

PORT PHILLIP SURVEY 1957—1963.

SESSILE BARNACLES THORACICA, CIRRIPEDIA.

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SUMMARY:

Of the three species of barnacles occurring in Port Phillip Bay one, *Elminius simplex* belongs more properly to the fauna of the open coast and the other two species, *Balanus variegatus cirratus* and *Elminius modestus* are well-known fouling species with distributions in Australian seas and beyond.

INTRODUCTION.

The collections made during the Survey of Port Phillip in Victoria have revealed that the sessile barnacles play a comparatively minor role in the Bay fauna. Only three species of two genera were represented, as follows:—The common fouling species, *Balanus variegatus cirratus* Darwin, *Elminius modestus* Darwin and *E. simplex* Darwin. Of these, *Balanus variegatus cirratus* was commonest, *Elminius modestus* is apparently less common than it is in other Australian inlets and bays and *E. simplex* is included only on the strength of a single record which is actually outside the "Bay" proper, on the open sea coast.

Both genera from Port Phillip belong to the family *Balanidae* but are easily distinguishable from one another by the number and internal structures of the plates forming the outer whorl of the shell. *Balanus variegatus* has six plates articulated together to form the shell crown and each of these plates, when broken across horizontally, possesses a row of pores—hollow tubes running from the basis towards the top of the shell plates, between its outer and inner lamina. In the genus *Elminius*, on the other hand, there are only four shell plates which, when broken across, are quite solid and consequently thinner than those of *Balanus*. Detailed descriptions of the shell structures of these species, together with illustrations of the important opercular plates, have previously been recorded by the author (Pope, 1945) and will not be repeated here. Their occurrence in Port Phillip and some remarks about each species are set out below.

Genus *Balanus*.

Balanus variegatus var. *cirratus* Darwin.

Balanus amphitrite var. *cirratus* Darwin, 1854, p. 241, Plate 5, fig. 2b. Pope, 1945, pp. 362–3, Plate XXVIII., fig. 6, and Plate XXX., figs. 13 and 14.

Balanus variegatus var. *cirratus* Harding, 1962 pp. 293–4, Plate 10, figs. 1–n.

This barnacle which is one of the most troublesome of local fouling species has hitherto been known in Australian literature as *Balanus amphitrite* var. *cirratus* Darwin. Harding (1962), after re-examining

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Darwin's material in the light of modern usage in the systematics of cirripedia, split Darwin's unwieldy species-complex of *B. amphitrite* into four separate species. According to this new arrangement the commonest barnacle taken by the Port Phillip Survey should now be known as *Balanus variegatus* var. *cirratus* Darwin.

In making this change, Harding pointed out that Darwin himself had inclined towards creating a separate species for "var. *cirratus*" since the differences he observed between it and other varieties of the *B. amphitrite* complex seemed to him to be of specific rank. However, because he noticed its close affinities with *variegatus*—a New Zealand variety which he had already included in the species *amphitrite*—he lumped *cirratus* in with the rest of the *amphitrite* complex. Dr. Harding has now elevated Darwin's "variety *variegatus*" to specific rank and made *cirratus* a variety within it.

The collections made during the present survey record *B. variegatus cirratus* in every month of the year except September and its distribution in the Port is widespread, north from a line drawn from Martha Point and St. Leonards to the head of the Bay. The vertical distribution recorded ranged from the intertidal zone down to a depth of 6 fathoms, and it was recorded growing on harbour structures, on the mussel (*Mytilus*) and other benthic animals.

Balanus variegatus cirratus is tolerant to silt and other suspended matter and can withstand widely varying salinities and a number of the chemical wastes of the kind that are poured into rivers and bays. It can therefore be expected to be widely distributed in Port Phillip.

The shell of this moderately sized species has a basal diameter in well grown specimens of up to 18 mm. and a height of about 10 mm. but is often smaller than this. It may have either a regular, conical shape or, if growing in a crowded space, may assume a cornucopia-like shape and be up to 20 mm. or so in height. The ultimate shape is brought about by differences in the method of growth of the white basis section. This is flattened and closely cemented to the substratum in conical forms but is shaped something like a tall tumbler (tapering to a narrow base) in specimens which grow in crowded situations.

The central or parietal areas of each plate are alternately banded by dirty white and native stripes which are intersected horizontally by purple-brown bands running round the shell. This produces a generally flecked appearance. The radii of the shell plates lack flecks and are generally a manvish-pink colour. The orifice of the shell is often toothed (where the summits of the parieties project) and the carinal shell plate often forms a spout-like projection. For further details of shell structure reference should be made to Harding's (1962) paper, pages 291–296 and plate 10 in which a 'Key to Darwin's "Varieties"' is included or to Pope (1945) where it is illustrated under the name of *B. amphitrite cirratus*.

Genus *Elminius*.

This genus is represented in the present collections by both of the Australian species, *Elminius simplex* and *E. modestus*. They are easily separable because of their differing shell structures and habitat preferences.

The following key will help to separate the two species by means of superficial characters:—

Key to Australian Species of Genus *Elminius*.

- (1) Shell white, steeply conical and generally highest on the carinal side of the shell crown; with well-marked ribs; and a basal diameter of 12–13 mm. in mature specimens. The orifice of the shell is relatively small. Habitat: The lower surfaces of boulders, or under ledges and in caves near low water mark of spring tides; generally on the oceanic coast, in fully saline waters.
 *E. simplex*.
- (2) Shell greyish, much flatter than the above species and with each shell plate showing two low folds (rather than regular ribs). The carinal plate is generally produced into a sharp, spout-like projection and the diamond-shaped orifice is comparatively much larger than it is in *E. simplex*. Basal diameter 6–7 mm. but it can reach 10 mm. in favourable habitats. Grows between high water and low water of neap tide, on shore rocks, harbour structures, boats or on molluscs. It is tolerant of reduced salinities and silt and thrives where there is little water movement, other than tidal, e.g., in inlets, bays and river mouths.
 *E. modestus*.

As the ecological niches of *E. modestus* and *B. variegatus cirratus* overlap to a certain extent, some care is needed in determining the species of barnacles growing on intertidal areas of harbour structures or on the corresponding zone on the shore. As the shells of barnacles in calmer waters are often covered by other marine growths or obscured by deposits of silt it may be difficult to see details of shell structure. However, even a perfunctory cleaning of the shell crown generally suffices to show whether it is made up of six plates (*Balanus*) or four plates (*Elminius*). The two species of *Elminius* recorded in the present survey are as follows:—

Elminius simplex Darwin.

Elminius simplex Darwin, 1854, pp. 353–4, Plate 12, fig. 3. Pope, 1945, p. 370, Plate XXIX., fig. 5, and Plate XXX., figs. 25 and 26.

Elminius simplex is somewhat solitary in habit, occurring sporadically throughout its geographical range in south-eastern Australia. It is therefore not surprising that only a single specimen was taken during the present survey. The western extremity of its range is near Cape Otway and this record, in a locality lying just outside the heads of Port Phillip proper on Point Nepean, is an interesting addition to our knowledge of its distribution.

Elminius modestus Darwin.

Elminius modestus Darwin, 1854, pp. 350–351, Plate 12, fig. 1a–1e. Pope, 1945, pp. 368–370, Plate XXIX., fig. 4, and Plate XXX., figs. 27 and 28.

It is perhaps a matter for some surprise that the present survey has recorded *Elminius modestus* in only one locality, namely, Safety Beach, Martha Point where it was attached to rocks near low tide level or on molluscs. It is also recorded from wharf piles growing at its normal level (near high water neap tide) at St. Leonards. These latter specimens are in the collections of the Australian Museum, Sydney.

It is likely that systematic searching of wharf piles or shore rocks to the north of these two localities would reveal that *E. modestus* is common in Port Phillip Bay, for there seems to be no reason to prevent its spread and growth, and its abilities to colonise and travel along sea coasts have been recorded by numerous European authors since its invasion of English waters in 1943.

SELECTED REFERENCES.

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