A NEW SPECIES OF CANCELLARIID GASTROPOD FROM ANTARCTICA WITH A DESCRIPTION OF THE RADULA

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Contained within a collection of sublittoral gastropods from Signy Island, South Orkney Islands, were two specimens resembling species typically placed in the genus *Admete* Kroyer 1842. *Admete* is characterized by the absence of a radula (Thiele, 1929) but, on dissection, the larger specimen of the Signy Island material was found to possess a radula. Consequently, the congeneric status of this, and perhaps other Antarctic species, with the Arctic type of the genus *A. viridula* (Fabricius) is now doubtful.

A revision of the Admetinae is long overdue but this cannot be adequately undertaken using shell characters alone. Specimens of *Admete* suitable for anatomical studies are very scarce, most institutions holding examples of shells only. All but two descriptions of *Admete* lack details of the radula and this reflects the paucity of published anatomical data. Lack of a radula has been confirmed only for *A. viridula* and *A. magellanica* Strebel (Powell, 1951). Antarctic material is scarce and the author has been able to obtain only a few preserved specimens of *A. magellanica*.

The interpretation of the radula observed here by scanning electron microscopy is difficult because of the conflicting data published by Graham (1966) and Olsson (1970). To rationalize this conflict, SEM data have been obtained for the tropical genera *Trigonostoma* and *Cancellaria*. Again, materials are scarce and there is no guarantee that the species are typical of the genera or of the Cancellariidae as a whole.

This paper is therefore restricted to presenting the few data available with the realization that our understanding is and will remain, far from complete until larger series of preserved specimens from polar and deep water environments become available.

Family Cancellariidae

Subfamily Admetinae

Genus *Nothoadmete* gen. nov.

Shell small, spire depressed, body whorl large, rather tumid. Sculpture weak of numerous fine spiral striae. Aperture large, oval, columella smooth with no plaits, siphonal notch small. Periostracum thin, pale. Operculum absent. Radula present, cancellariid in form. Teeth long, blade-like with bulbous barbed tips. (*Nothoadmete* from Greek, *nothos* meaning 'spurious'.)

Remarks. The genus *Admete* was erected to cover the aradulate species *A. viridula* but has come to include the majority of weakly sculptured cancellariids. Only in *A. viridula* (Thiele, 1929) and *A. magellanica* (Powell, 1951) has the aradulate condition been confirmed. The remaining species are designated on shell characters alone (Dall, 1886, 1908; Watson, 1886; Strebel, 1905, 1908; Powell, 1951; Dell, 1956). Other weakly sculptured genera, notably *Zeadmete* Finlay 1927, have a similar shell form but again the radula structures are unknown (Garrard, 1975). Comparing *Nothoadmete* with *A. viridula*, not only is the radular condition significantly different but *A. viridula* has a fusiform outline, columellar plaits and a weak

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cancellate sculpture, characters not possessed by *Nothoadmete*. Despite the very limited number of specimens available, the above difference warrants separation at the generic level. The other Antarctic and Subantarctic species of the Admetinae have shells similar to that of *Nothoadmete* especially the species *A. antarctica* Strebel and *A. consobrina* Powell. *A. magellanica*, however, does not possess a radula but the tubular jaw is present. The shell sculpture is weakly cancellate and faint columellar plaits are present. *A. magellanica*, therefore, should not be included in *Nothoadmete*.

Nothoadmete tumida sp. nov.

Shell. Small (max. height 12.5 mm; max. diam. 9.8 mm), spire depressed, body whorl inflated. Protoconch of approximately one and a half whorls. Teleoconch of three whorls, periphery rounded, sutures slightly impressed, spire very short, not more than 10% the height of the shell. Body whorl large, tumid. Sculpture of numerous spiral striations, numbering approximately 40 on the body whorl and base. Aperture large, oval, outer lip with a slight angulation just before it meets the whorl, otherwise evenly rounded. Columella smooth with no plaits, siphonal notch small, siphonal fasciole present but very weak. Periostracum thin, horn-coloured (Figs. 1 and 2).

Operculum. Absent.

Radula. Typical in overall form of the Cancellariidae, consisting of a single row of 20 elongate blade-like teeth. The tip of each tooth is bulbous, with bulbs having a median expression along which are set 8–10 recurved barbs (Figs. 3, 4 and 5).

Type locality

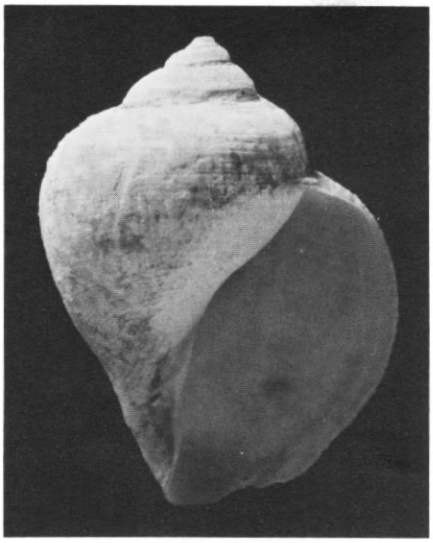
40–80 m. Borge Bay, Signy Island, South Orkney Islands. 60° 43′ S, 43° 38′ W.

Material

Holotype. Height 12.5 mm. Diameter 9.8 mm. National Museum of Wales, Cardiff: N.M.W. Z:1979:2.1. Paratype: N.M.W. Z:1979.2.2. Collected by Dr Gordon Picken, 1975–77.

Remarks. Only two other species of Antarctic Admetinae are known, *A. antarctica* Strebel 1908 and *A. consobrina* Powell 1951. *A. consobrina* has a distinctly carinate shell quite unlike that of *N. tumida*. *A. antarctica* is quite similar but the materials that I have seen and the figures given by Strebel (1908) consistently show a less tumid outline and a more prominent spire. Strebel (1905) described a carinated form of *A. magellanica* and such variability may exist in the Antarctic species. The exact nature of the relationship between *A. antarctica*, *A. consobrina* and *N. tumida* will only be clarified when larger samples become available.

Radula. Adam and Knudsen (1955), Barnard (1957), Graham (1966) and Olsson (1970) have described the cancellariid radula using light microscopy. Olsson's (1970) interpretation of the teeth having a microtubular structure is quite different from that given by the other authors cited, who described the teeth as having strengthening venation with simple, petaloid or minutely barbed tips. The large bulbous tips observed in *N. tumida* do not entirely equate with such interpretations but this may be due to the different techniques employed. Consequently the radulae of two 'typical' cancellariids, *Trigonostoma costigera* Sowerby and *Cancellaria oblonga* (Sowerby), were examined by scanning electron microscopy (Figs. 6, 7 and 8). The overall radular and jaw structure agrees with previous studies. The blades of the



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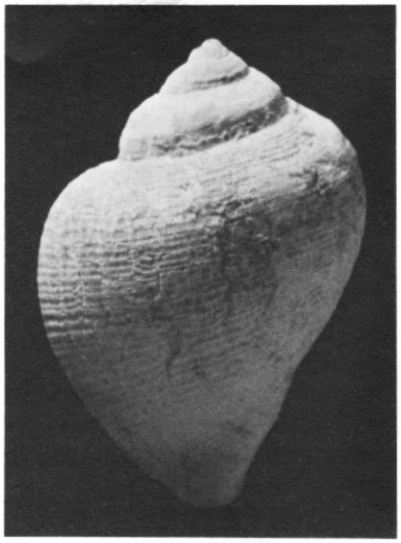

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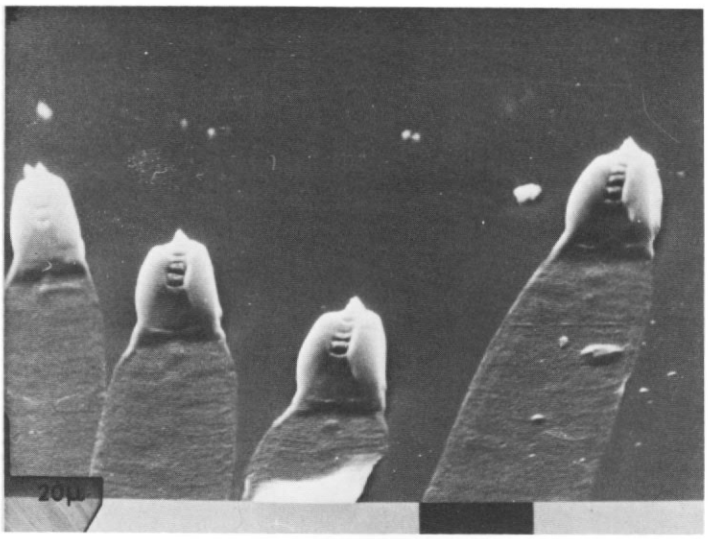

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Figs. 1, 2, 3. *Nothoadmete tumida* sp. nov. Holotype N.M.W. Z:1979:2.1. × 4 (Figs. 1 and 2) and SEM micrograph of radula teeth (Fig. 3).

teeth are strengthened in *Trigonostoma* and *Cancellaria* by lateral thickening and no microtubular structure was observed. Olsson's (1970) interpretation can therefore be discounted. The tips of the teeth of *Trigonostoma* and *Cancellaria* are swollen apparently by heavy lateral thickening and at their extremities are formations of small barbs. This structure agrees well with that described by Adam and Knudsen (1955). The simple or petaloid tips observed by Graham (1966) are probably varia-

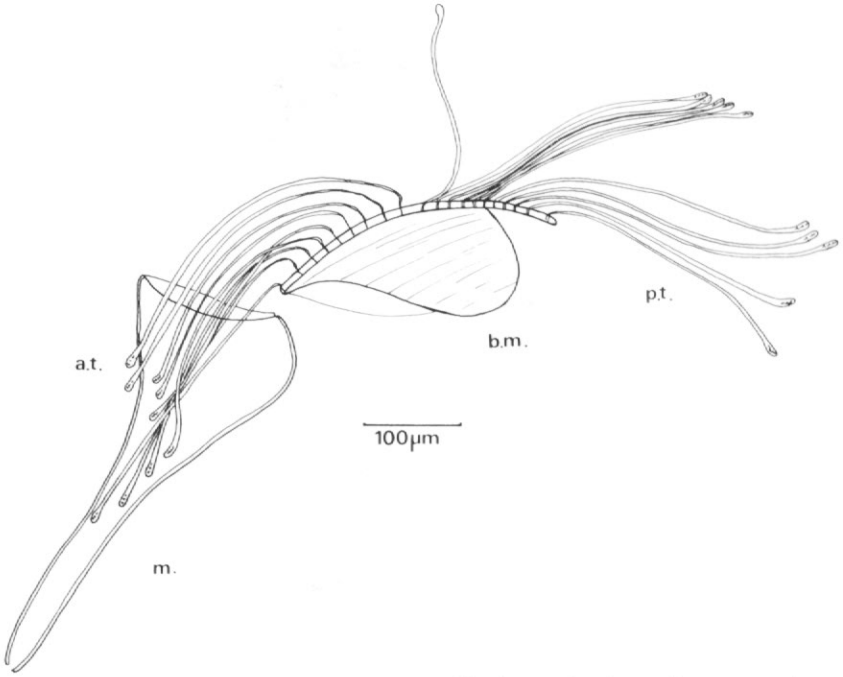

Fig. 4. Radula and 'mandible' of *Nothoadmete tumida*. b.m. = basal membrane; m. = 'mandible'; a.t. = anterior set of teeth; p.t. = posterior set of teeth.

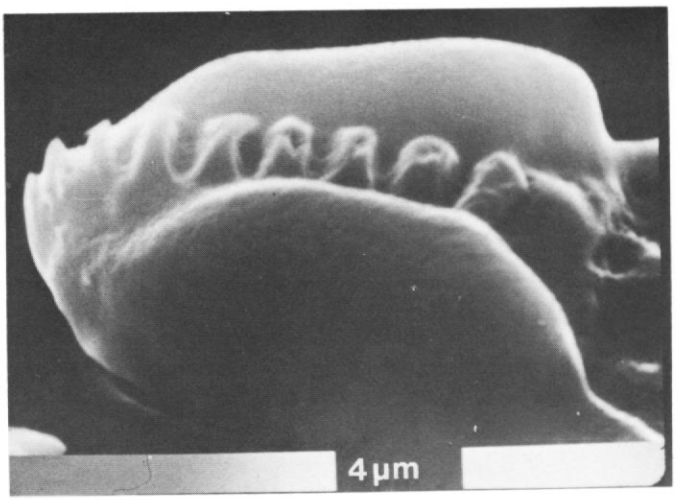

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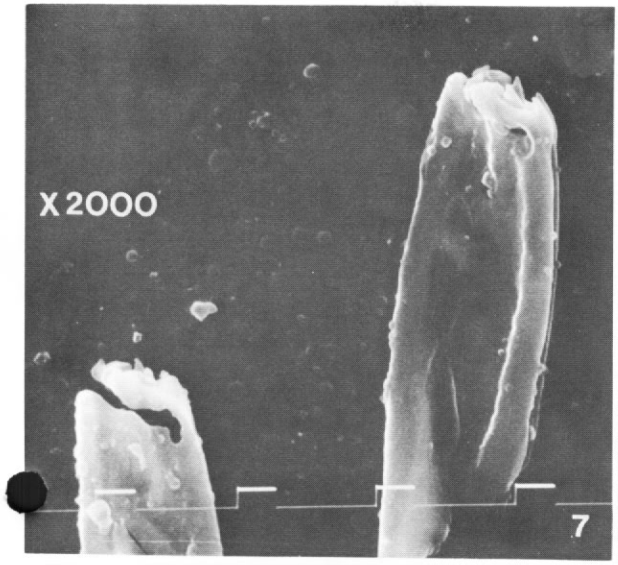
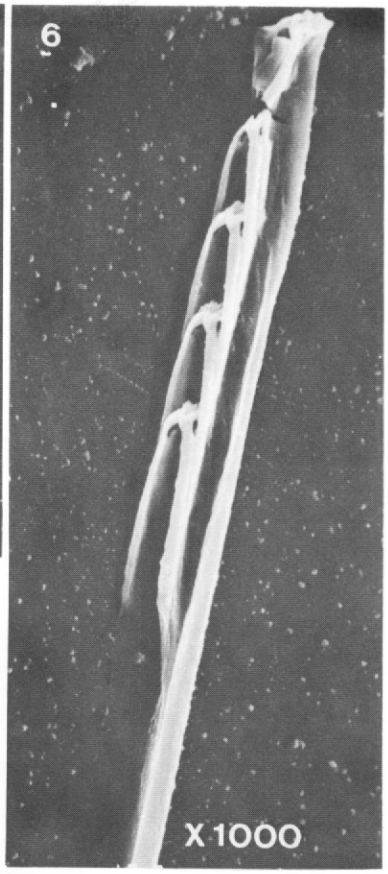
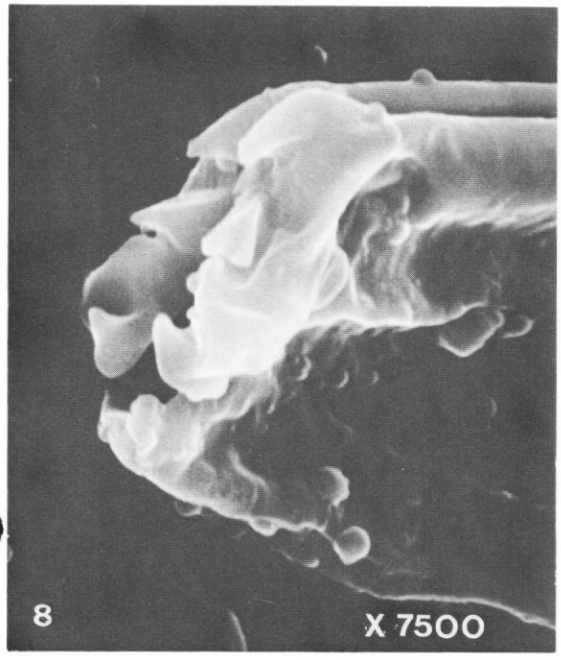
Fig. 5. SEM micrograph of the tip of a single radular tooth.

tions of the development of the tip. The alignment of the teeth, one behind the other is confirmed and this arrangement may be maintained by the tubular jaw. The aperture of the jaw in all three genera examined only just exceeds the dimensions of the cross-section of a single tooth and therefore the teeth must emerge in a single







Figs. 6, 7, 8. SEM micrographs of the radular teeth of *Trigonostoma costigera*: five teeth showing alignment (Fig. 6), swollen tip of an individual tooth (Fig. 7) and formation of small barbs at the extremity of the swollen tip of a tooth (Fig. 8).

row. In *Nothoadmete* the bulbous tips are analogous to those of *Trigonostoma* and *Cancellaria* but their greater size and strong recurved barbs suggest a somewhat different function. Graham (1966) proposed that the teeth acted like a brush, picking up microparticles but the close alignment of the teeth and the barbed tips seen in *Trigonostoma* and *Cancellaria* suggest a rasping mode of action. The robust form of

the tips of the teeth in *Nothoadmete* could also be interpretated as having a penetrating function, perhaps the teeth being employed to enter and rip open individual zooids of colonial organisms. Clearly the function of the cancellariid radula and the feeding biology of the family needs reassessment.

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