

BARNACLES OF THE SAN JUAN ISLANDS, WASHINGTON.

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The Cirripedes noted below were collected by Dr. Carl C. Engberg during 1918 and 1919, partly at Olga, in the Orcas group, the others at Friday Harbor.

Two species not found by Doctor Engberg have been reported from the San Juan Islands, without special locality—*Balanus balanoides pugetensis* Pilsbry¹ and *Balanus rostratus heteropus* Pilsbry.² The list is doubtless otherwise incomplete, as it comprises no species of goose barnacles (*Lepas*), and no *Chthamali*, small, sessile barnacles living on shells, stones, and other barnacles, between tides. As these islands are now frequented by many students of zoology it is thought that a local list may prove useful and may lead to further study of the group, ecological and systematic.

Figures, descriptions, and references to the literature of barnacles may be found in United States National Museum Bulletins 60 and 93.

KEY TO SPECIES.

a.¹ Stalked barnacles.

b.¹ Protected by five thin valves; usually attached to floating objects—*Lepas*.

b.² Protected by many thick valves; attached to solid objects near low tide.

Mitella polymerus.

a.² Sessile barnacles.

b.¹ Compartments of the wall penetrated by longitudinal tubes.⁵

c.¹ Ribs on the inner side of the compartments more numerous than the septa between tubes in the base; tergum long.

d.¹ Tubes of wall without transverse septa.

Balanus balanoides pugetensis.

d.² Tubes of wall having transverse septa, at least above.⁴

Balanus rostratus heteropus.

c.² Ribs on the inner side of compartments corresponding to septa between the tubes⁶; basis calcareous.

d.¹ Spur of the tergum wide at base, tapering distally, situated near middle of the basal margin; large barnacles, up to 100 mm. diameter.

Balanus nubilus.

¹ Bull. U. S. Nat. Mus., 93, p. 163.

² Idem, p. 142.

³ These tubes can be seen by filling the outside, or breaking a compartment transversely. In eroded specimens the tubes are often laid open.

⁴ To be seen by filling the outside.

⁵ In old specimens of *Balanus nubilus* the interior is smooth.

- d.*² Width of tergum more than half its length, the spur short, near the basi-scutal angle; small barnacles.
- e.*¹ Three pits in the inner side of the scutum.....*Balanus glandula.*
- e.*² No middle pit in the scutum.....*Balanus crenatus.*
- c.*⁸ Wall without regular internal ribs; basis membranous; tergum narrow and long, with long, slender spur.....*Balanus cariosus.*
- b.*² Compartments of the wall without longitudinal tubes; tergum short, with a short spur.
- c.*¹ Scutum distinctly striate longitudinally; walls strongly ribbed.
Balanus engbergi.
- c.*² Scutum weakly or not striate longitudinally.
- d.*¹ Spur of the tergum tapering, less than half as wide as the basal margin of tergum; upper part of the scutum thickened within.
Balanus hesperius laevidomus.
- d.*² Spur very short and truncate, occupying half of the basal margin; scutum with three pits inside.....*Balanus glandula.*

MITELLA POLYMERUS (Sowerby).

Plate 20, figs. 1, 2.

Piles of the dock at Olga (Cat. No. 53813, U.S.N.M.), and at the promontory, Deer Point, forming the eastern entry to Obstruction Pass. Abundant and typical. As this species was not figured in United States National Museum Bulletin 60 or other readily accessible work, photographs are here reproduced, natural size.

BALANUS NUBILIS Darwin.

Friday Harbor. In Puget Sound this species reaches its maximum size, far larger than Darwin's original specimens. In a group of four sent, the diameter is between 90 and 100 mm. (Cat. No. 53811, U.S.N.M.)

BALANUS CRENATUS Bruguiere.

Patelliform, columnar, and club-shaped specimens, the latter like the well-known club form of *Balanus balanoides*. Friday Harbor. (Cat. No. 53805, U.S.N.M., 30 specimens; Cat. No. 53806, U.S.N.M., 6 specimens; and Cat. No. 53808, U.S.N.M., 4 specimens.)

BALANUS GLANDULA Darwin.

Large examples up to 25 mm. long, similar to plate 43, figure 5, of Bulletin 93. Friday Harbor (25 specimens, Cat. No. 53810, U.S.N.M.)

BALANUS CARIOSUS (Pallas).

Plate 20, figs. 3, 6.

Friday Harbor. Very abundant (Cat. Nos. 53802, 53803, 53804, and 53807, U.S.N.M.). Old specimens are deeply eroded, cylindrical, with rather thin walls at the base, not showing as many pores as in the conic typical form. A crowded, columnar form of small diameter is also abundant; length about 55; diameter, 5 to 15 mm. As this seems to be an unusual form elsewhere it is figured (pl. 20.

figs. 3, 6; Cat. No. 53812, U.S.N.M.). The young are not stellate, with strong corrugation and small orifice, but steep-walled with open orifice and walls but little corrugated. These unusual forms of *cariosus* are readily recognized by the shape and sculpture of the opercular valves.

BALANUS HESPERIUS LAEVIDOMUS Pilsbry.

Friday Harbor (Cat. No. 53809, U.S.N.M., 10 specimens). It is easily distinguished from the following species by the rather fragile walls, which are not ribbed.

BALANUS ENGBERGI, new species.

Plate 20, figs. 4, 5.

Type.—Cat. No. 53801, U.S.N.M., from Olga, Washington, collected by Dr. C. C. Engberg.

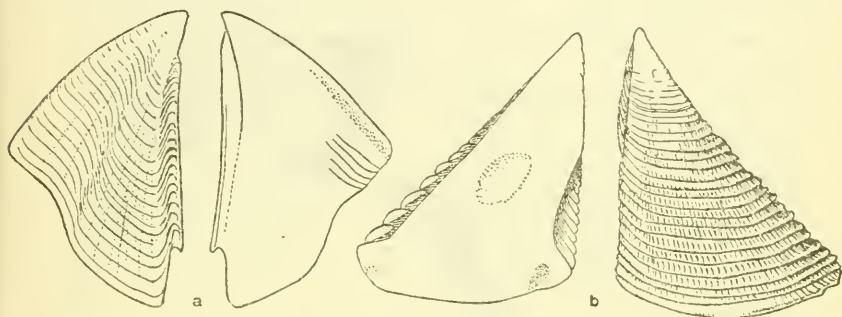


FIG. 1.—*BALANUS ENGBERGI*. EXTERNAL AND INTERNAL VIEWS OF THE TERGUM, *a*, AND OF THE SCUTUM, *b*.

The barnacle is rather small, conic, grayish white, strongly ribbed, with a very small, shortly oval orifice, and partly covered with a very thin and pale cuticle, in large part fugacious. The compartments are not porose. The basis is calcareous, not porose. The opercular valves have the general shape of those of *Balanus crenatus*.

Greatest basal diameter of type, 14 mm.; altitude 7.3 mm.; length of orifice, 2.5 mm.

The scutum (fig. 1*b*) is shaped like that of *Balanus hesperius*. The tergal border is somewhat longer than the basal; the latter convex. The occludent border has a series of regular short, oblique ridges. The exterior is somewhat concave between the apex and base; quite convex between occludent and tergal margins. It is closely and regularly sculptured with high ribs, sloping downward; each alternate rib continued in the short ridges of the occludent edge. It is distinctly, finely, and closely striate from apex to base. Inside there is a rather strong articular ridge, but no adductor ridge. The pit of the adductor muscle and the very small pit of the lateral depressor are deeply sunken.

The tergum (fig. 1a) is thin, flat, having fine, transverse riblets and some weak radial striae. The short, obliquely truncate spur is fully half the basal width of the valve.

The compartments are very firmly united. The parieties have no tubes. The walls are thick, very deeply furrowed between the high ribs, which are unequal, two on each side usually being flat-topped, with narrow raised borders. The radii are narrow, not readily distinguishable. Internally there is a short sheath, overhanging deep cavities; the compartments below it coarsely folded like a heavy drapery and toward the base closely costate.

The basis is calcareous, solid, radially grooved inside.

The labrum, mandible, and maxillae (fig. 2a, b, c) are substantially as in *Balanus hesperius*. The palpi are also similar, but less profusely bristly.



FIG. 2.—*BALANUS ENGBERGI*. a, LABRUM; b, MAXILLA; AND c, MANDIBLE.

The first cirrus has very unequal rami; the shorter, of 8 protuberant segments, a little more than one-third as long as the longer, which consists of at least 21 segments. Cirrus II has rami not very unequal, about 2 segments of the longer projecting beyond the shorter. In cirrus III the rami are equal. The posterior cirri have four pairs of spines on the segments, the lower pair very small. There are long posterior-distal spines, as in *Balanus hesperius*.

On the third cirrus there are a few excessively minute multifid scales distally on some segments, such as have been figured for *B. crenatus curviscutum* (Bull. 93, fig. 55a), but vertically placed, and not accompanied by small spinules.

Comparisons.—While this species is evidently related to *Balanus hesperius*, it differs conspicuously by the far wider spur of the tergum and by the distinct longitudinal striae of the scutum, which is plain inside. Externally it differs by the very strong ribs of the wall; but this is not usually a character of much constancy. *Balanus glandula* Darwin is most easily differentiated by its scutum, pitted below the

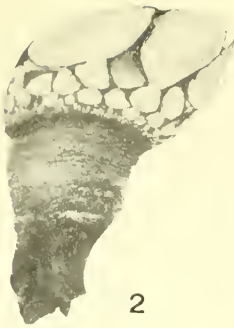
adductor ridge, and not longitudinally striate externally. In *Balanus crenatus* the walls are conspicuously porose, and the scutum is not distinctly striate longitudinally. All of these species are of about the same size. While all occur on the San Juan Islands, they are not associated in any of the groups at hand, each forming its own colonies on separate objects. The specimens of *B. engbergi* were found on a board which had floated in. To what extent, if any, these species inhabit different zones in the San Juan Islands remains to be ascertained. In southern California *B. glandula* occurs at and above low tide. *B. crenatus*, on the eastern coast, is found below low tide.

EXPLANATION OF PLATE 20.

- FIG. 1, 2. *Mitella polymerus* (Sowerby). Olga. Natural size.
3. *Balanus cariosus* (Pallas). Friday Harbor. Slender individual from a close group. Natural size.
4, 5. *Balanus engbergi* new species. Olga. Top of the type and lateral view of two paratypes. $\times 3$.
6. *Balanus cariosus* (Pallas). Friday Harbor. Part of a compact group. Natural size.



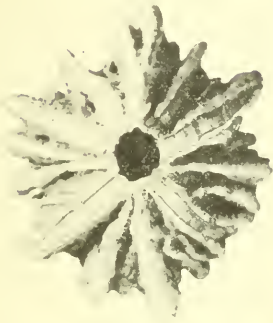
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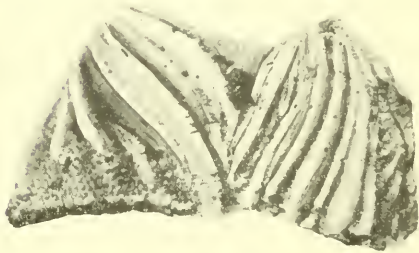
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BARNACLES OF THE SAN JUAN ISLANDS.

FOR EXPLANATION OF PLATE SEE PAGE 115.

