Chitons of the D'Entrecasteaux Channel, Southern Tasmania, including Additions to the Tasmanian Fauna, and Descriptions of a New Species and a New Variety.

By Edwin Ashby, F.L.S., M.B.O.U.

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Plate XI.

On March 22, 1920, Mr. W. L. May and myself left Hobart for Lunawanna, situated on the western side of South Bruny Island, in D'Entrecasteaux Channel, where we were most hospitably entertained by Mrs. Drake, of "Clovelly."

Except for some work done by Mr. May on the occasion of a brief visit paid previously to this spot and a little dredging at the north end of the channel, we believe no systematic chiton-collecting has previously been done in the Channel. It seems therefore desirable that the results of a few days' strenuous work in that locality should be placed on record. A little reefing was done *en route* for Lunawanna, at a spot a few miles north, called Alonnah. Advantage was taken of the low tides of the three following days to examine the chiton fauna both north and south of Lunawanna. On two days, the afternoon as well as the morning tides were tried, but we found that at daydawn the latter was much lower than the former, and the finds were proportionately greater.

The night of the 25th was spent at a place named Woodbridge, much further north, though still in the Channel. Next morning we were in the water as soon as it was light enough to see, working for four hours on what we took to be an exceptionally low tide, with some very interesting results. The extreme cold of the water, and the heavy igneous rocks that had to be lifted out of the water and turned over, added much to the difficulty of our work.

While the number of species obtained in the Channel may not be considered exceptionally large, many good forms were obtained, also the negative results were nearly as interesting as the positive ones.

Species collected at Lunawanna.

Eudoxoplax inornatus, Ten. Woods. While no true *Callochiton* was found in this part of the Channel, a nice series of *Eudoxoplax inornatus* was obtained. When alive the rich orange colour of the underside and girdle gives a rich ruddy tinge to the upper side. This is always a striking

chiton, very flat, with widely expanded girdle which puckers in drying. At present it is only recorded from Tasmania, and originally described from the northern side of the island; the locality under review extends its range almost to the extreme south.

Ischnochiton atkinsoni, Ire. and May, was fairly common, and varied from the typical reddish-brown form to a creamy-white one. As compared with *I. crispus*, Reeve, they are always a small chiton, and their station is in decidedly deep water in Tasmania.

Ischnochiton proteus milligani, Ire. and May. Only one somewhat worn specimen of this shell was taken. While it is fairly common at Port Arthur, it looks as if Lunawanna is the extreme limit of its habitat westward and southward.

Ischnochiton iredalei, Dupuis, non *lineolatus*, Blainville. A series of this form was collected, mostly rather old and worn.

Ischnochiton (Haploplax) mayi, Pilsbry. Quite a common species, seldom met with below half tide; its almost circular shape and deep-black colour easily separates it from any other known species.

Ischnochiton (Haploplax) mayi, var. *viridis*, n. var. A very striking variant from the foregoing black form is met with at Lunawanna, and seems peculiar to the southern end of D'Entrecasteaux Channel. The shell is pale green and the girdle jet black. While it is so distinct in outward appearance from the typical shell a careful examination of the sculpture and girdle scales reveals no radical differences from the usual black form. It is interesting that a form that everywhere else seems so constant in both colour and sculpture should in this locality have such a distinct local race.

Ischnoradsia australis evanida, Sow. This chiton, with the exception of *Sypharochiton pellisserpentis*, Q. and G., which, in respect to numbers, runs it very close, was by far the most common species in the locality and there attains a very large size; specimens were taken up to 90 mm. in length, but these large ones were always more or less eroded. They vary from the almost smooth form, common in North-western Tasmania and South Australia, to those in which almost the whole of the pleural area is covered with longitudinal ribbing, and some, in which the ribbing is carried across the dorsal area. In none of them was this sculpture quite as coarse as is the case with the Port Jackson specimens, that being the type locality for the dominant form *I. australis*.

Ischnochiton (Heterozona) sub-viridis, Ire. and May. This species was very numerous in this locality; it appears to replace *I. crispus*, Reeve, which is the common species in the northern and eastern coasts of Tasmania, and from which this

species is easily distinguished by its erect girdle scales. Nearly all the larger specimens were considerably eroded.

Plaxiphora albida, Blainville, and *P. costata*, Blainville. These two species were living together at Lunawanna on the sides and upper sides of large rocks at low water. While all were covered with growth, many of them were in a state of good preservation. The vermiform marking or ribbing of the former is in some specimens barely traceable, suggesting a possible transition from one species to the other, but to decide this point will need a more extensive investigation than the extent of this paper or the time available permits. Mr. W. L. May writes me, "My experience is that, generally, *albida* is found in more sheltered situations. I have frequently seen *costata* of large size on the outside rocks, exposed to the full force of very heavy surf, as at Eagle Hawk Neck, *albida* being quite absent. At the same time, from shell characters only, it is difficult to keep them separate."

Kopionella, Ashby. A nice series was met with, but will be dealt with further on in this paper.

Acanthochiton sueri, Blainville, was very common at a shallow depth; a few were large with extremely wide girdles.

Acanthochiton bednalli, Pilsbry. A few specimens were taken in rather deeper water than the former species.

Acanthochiton (Notoplax) costatus, Ad. and Ang. One very fine specimen was collected close to Lunawanna Jetty; the girdle was of great width when alive, but shrinks much in drying. The dry shell measures 24 × 14 mm.

It will be seen that I have placed this species under the sub-genus *Notoplax* instead of *Macandrellus*, Dall., he having adopted Carpenter's name *Macandrellus* for an *Acanthochiton* having no spicules on the girdle, citing *A. costatus* as type of said genus. As well-preserved *costatus* from the type locality have small spicules distributed over the girdle, I can see no justification for separating them from the genus *Notoplax*. Dr. Torr's species, from South Australia, is only differentiated from *A. costatus* by the girdle being clothed densely with coarse spicules, and therefore *A. rubrostratus*, Torr, must be considered a sub-species of *costatus*. The Tasmanian form under review is freely covered with very small spicules of the same character as the Sydney specimens, but more numerous.

Rhyssoplax oruktos, Maughan, although evidently rare, several were secured at lowest tide, or nearly so. One interesting feature, before unrecorded, is that in the juvenile form the characteristic pitting is quite absent, so much so that they might easily be mistaken for *R. translucens*, Hed. and Hull, suggesting that both have the same ancestry.

Sypharochiton pellisserpentis maugeanus, Ire. and May. This, as before remarked, was one of the most numerous species and most variable, many being handsomely mottled with white, and one, almost entirely white, whereas others were almost black. There was a great variation in sculpture also, from strong ribbing throughout the pleural areas to those in which this area was practically smooth. I cannot help questioning the wisdom of separating the Tasmanian shell from *pellisserpentis*, Q. and G., for its exceptional habit of variability, both in sculpture and colour markings, suggests that there are no constant sub-specific differences.

Lorica cimolea, Reeve. One or two specimens only. No doubt rather rare in this locality.

Additional Species collected at Woodbridge.

Woodbridge is, as before stated, much further north, though still in the Channel, and while most of the species collected at Lunawanna were found here, there were some notable exceptions and some very fine additions.

Among the exceptions may be cited that of *Rhyssoplax oruktos*, Maughan, and the green variety of *Haploplax mayi*, Pilsbry, neither of which were here present. No specimen of *Acanthochiton costatus* was found, but it is evidently a rare species, generally. It is quite possible that a further search at Woodbridge would reveal it. The most noteworthy find at this place was that of three different species of the genus *Callochiton*. This probably easily constitutes a word's record; three distinct species of this genus at the same locality on the same day.

Callochiton platessa, Gould. One small and rather abnormal specimen was found. Instead of the regular convexity of the median valve the outer half is flattened or slightly concave.

Callochiton mayi, Torr. One specimen of this striking and rare species was found here and thereby considerably extending its range. Mr. May writes me that he dredged it in about nine fathoms off Pilot Station, just within the northern end of the Channel; it is doubtless a deep-water shell. The only other locality in Southern Tasmania known is Port Arthur, and there it is very rare.

Callochiton elongatus, May. This striking diminutive Callochiton, with its spoon-shaped girdle scales, has previously to this find, been only known to occur at Port Arthur and Norfolk Bay, and then only taken by Mr. Mawle, who supplied them to Mr. May for description. The girdle in life is broad but very thin and delicate, the general colouration of both shell and girdle being a bright pink, forming a

perfect colour protection as they occupy slight hollows in the pink calcarious algae that encrust the rocks.

Eudoxoplax inornatus, Ten. Woods. Although we found one or two specimens it is evidently rarer than at the more southerly locality.

Callistochiton mawlei, Ire. and May. Three specimens were found in the deepest water reached, an interesting extension of its habitat; previously it had only been recorded from Port Arthur and Norfolk Bay.

Acanthochiton gatliffi, Ashby. A very fine specimen of this rare Acanthochiton was obtained, making the first record for the State of Tasmania. When dry it measures just over 8 mm. in length and 4 mm. in width. The method of sculpture is quite typical, the delicate pink colour of the type is quite absent; in this the ground-colour is cinnamon-brown, blotched with darker brown. A large percentage of the granules of the dorsal area and the large flat pustules of the other areas are white, from opaque-white to semi-transparent white, but some are very dark brown. So many of the interspaces were filled in with sand granules that, until they had been cleaned away by boiling, the identification was quite uncertain. The shell was found on the upper side of a rock brought up at the lowest tide by Mr. May, and I recognized it at once as one of our rare *Acanthochitons*. With the exception of the specimens I collected at Port Lincoln in South Australia, the only other known ones have been found in Victoria, which makes this a very interesting addition to the fauna of Tasmania. The median valves in the specimen under review are not as "bow shaped" on the posterior margins as are the Victorian specimens, but are almost straight, except for the beak, which is normal.

Amaurochiton glaucus, Gray. A few specimens were found here in fairly shallow water. This is probably the southern limit of its present range. At Bellerive, opposite Hobart, it is very numerous, and is believed to have been originally introduced with ballast from New Zealand over thirty years ago. The ballast was unloaded at Bellerive, and this chiton has increased most extensively in that locality, and has slowly extended its range down the Derwent and in at the entrance of the D'Entrecasteaux Channel until it has reached as far as Woodbridge. It will be very interesting to watch the extension of its habitat, by which it will be possible to compute the rate a species may extend its range under favourable conditions.

Mr. May writes me as follows:—"It might be well to add that in addition to the species we collected, the following are known to occur in the Channel: *Ischnochiton falcatus*,

Lepidopleurus, sp. indet.; and *Acanthochiton speciosus*, H. Adams; all dredged in 9 fathoms off Pilot Station, and also at the same depth between Alonnah and Gordon in mid channel."

"Although it seems unlikely that the chiton fauna will be greatly increased, yet it is probable there are some species still to be found, when we consider the great extent of the coastline and that there are several absolutely land-locked bays, the sort of localities loved by Acanthochitons. It seems reasonable to expect a few of these. Possibly others may occur, such, for instance, as *Loricella*, which is found at Port Arthur, and *Rhyssoplax diaphora*, Ire. and May, which has been taken in the vicinity of Brown River."

In conclusion.—The absence of *Ischnochiton crispus*, Reeve, from the Channel is remarkable, and suggestive that its range westward ends with the mouth of the Derwent. At Frederick Henry Bay and Port Arthur it is very numerous and of exceptional size, and on the northern coast of Tasmania, in Victoria, and eastern South Australia, it is the common chiton. I wish to acknowledge the able help of my colleague, Mr. W. L. May, the well-known conchologist, for the results of the collecting trip would have been far inferior but for his co-operation. The types of *Kopionella tasmanica* and *Haploplax mayi*, var. *viridis*, I am presenting to the South Australian Museum.

Mopaliidae, Pilsbry.

Kopionella tasmanica, n. sp.

In my description of the genus *Kopionella* (Trans. Roy. Soc. S. Austr., vol. xliii., 1919, p. 70) I foreshadowed the probability of the Tasmanian form being ultimately found to be specifically distinct from *K. matthewsi*, Iredale. Now that Mr. W. L. May and I have collected a complete series of fresh, undamaged specimens, I am able to demonstrate the correctness of this surmise. I would take this opportunity to correct the closing paragraph in the same paper which compares the genus *Loricella* with the *Mopaliidae*, it should have been between the former and *Plaxiphora*.

General Appearance.—Shell broad, rather flat, sides slightly rounded, dorsal area raised and beaked, lateral area clearly defined by two raised ribs, girdle beset with spicules, the whole shell usualy covered with a dense growth of algae.

Colour.—When wet a bay-brown (Ridgway's Colour Standards, pl. ii.m.), in others claret-brown, ornamented with two broad, longitudinal, white dashes or stripes across the pleural area; in some valves two additional incipient stripes are discernable. In some specimens these stripes are green or greenish-white. In specimens from Little Norfolk Bay the

white longitudinal dashes are more numerous and towards the dorsal area quite crowded. In one specimen the whole of one valve is green and others are blotched with green. Most of those from that locality exhibit a large amount of pink; in these the beak is pink, this colour spreading over fully one-third of each valve. These specimens are extremely pretty, striped with white, banded with brown, extensively washed with pink and blotched with green. The pink shade seems near to what is described in Ridgway (plate as above) as salmon-orange.

Anterior Valve.—Slope steep, 9 raised radiating ribs, which, with the two posterior margins, are composed of a series of large, flattened, more or less circular pustules, smaller at the apex, and increasing rapidly towards the margin. These pustules give a crenate appearance to the margin of valve at the suture. Inside, white tinged with greenish-blue, slits 8, edges of teeth rounded and thickened, some show slight notching.

Posterior Valve.—Valve small, mucro-terminal, elevated, sinus below, a thickening extending from the mucro forwards to near the anterior margin. A bow-shaped continuation of the tegmentum extends behind the diagonal rib, downwards. The anterior margin on many specimens also shows thickening. Except for grooves following the growth-lines, unsculptured. Inside sinus wide, anterior margin of sutural laminae parallel with margin of tegmentum and almost straight, white tinged with greenish-blue, unslit, with a broad sinuosity under the upturned tail.

Median Valve.—Beaked, side slope rather flat, in some slightly rounded; dorsal area raised towards the posterior margin and rounded, defined by a pale wedge-shaped mark which is closely subgranulose; in places, these irregular longish granules are defined, in others they are coated over with a smooth outer coating. The lateral area is defined by two raised ribs composed of coarse, flattened, elongated protrubrances or pustules, set on a diagonal, well defined on the posterior margin, but on the other rib ill-defined, although distinctly raised. The space between these ribs is smooth, or almost so, but not polished. The pleural area is in the type specimen occupied by a series of coarse, broad, wavy ribs separated by irregular wavy sulci. This method of sculpture suggests "ripple marks" on a sandy sea beach. Inside, white tinged with greenish-blue, 1 slit, which is deep and well defined, pillared or produced upwards under the eaves at each side of slit. The eaves are defined, but the insertion plates are produced beyond the eaves.

Girdle.—When cleaned by boiling the girdle is found, under a magnification of 28 diameters, to be covered with a

dense mass of minute granules or scales, and is banded white and brown; it is also beset with three forms of spicules: (1) bunches of coarse, horn-coloured, pointed spicules at the sutures, placed similarly to those of an *Acanthochiton*, like bunches of spicules, are scattered indiscriminately about the girdle. (2) A fringe of lance-shaped white spicules, smaller lance-shaped scales cover a good deal of the under side of the girdle. (3) Long, slender, pale-brown spicules, surmounted with lance-shaped heads of porcelain-white. These are dealt with more particularly in the following paragraph.

"*Oar-headed Spicules.*" — These spicules, in the form under description, differ from those of *K. matthewsi*, Iredale, in that the "heads," while porcelain-white and polished, similar to that species, are different in shape, being smaller, more slender, and tapering. They remind one more of a stiletto than an oar-head. On the average these spicules appear to be longer and proportionately more slender, though this may be more apparent than real.

These lance-shaped heads, mostly, seem equally rounded on each side and straight, whereas those in the other species are flat on one side and curved like the blade of a scull. Practically all the specimens taken in the D'Entrecasteaux Channel, and most of those taken by Mr. May in Little Norfolk Bay, have these spicules present as well as the clusters of coarse spicules and fringe spicules. The lance-headed spicules are attached to the girdle either amongst the fringe spicules or just above them. As we took great care with the Channel specimens not to so clean off the vegetable growths that cover them as to break off these spicules, we may conclude that they are well preserved. A comparison with the South Australian species, taken at Marino, reveals the fact that the "oar-headed" spicules are much less numerous in the Tasmanian species than in the South Australian. The specimens examined vary in length from 6 mm. to 36 mm., all sizes, equally, having this feature present.

Measurements.—As before stated, those examined vary from 6 mm. to 36 mm., the latter being 21 mm. in width. The smaller ones are usually about three-quarters as wide as long, giving a flattened, rounded appearance to the chiton. In the type the median valve is 12 mm. from side to side, anterior valve 8 mm., posterior valve under 6 mm.

Radula is furnished with tri-lobed teeth, the central one broader and slightly longer than the two lateral, but seems slightly narrower than is the case in the South Australian species.

Hab.—Mr. W. L. May (to whom I am greatly indebted in connection with this investigation) and I found