

Notes on Loricata¹
15. A remarkable anomaly in *Tonicella lineata* (Wood)

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A unique anomaly in the shape of the valves VII and VIII of a British Columbia (Canada) specimen of *Tonicella lineata* is described and figured. Valve VII has its lateral areas extremely extended posteriorly at the cost of valve III, of which only a triangular remnant is present. However, this shows normal apophyses; the abnormal valve VII has 4 slits on both sides instead of only 1. The anomaly may be due to disturbance at an early larval stage. Normally valves I-VII are formed by the fusion of three platelets, valve VIII only appearing later. Two of its three initial platelets might have fused with valve VII, resulting in valve VIII originating only from the central platelet.

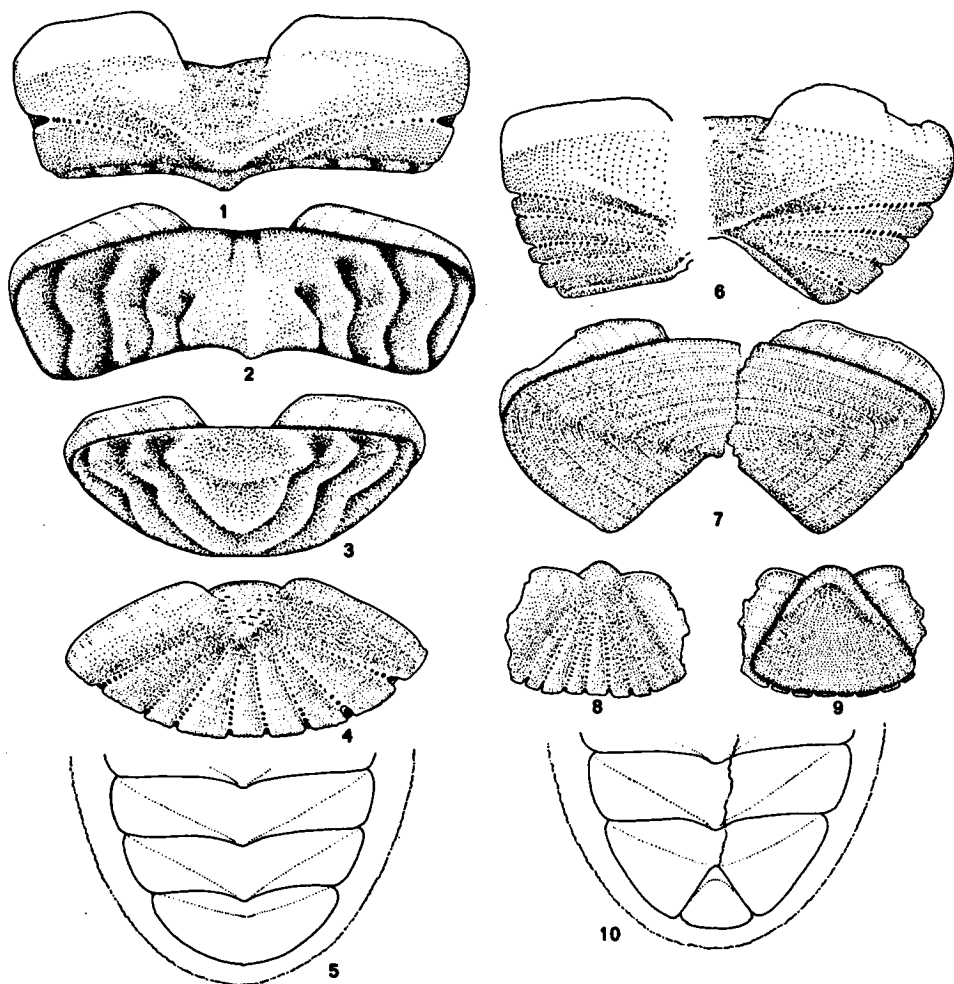
Key words: Loricata, *Tonicella*, teratology, Canada.

Recently Mr. Daryl E. Foote of Vancouver North, Canada, B.C., sent me two samples of young *Tonicella lineata* (Wood, 1815), collected by SCUBA diving on July 23, 1983, in a depth of 5-10 m on boulders off a small island N. of spit in Tuwanek Point, Sechelt Inlet, British Columbia, Canada, in order to show me the many colour varieties of this species, especially in the younger stages. One unidentified specimen with a "tiny tail valve" from the same habitat was included, which made a total of 38 specimens, of which four, inclusive of the one with the tiny tail valve, were colourless, the tegmentum and the girdle being dirty white all over. This specimen (figs. 6-10) does not differ markedly from the others, except for the hinder part of the animal, as the shape of the valves VII and VIII is widely divergent from that of normal specimens (compare figs. 5 and 10).

Unfortunately the 10 mm long specimen was severely damaged while it was collected, all of the valves, except the tiny VIII, being broken along the median axis.

When viewed from above (fig. 10) the lateral areas of valve VII appear to be extremely extended posteriorly, at the cost of VIII, of which only the central part of the postmucronal area is left, leaving an equilateral triangular tegmentum. That we are not dealing with an anomaly caused by repair of some damage sustained at an earlier stage, becomes quite obvious after disarticulation of the hinder valves. The tail valve (figs. 8-9) appears to be equipped with a rather normally looking articulamentum, showing seven slits in the posterior margin, the teeth very finely crenulated on the outside, the slit rays distinct as rows of perforations, the apophyses well developed along the oblique side margins. As a consequence the posterior margin of VII (figs. 6-7) forms an acute angle, enclosing valve VIII, the articulamentum provided with four slits on either side. As 1-1 slits in the intermediate valves is normal in this species, three slits on either side initially belong to VIII, so that the number of slits in the terminal

¹ Notes on Loricata 11-14, see Zool. Meded. Leiden 59 (25), 1985.



Figs. 1-10. Specimens of *Tonicella lineata* (Wood) from Tuwanek Point, Sechart Inlet, British Columbia, Canada, both 10 mm long; 1-5 normal specimen, 6-10 anomalous specimen. 1, 6, valve VII, ventral view $\times 12.5$; 2, 7 same valve, dorsal view $\times 12.5$; 3, 9, valve VIII, dorsal view, $\times 12.5$; 4, 8, valve VIII, ventral view, $\times 12.5$; 5, 10, camera lucida sketches of posterior part of animals, dorsal view, $\times 6.5$

valve would (normally) amount to 13. This appears to be uncommonly high, as normally 8-12 slits are found in this valve (Kaas & Van Belle, 1985).

Anomalies in chitons have been the subject of investigations of many authors. Dell'Angelo (1982) has summarized most of these. They almost invariably relate to cases of hypermerism (9 valves, only known in four specimens of three species), or hypomerism (3-7 valves, seven-valved specimens rather regularly found in many species), or abnormal development of certain valves (total or partial duplication, or

partial loss of valves), mostly in consequence of earlier injury. Duplication of the terminal insertion plates has been demonstrated by Dell'Angelo & Palazzi (1983) and formation of a cone-shaped appendix on the girdle of *Chaetopleura angulata* (Spengler, 1797) by Van Belle (1983). An anomaly such as the present one, however, has never been reported to my knowledge. It must have been the result of some unusual event in the early shell formation, which occurs in the late trochophore, the eighth valve always appearing considerably later. As each valve is formed of three merging initial calcareous plates, it is conceivable that two of these plates, normally constituting VIII, were fused with VII, leaving only the central one to give rise to a degenerate VIII. Of course, this is only a suggestion, as the development of shell plates in chitons has so far not been investigated sufficiently.

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SAMENVATTING

Een merkwaardige afwijking in *Tonicella lineata* (Wood)

Een unieke afwijking in de vorm van de laatste twee schelpstukken van een exemplaar van *Tonicella lineata* (Wood), afkomstig van Brits Columbia, Canada, is beschreven en afgebeeld. Plaat VII is lateraal sterk naar achteren verlengd ten koste van plaat VIII, waarvan slechts een driehoekig rudiment over is, dat echter normale apophyzen vertoont; de abnormale plaat VII vertoont aan beide zijden 4 inkepingen, in plaats van de normale 1. De afwijking kan ontstaan zijn tijdens de larvale ontwikkeling, waarbij de schelpstukken I-VII elk gevormd worden uit drie kalkplaatjes, die met elkaar vergroeien. Het schelpstuk VIII verschijnt pas later. Twee van de drie plaatjes-in-aanleg zouden vergroeid kunnen zijn met VII, waardoor VIII alleen gevormd is uit het middelste deel.