



XVI.—On the generic affinities of the New-England Chitons

Philip P. Carpenter

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about one half and one third as long as the preceding. Abdomen ending in a short conical process. Copulative organs of the male of complex structure, the basal portion on each side consisting of a subrhomboidal acuminate lamina, the apical portion of an irregularly shaped plate produced laterally into an aliform process, and on the distal margin into a short strong hook. Female probably viviparous.

EXPLANATION OF THE PLATES.

PLATE IV.

- Fig. 1. Cytherura fulva*, male, seen from right side. }
- Fig. 2.* The same, male, seen from above. }
- Fig. 3.* The same, male, seen from end. } × 84.
- Fig. 4.* The same, female, seen from right side. }
- Fig. 5.* The same, female, seen from below. }
- Fig. 6. Cytherura Sarsii*, seen from right side. } × 84.
- Fig. 7.* The same, seen from above. }
- Fig. 8. Xestoleberis labiata*, female, seen from left side. }
- Fig. 9.* The same, female, seen from above. }
- Fig. 10.* The same, female, seen from below. }
- Fig. 11.* The same, female, seen from end. }
- Fig. 12.* The same, male, seen from left side. } × 50.
- Fig. 13.* The same, male, seen from below. }
- Fig. 14.* The same, left valve, seen from inside. }
- Fig. 15.* The same, right valve, seen from inside. }

PLATE V.

- Fig. 1. Cytherideis subulata*, var., seen from right side. }
- Fig. 2.* The same, var., seen from above. }
- Fig. 3.* The same, var., seen from below. } × 50.
- Fig. 4.* The same, anterior margin of shell. × 84.
- Fig. 5.* The same, shell-structure. × 100.
- Fig. 6. Paradoxostoma cuneatum*, seen from right side. } × 50.
- Fig. 7.* The same, seen from below. }
- Fig. 8. Darwinella Stevensoni*, mandible and palp : *a*, mandible ;
b, palp ; *c*, branchial plate. }
- Fig. 9.* The same, first jaw : *a*, incisive lobes ; *b*, branchial plate. } × 220.
- Fig. 10.* The same, second jaw : *a*, maxilla ; *b*, pediform palp ;
c, branchial plate. }

XVI.—On the Generic Affinities of the New-England Chitons.
By PHILIP P. CARPENTER, of Montreal*.

IT has been common, with conchologists even of the "advanced" school, to call every mollusk with eight valves a *Chiton*, except the vermiform species, which Lamarck sepa-

* Communicated by the Author, having been read at the Meeting of the American Association for the Advancement of Science, held at Portland, August 1873.

rated as *Chitonellus*. The consequence has been that very little is known of most Chitonidæ except the external characters—the differentiation shown in the soft parts, and even in the shelly valves, having been overlooked.

We have been fortunate, during the explorations of the U. S. Fish Commission, in observing four species alive; another was taken alive at Eastport last year; a sixth has been captured on the southern coast. These are all as yet known to inhabit the American Atlantic seas from Labrador to Florida. A seventh, called *Chiton cinereus*, is said to have been taken alive by Dr. Pickering, and to be in the collection of the Philadelphia Academy of Natural Sciences; but it may prove to belong to one of the other species, or to be a ballast specimen.

The six authentic species present well-marked characters, ranging under five genera.

It may be premised that the Lamarckian genus *Chiton* was first divided by the Rev. L. Guilding according to the external characters of the West-Indian species. About the same time the Rev. T. Lowe published the peculiarities in the insertion-plates of the British species. Both papers appeared in the 'Zoological Journal.' Dr. Gray, however, was the first to present, in the 'Proc. Zool. Soc.,' a full description of the forms of Chitonidæ, accurately arranged under genera and sections, partly according to the external, but principally according to the internal characters. Mr. Henry Adams, in compiling the 'Genera' from H. Cuming's collection, was not allowed to examine the insertion-plates. He thought he saw, however, a correlation between the internal and external marks, and accordingly redescribed Gray's genera, with lists of species, according to the surface-diagnosis. Gray, in his 'Guide,' unfortunately copied from H. Adams's lists without examination. Lastly, Chenu, as usual, reproduced the mistakes of H. Adams, with fresh ones of his own.

Having had unusual opportunities of dissecting out the valves of Chitons, I have felt compelled to rectify the previously published lists, and also to propose various new genera. These I communicated to Mr. Binney while his edition of Dr. Gould's 'Invertebrata' was passing through the press; but he did not think well to alter the position of every one of our species, as I feel compelled to do.

1. The *Chiton apiculatus* does not appear in H. Adams or Gray. It is a true *Chætopleura*, distinguished by the thin hairy girdle, regular valves with sharp teeth, and long series of gills. I have not seen it alive. It ranges from Southern Massachusetts to Florida. The genus is for the most part tropical.

2. The *Chiton ruber* is *Leptochiton ruber* of H. Adams, and is probably *Callochiton puniceus*, Couth., of the same author. It is the *Tonicia rubra* of Gray's 'Guide,' to which he adds as synonyms, in P. Z. S., *marmorea* and *fulminata*; and it also appears in Gray's 'Guide' as *Corephium? rubrum*. It has not the characters of any one of these four genera, in which our two best authors have placed it. It belongs to Gray's genus *Ischnochiton* (= *Lepidopleurus*, H. Ad., not Risso), section †, "mantle-scales minute, granular;" but as the gill-rows are short, instead of surrounding the foot as in the typical species, it is necessary to establish a fresh genus, *Trachydermon*. The insertion-plates are, as in *Ischnochiton* and *Chaetopleura*, regularly slit and sharp all round. Mr. Emerton first observed a great peculiarity in the animal, that there is a cancellated space between the posterior gill and the caudal extremity. Prof. Verrill observed that in different specimens there were either one, two, or three rows of holes on each side. The caudal lobe is generally figured as an anal tube; but in *T. rubrum* it is an imperforate muscle, working the posterior part of the girdle. The fæces were distinctly seen to escape, sometimes on one side, sometimes on the other, as it appeared to me from a slit on each side.

3. The *Chiton albus* is *Leptochiton albus* of H. Adams, = *sagrinatus*, Couth. I twice captured a live specimen; but each time it eluded the aftersearch. I do not doubt that this is also a *Trachydermon*, but cannot vouch for the peculiar characters above quoted. The genus belongs to cold and temperate seas.

4. The British *C. marginatus* is also a *Trachydermon*, and not a *Leptochiton*. It is the *C. cinereus* of Lowe, Forbes, and Hanley, but not of many other writers. Of the unique American shell so called I can say nothing.

5. The *C. marmoreus*, common at Eastport and northwards to Greenland, is *Tonicia* of H. Adams and Gray, simply because the girdle is smooth. The true southern *Tonicia*, however, have pectinated insertion-plates and ambient gills, like the typical Chitons; while the northern species so called have sharp plates and short gills. They differ, in fact, from *Trachydermon* simply in the girdle being destitute of the minute scales. I distinguish the group as *Tonicella*.

6. The *C. mendicarius* does not appear in the lists, and is probably unknown in Europe. Fortunately a very few specimens were dredged in the 'Bluelight,' one of them smashed but very large. It is known outside by the minute bristles on the girdle; but within it presents the very abnormal characters which had before been observed only in the minute British

C. Hanleyi. This appeared as *Leptochiton Hanleyi* in Gray's first paper, but as *Acanthopleura Hanleyi* in his 'Guide,' p. 183. But in the same book, p. 186, the same species reappears as *Hanleya debilis*, the genus (constituted for that species alone) being said to have lateral tufts of spines; insertion-plates entire, of terminal valves alike. H. Adams, following this diagnosis externally, described other species which really had these spine-tufts though not the internal characters. However, on examining every specimen of the species in the market, I could not discern a single spine-tuft, though announced by the accurate Lovén. I found, however, excellent internal characters. All the valves were destitute of insertion-plates *except* the anterior one, which really *was* "entire," having one continuous plate, not slit. I did not know whether to believe my own eyes or the testimony of Lovén and Gray, till Prof. Verrill allowed me to open the large, smashed specimen of *C. mendicarius*. It proved to be a true *Hanleya*, according to my diagnosis, but not according to Lovén and Gray. I presume that the contraction of the skin in so minute a shell led to the *appearance* of tufts, and that Dr. Gray *supposed* that the posterior valve had an entire plate like the anterior. I should be glad of the opinion of the Section whether the genus *Hanleya* should follow the type against the diagnosis, as here given, or an unreal diagnosis against the type, as followed (in part *only*) by H. Adams. The animal of this species resembles *Leptochiton* in having short posterior gills, and a central anal tube from which the fæces were seen to exude.

7. A similar confusion attends the last and most remarkable species, '*C. Emersonii*.' Several live specimens were dredged by the 'Bluelight,' one of extraordinary size; and still more have been dredged by Principal Dawson at Murray Bay. For the original species *C. vestitus*, from Alaska, a genus *Amicula* was constituted by Gray, characterized by covered valves and regular pore-tufts. The elder Sowerby figured the *Emersonii* as *vestitus* in his 'Conch. Illustr. '; hence Dr. Gould naturally looked for the pore-tufts, and found them. Having received a fresh specimen from Dr. Stimpson, I could *not* find them. I wrote to Dr. Gould, who sent me his type specimens, with sketch of regular pore-tufts, as he saw them; but still I could not. He died without clearing the difficulty; and I presumed there might be two species, one with and one without pores. But after examining both northern and southern suites of specimens, I feel confidence in stating that there are no true pores, but simply a profusion of hair branches, generally very irregular, but sometimes, in early stages, more conspicuous at the

sutures. I propose, therefore, to keep the name *Amicula* for the Alaskan pore-bearing species—and to name this (with the Alaskan *Pallasii*) *Stimpsoniella*, in honour of one of the best naturalists born in New England. In this genus, as in *Trachydermon*, the faeces are expelled through slits close to the caudal lobe, one on each side. When at rest, the creature makes a posterior fold in the girdle, corresponding to the wave in the posterior valve.

I should be extremely indebted to any gentlemen who would lend me unusual Chitons for examination, previously to the publication of my 'Contributions towards a Monograph of the Chitonidæ' by the Smithsonian Institute. There is also a great field open for investigation to all those who can examine living Chitons or even dissect alcoholic specimens. It is known that the external characters are *not* coordinate with the internal ones; it remains to be found out whether either of them correlate with the anatomical characters of dentition, gills, vent, &c., which ought to furnish the best divisions in arranging this difficult group.

XVII.—*Descriptions of two new Species of Birds.*
By ARTHUR, VISCOUNT WALDEN, P.Z.S., F.R.S., &c.

Pelargopsis gigantea, n. sp.

Head, nape, chin, cheeks, back and sides of the neck, flanks, under tail-coverts, and entire under surface white, washed more or less with dilute fulvous, the concealed parts of the feathers being pure white and their exposed parts being tinged with fulvous; this hue is deepest on the flanks, breast, and on the abdominal and ventral regions, and on the under tail-coverts; crown nearly pure white; middle and lower part of the back rich pale glistening turquoise-blue; outer edges of primaries and secondaries, and all the tertiaries and scapulars, dingy bluish green; middle pair of rectrices above entirely, and lateral pairs on their outer webs, of a purer blue; under wing-coverts and axillaries fulvous, somewhat deeper than that of the flanks; bill coral-red; feet red.

Bill from forehead 3·25 inches, wing 6·62, tail 4·50, tarsus 0·88, middle toe 1·50.

Obtained at Salok, Sulu Islands, near Borneo, by Dr. Bernhard Meyer.

Scops modestus, n. sp.

Stiff loral bristles pure white at base, some tipped with