELL, C. A. 1921 Cirripeden-Studien. Zur Kenntnis der Biologie, Anatomie und Systematik dieser Gruppe. Zool. Bidrag. Från Uppsala. Bd. VII. Uppsala.
- PILSBRY, H. A. 1907 The Barnacles (Cirripedia) contained in the collections of the U. S. National Museum. Smithsonian Inst. U. S. Nation. Mus. Bull. 60. Washington.
- 1911 Barnacles of Japan and Bering Sea. Bull. Bureau of Fisheries. Vol. XXIX. Washington.
- 1912 Diagnoses of new barnacles from the Philippine Archipelago and China Sea. Proceed. U. S. Nation. Mus. Vol. 42. Washington.
- 1916 The sessile Barnacles (Cirripedia) contained in the collections of the U. S. National Museum; including a monograph of the American species. Smithsonian Inst. U. S. Nation. Mus. Bull. 93. Washington.
- 1927 Littoral barnacles of the Hawaiian islands and Japan. Proc. Acad. Nat. Sci. Philadelphia. Vol. LXXIX. Philadelphia.

EXPLANATION OF PLATES

PLATE XI

- Figs. 1—1c. *Oxynaspis pacifica* n. sp.
1. Lateral view of the type-specimen. $\times 6\frac{1}{2}$.
 - 1a. Scutum, the bark removed. $\times 13$.
 - 1b. Tergum, the bark removed. $\times 13$.
 - 1c. Carina, dorsal view. $\times 6\frac{1}{2}$.
- Fig. 2. *Heteralepas (Heteralepas) percnicola* n. sp.
2. Lateral view of the type-specimen. $\times 9$.
- Figs. 3—3a. *Heteralepas (Heteralepas) avis* n. sp.
3. Lateral view of the type-specimen. $\times 5$.
 - 3a. Capitulum, frontal view. $\times 5$.

PLATE XII

Figs. 1—1d. *Acasta Komaii* n. sp.

- 1. Lateral view of the type-specimen. $\times 5$.
- 1a. Scutum, external view. $\times 14$.
- 1b. The same, internal view. $\times 14$.
- 1c. Tergum, external view. $\times 14$.
- 1d. The same, internal view. $\times 14$.

Figs. 2—2c. *Acasta aperta* n. sp.

- 2. Lateral view of the type-specimen. $\times 7$.
- 2a. Lateral view of another specimen. $\times 7$.
- 2b. Scutum, internal view. $\times 17$.
- 2c. Tergum, internal view. $\times 17$.

PLATE XIII

Figs. 1—1d. *Acasta cancellorum* n. sp.

- 1. Lateral view of the type-specimen. $\times 5$.
- 1a. Scutum, external view. $\times 10\frac{1}{2}$.
- 1b. The same, internal view. $\times 10\frac{1}{2}$.
- 1c. Tergum, external view. $\times 10\frac{1}{2}$.
- 1d. The same, internal view. $\times 10\frac{1}{2}$.

Figs. 2—2f. *Acasta amakusana* n. sp.

- 2. Lateral view of the type-specimen. $\times 4\frac{1}{2}$.
- 2a. Scutum, external view. $\times 10$.
- 2b. The same, internal view. $\times 10$.
- 2c. Tergum, external view. $\times 10$.
- 2d. The same, internal view. $\times 10$.
- 2e. Lateral compartment, internal view. $\times 7\frac{1}{2}$.
- 2f. Carino-lateral compartment, internal view. $\times 7\frac{1}{2}$.

PLATE XIV

Figs. 1—1d. *Acasta denticulata* n. sp.

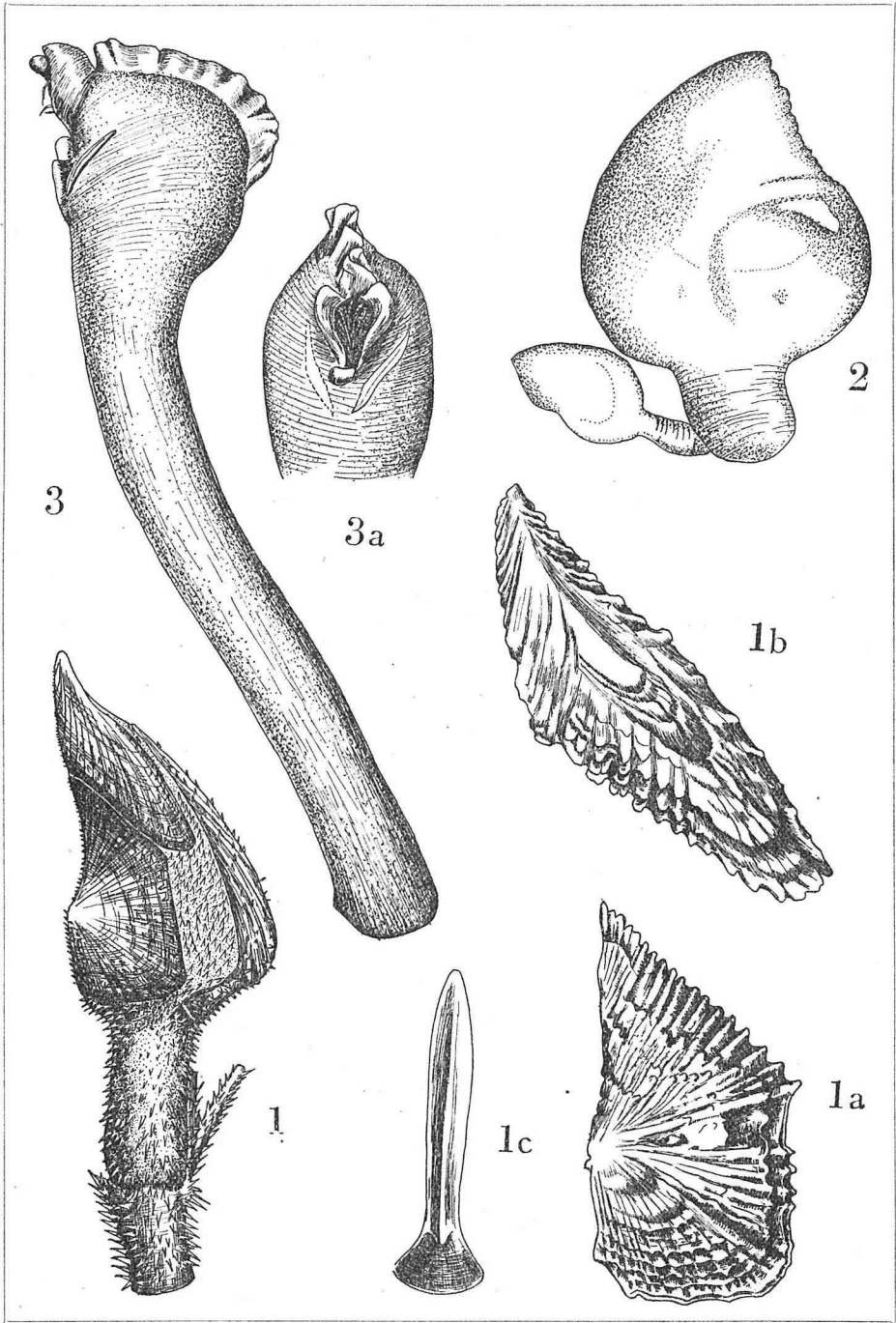
- 1. Lateral view of the type-specimen. $\times 4\frac{1}{2}$.
- 1a. Scutum, external view. $\times 7$.
- 1b. The same, internal view. $\times 7$.
- 1c. Tergum, external view. $\times 7$.
- 1d. The same, internal view. $\times 7$.

Figs. 2—2b. *Pyrgoma elongatum* n. sp.

- 2. Apical view of shell of the type-specimen. $\times 5$.
- 2a. Scutum and tergum, calcified together, external view. $\times 12$.
- 2b. The same, internal view. $\times 12$.

Figs. 3—3d. *Tetracrita purpurascens nipponensis* n. subsp.

- 3. Apical view of the type-specimen. $\times 4$.
- 3a. Scutum, external view. $\times 12$.
- 3b. The same, internal view. $\times 12$.
- 3c. Tergum, external view. $\times 12$.
- 3d. The same, internal view. $\times 12$.



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