

REPORT OF THE BIOLOGICAL SURVEY OF MUTSU BAY.

25. CIRRIPIEDIA.¹⁾

By

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(With four text-figures.)

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The present paper deals with the Cirripedia in Mutsu Bay, collected by Professor S. HÔZAWA, of the Tôhoku Imperial University, and by Professor S. HAREYAMA, of the Hiroshima Higher Normal School. The collections are represented by only the seven species which are all the forms prevalent in the Japanese waters. No cirriped, parasitic or commensal with other animals, is found. Thus, the cirripedian fauna of this bay seems to be rather poor. For all the species represented here, previous investigators such as PILSBRY and NILSSON-CANTELL have given full descriptions, so that it might be superfluous to reiterate here.

Finally, I wish to express my sincere thanks to Professor S. HÔZAWA for giving me the chance of examining the material.

KEY TO FAMILIES AND GENERA OF CIRRIPIEDIA KNOWN TO
OCCUR IN MUTSU BAY.

- a. Pedunculate barnacles.
 - b. Peduncle scaly; capitulum having 8 or more plates
..... Family Scalpellidae.
Genus *Mitella*.
 - bb. Peduncle nude; capitulum having 5 large plates.....
..... Family Lepadidae.
Genus *Lepas*.
- aa. Sessile barnacles.
 - b. Rostral compartment having alae overlapped by the adjacent
rostrolateral compartment; walls composed of six compartments
..... Family Chthamalidae.
Genus *Chthamalus*.
 - bb. Rostral compartment united with the adjacent rostrolateral com-
partment Family Balanidae.

¹⁾ Contributions from the Marine Biological Station, Asamushi, Aomori-Ken. No. 92.

- c. Walls composed of six compartments. Genus *Balanus*.
 cc. Walls porous, composed of four compartments
 Genus *Tetraclita*.

Family **Scalpellidae** PILSBRY.

Genus MITELLA OKEN.

1. *Mitella mitella* (LINNÉ).

Syn. PILSBRY, 1907; NILSSON-CANTELL, 1921.

This species is represented by numerous specimens which carry some individuals of *Chthamalus challengerii* on the capitulum. The largest specimen measures 28 mm. in breadth and 68 mm. in length.

Locality: Futago-jima. Coll. Prof. S. HÔZAWA; Prof. S. HAREYAMA.

Distribution: Widely distributed from Japan to the Malayan waters.

Family **Lepadidae** DARWIN.

Genus LEPAS LINNÉ.

2. *Lepas anatifera* LINNÉ.

Syn. NILSSON-CANTELL, 1921.

The specimens, which are attached to a floating bamboo-stem, correspond with the typical form of this species; the surface of the scuta is marked with a diagonal broken line of hellebore green, while on the surface of the terga there is no trace of it.

Locality: Off Jizôson near the Asamushi Marine Biological Station. Coll. Mr. T. MORIYAMA.

Distribution: Pelagic, cosmopolitan.

Family **Chthamalidae** DRAWIN.

Genus CHTHAMALUS RANZANI.

3. *Chthamalus challengerii* HOEK.

(Text-figs. 1, 2.)

Chthamalus challengerii HOEK, 1883, and other later authors.

Chthamalus stellatus WELTNER, 1897 (in part); KRÜGER, 1911.

Chthamalus challengerii nipponensis PILSBRY, 1916.

Chthamalus challengerii occurs in the Japanese waters in crowd on *Mitella mitella* and *Tetraclita squamosa japonica*, as well as on rocks in the littoral zone. It is very difficult to make a distinction between *C. challengerii* and *C. stellatus* (POLI, 1795) by the mere external appearance,

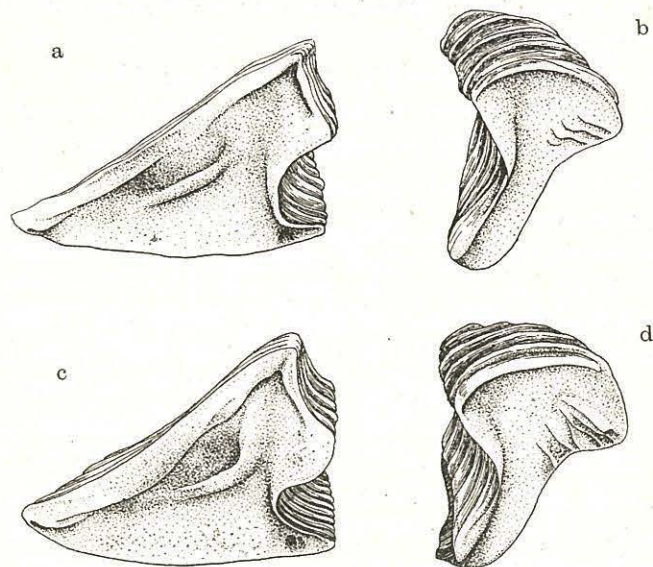
and they have been often confused, as it was done by WELTNER (1897) and KRÜGER (1911).

The difference may be found in that *C. challengerii* has a well-developed adductor ridge on the scutum, while it is only feebly represented in *C. stellatus*. The latter species is widely distributed in the Mediterranean and the Atlantic; it is also known in the Malay Archipelago, but not yet in the Japanese waters.

In the external appearance of this species there are developmental and individual variations, as is also the case with *C. stellatus*. In fact the numerous specimens which were obtained in Mutsu Bay, differ to some extent from the southern forms, e. g., those from Seto or Misaki, in both the external and internal features. In most of the southern specimens, the walls show many radiating ribs and a punctate appearance, as in a form of *C. stellatus* (Cf. PILSBRY, 1916: Pl. 71, Fig. 3.); the walls also are rather fragil and the orifice is much larger than that of the northern form. The latter form, *viz.*; the specimen collected in Mutsu Bay, has almost smooth walls, and when it is found in crowd, it becomes cylindrical, and up to about 10 mm. in height, much like the tubular form of *C. stellatus* (Cf. PILSBRY, 1916: Pl. 71, Fig. 2 b.).

In the opercular valves also, there is a little difference between the northern and southern forms. In small specimens in this collection the opercular valves bear similarity to HOEK's figure of the typical form of this species (Cf. HOEK, 1883: Pl. XIII, Figs. 37, 38.). In all the depressed and tubular forms, the scutum is rather elongate laterally and the tergum has a narrow spur; these valves correspond perfectly with PILSBRY's figure of those of the specimens from Matsushima and from Ayukawa which are also located in the northern Japan (Cf. PILSBRY, 1916: Pl. 72, Figs. 1, 1a, 2, 2a.). (Text-fig. 1, a. b.) In the specimens from Seto or Misaki, on the other hand, the scutum is rather wide and has a very strong articular ridge, and the tergum has a rather wide spur; the valves resemble closely the same author's figure of the same of the specimens from Yokohama which is near Misaki (Cf. PILSBRY, 1916: Pl. 72, Figs. 4, 4a.). (Text-fig. 1, c, d.)

In short, the differences found in these valves seem to be only local variation. However, the opercular valves, which are figured by NILSSON-CANTELL (1925) from a specimen from the Bonin Islands, show some resemblance to those of the northern form, in spite of the Islands being located far in the southern sea. Moreover the opercular valves of the specimen from Sagami Bay, which is described and figured by KRÜGER



Text-fig. 1. *Chthamalus challengeri* HOEK.
a, Scutum, b, tergum, of a specimen from Mutsu Bay. $\times 17$.
c, Scutum, d, tergum, of a specimen from Seto. $\times 17$.

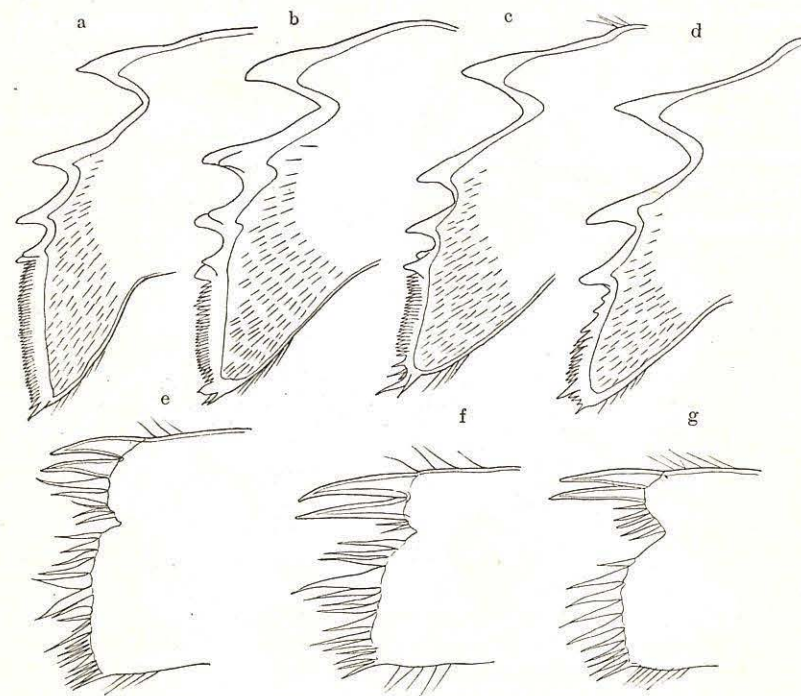
(1911) to be of *C. stellatus*, show a resemblance to those of the northern form. The disagreement of the opercular valves to be noted in these reports seems to be due to the variation in the shape of the external walls according to the state of environment.

As regards the mouth-parts, PILSBRY (1916) points out the mandible to bear a characteristic of the racial significance; he says: "The mandible is of the *stellatus* form, but the three points at the lower extremity are much more strongly developed and the finely pectinated space above them is shorter." As a matter of fact, in most of the specimens from Seto the mandible has a shorter pectinated space, as PILSBRY says, and the first maxilla bears deeper notch than found in *C. stellatus*. But the mouth-parts of the specimens from Mutsu Bay agree more closely with those of *C. stellatus*, while among the specimens from Seto and Misaki there is often the state intermediate between these two forms. (Text-fig. 2, a—g.)

It is probably certain that the specimen from Hakodate recorded by WELTNER (1897) as *C. stellatus* is *C. challengeri*.

Locality: Futago-jima. Coll. Prof. S. HÔZAWA; Prof. S. HAREYAMA.

Distribution: Japanese and Malayan waters.



Text-fig. 2. *Chthamalus challengeri* HOEK.
a—d, Mandible of specimens from Mutsu Bay (a, b), from Misaki (c), from Seto (d).
e—g, Maxilla I of specimens from Mutsu Bay (e, f), from Seto (g).

Family Balanidae GRAY.

Genus BALANUS DA COSTA.

4. *Balanus tintinnabulum rosa* PILSBRY.

(Text-fig. 3)

Balanus tintinnabulum rosa PILSBRY, 1916; BROCH, 1931; NILSSON-CANTELL, 1931, 1932.

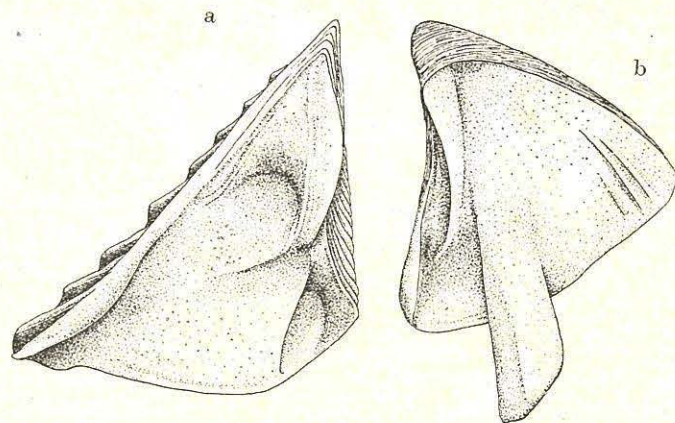
The collection includes several specimens of this species, attached to the rocks and to the shell of *Mytilus crassitesta* LISCHKE. These correspond well with PILSBRY's original statement "The barnacle is conic or subcylindric, with a rather large, broadly and acutely ovate aperture; roseate (between pomegranate-purple and Indian-lake of RIDGWAY's Color Standards), the parietes of rostrum and lateral compartments paler than the carina, the radii a deeper shade of the same color. Sheath a duller shade of the external color." Although the beautiful color is characteristic of this subspecies, there are white forms in small number mingled with

the reseate forms; the former is entirely white in the young stage, and the adult specimen bears the white parietes, though the radii and sheath are tinged with very pale roseate hue.

The opercular valves (Text-fig. 3, a, b.) and mouth-parts agree with the description of NILSSON-CANTELL (1932).

Locality: Futago-jima. Coll. Prof. S. HÔZAWA.

Distribution: Japan.



Text-fig. 3. *Balanus tintinnabulum rosa* PILSBRY.
a, Scutum, b, tergum. $\times 6$.

5. *Balanus rostratus eurostratus* BROCH.

(Text-fig. 4.)

Syn. PILSBRY, 1916; HIRO, 1932.

The specimens from Mutsu Bay agree perfectly with *Balanus rostratus* HOEK, forma *eurostratus* (BROCH, 1922). There are numerous small and large specimens up to 49 mm. in carino-rostral length and 80 mm. in height. In the largest specimen, which is dry and bears a very corroded surface, the orifice is almost as large as the base and the rostrum is furnished with 18 parietal tubes, like those of *B. rostratus apertus* PILSBRY, 1911 from Bering Sea, though the parietal tubes are with many transverse septa which extend quite to the base. The number of parietal tubes is individually different as mentioned by NILSSON-CANTELL (1932) for the examples of *B. rostratus spiniferus* from Kobe; a specimen measuring about 28 mm. in carino-rostral length in this collection has 14 tubes in the rostrum.

Locality: Mutsu Bay. Coll. Prof. S. HÔZAWA; Prof. S. HAREYAMA.
Distribution: Japan.



Text-fig. 4 *Balanus rostratus eurostratus* BROCH. $\times 1$.

6. *Balanus trigonus* DARWIN.

Balanus trigonus DARWIN, 1854, and other later authors.

Locality: Mutsu Bay. Coll. Prof. S. HÔZAWA.

Distribution: Pacific, Indian and Southern Atlantic Ocean.

Genus TETRACLITA SCHUMACHER.

7. *Tetraclita squamosa japonica* PILSBRY.

Tetraclita porosa var. *nigrescens* KRÜGER, 1911.

Tetraclita porosa PILSBRY, 1911,

Tetraclita squamosa japonica PILSBRY, 1916.

Tetraclita porosa japonica NILSSON-CANTELL, 1927, 1931, 1932.

This subspecies is the prevalent form of the species in the Japanese waters.

Locality: Futago-jima. Coll. Prof. S. HÔZAWA.

Distribution: Japan.

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