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A new limid bivalve from the La Meseta Formation (Eocene) of Seymour Island, Antarctic Peninsula

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ABSTRACT

STILWELL, D.J. & GAŹDZICKI, A. 1998. A new limid bivalve from the La Meseta Formation (Eocene) of Seymour Island, Antarctic Peninsula. *Acta Geologica Polonica*, **48** (2), 149-155. Warszawa.

Several specimens of an unusual limid bivalve were collected recently from basal transgressive facies (Telm1) of the Eocene La Meseta Formation, Seymour (Marambio) Island, Antarctic Peninsula. This bivalve represents a new subgenus and species, described herein as *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n. *Acesta* (*Acesta*) *bibbyi* STILWELL & ZINSMEISTER, 1992, and *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n. are the only limid bivalves recorded from the Eocene of Antarctica, but the history of the family in Antarctica extends from Cretaceous to Recent. *Acesta* (*Antarcticesta*) subgen. n. is monotypic and endemic to Antarctica with no known close relative.

INTRODUCTION

During the 1993-94 Argentine-Polish field party to the Antarctic Peninsula, several large limid bivalves were recovered from the lowermost facies (Telm1) of the La Meseta Formation of Seymour Island (Text-figs 1-2). The marine sediments of this small remote island preserve an exceptional record of latest Cretaceous to Eocene and ?earliest Oligocene life. The only other record of Eocene Mollusca from Antarctica is a newly described, moderately diverse fauna from McMurdo Sound in the Ross Sea region (STILWELL, *accepted*).

The La Meseta Formation represents some 800 m of nearshore sandstones and siltstones that were deposited in a spectrum of shallow marine environments (STILWELL & ZINSMEISTER 1992, GAŹDZICKI 1996). The basal facies of Telm1, exposed southwest of Cross Valley along López de Bertodano Bay, is characterized by 2 m of grey to red-brown limonitic, glauconitic, sandy siltstones, sandstones, and pebble conglomerates with intercalations and discontinuous lenses of shelly hash and clasts of pre-Tertiary rocks. Unit Telm1 developed as a result of accumulation in topographic lows on an erosional surface that was flooded during an Early Eocene transgressive cycle (STILWELL & ZINSMEISTER 1992, *see also* COCOZZA & CLARKE 1992). Although molluscan diversity is relatively high overall in the La Meseta Formation (some 170 described taxa and about 10 undescribed species), Telm1 is fairly depauperate of molluscs reflecting generally poor preservation in the shelly hash beds and the localized exposure of this unit. The presence of *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n. (*see* Text-figs 3-4), and associated bivalves

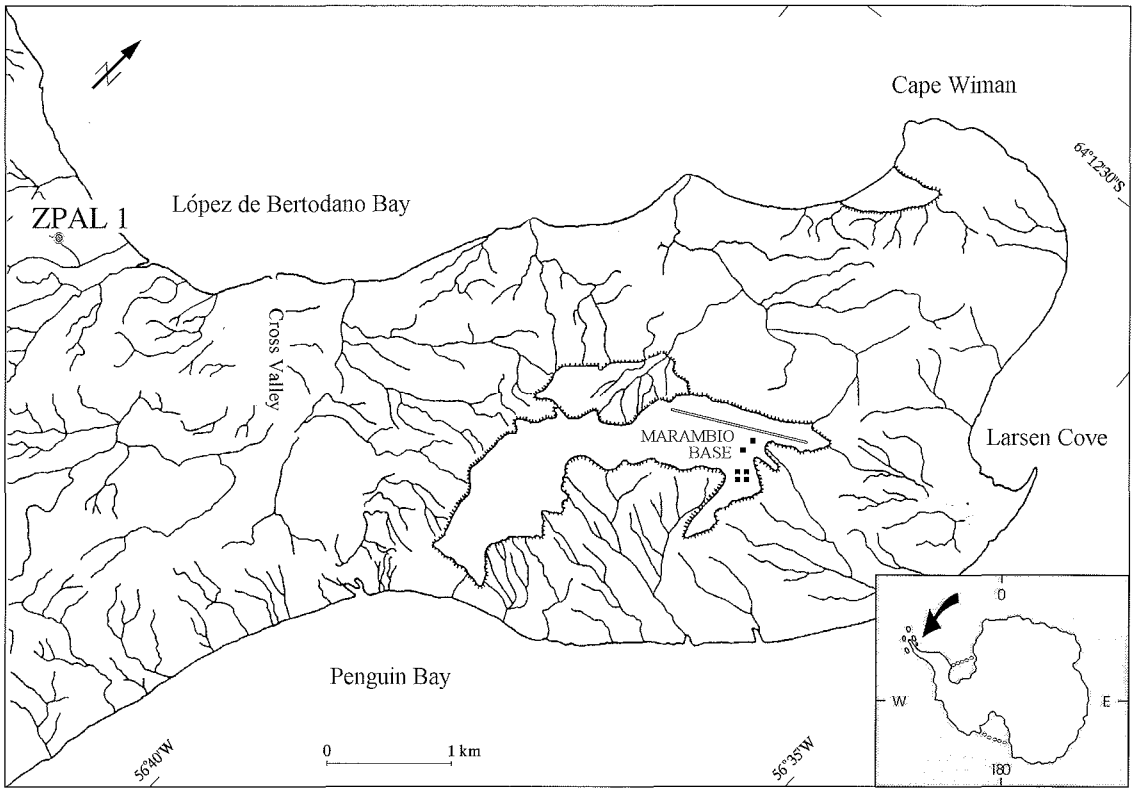

Fig. 1. Morphologic sketch-map of the northern part of Seymour Island showing the locality ZPAL 1 (*Bill Hill*) from which the new limid bivalve *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n. was collected; arrow of inset shows the location of Seymour Island at the tip of the Antarctic Peninsula

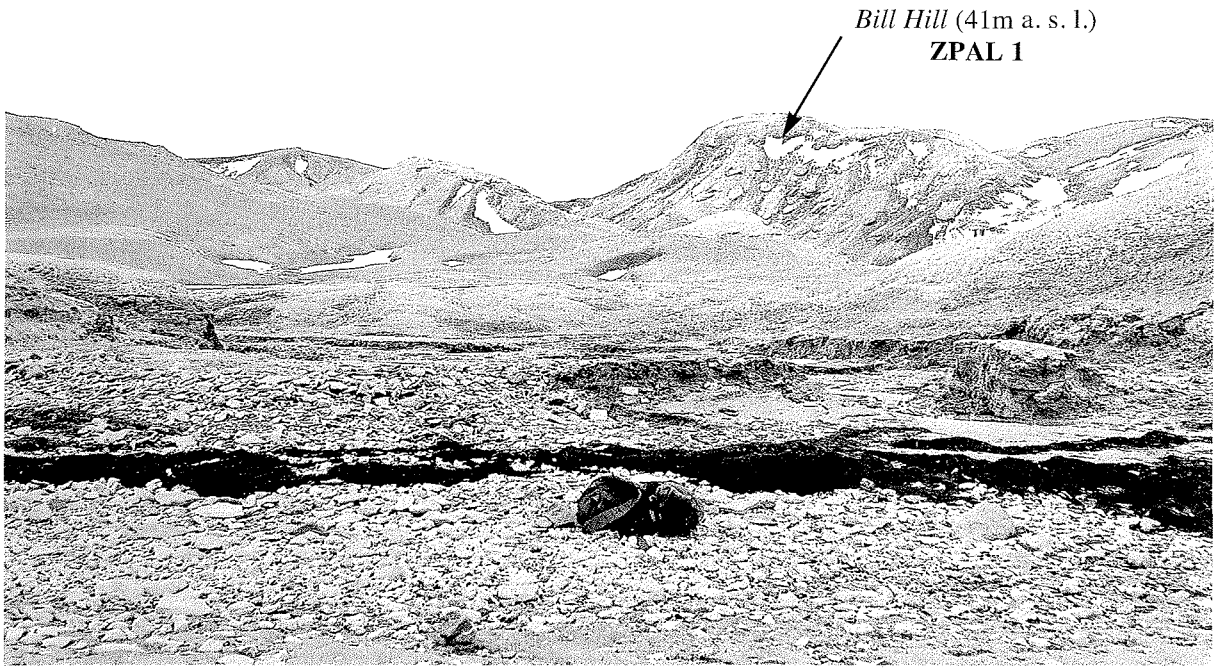

Fig. 2. Locality ZPAL 1 (*Bill Hill*) viewed from López de Bertodano Bay; arrow indicates the collecting site; photographed by A. GAŹDZICKI, February, 1994

and gastropods (*see* STILWELL & ZINSMEISTER 1992), cyclostome and cheilostome bryozoans (GAŹDZICKI & HARA 1994, HARA 1997), brachiopods (BITNER 1996), stylasterids (STOLARSKI, 1998), solitary and colonial corals (STOLARSKI 1996), polychaete worms, palinuran lobsters (FELDMANN & GAŹDZICKI 1997), crinoids (BAUMILLER & GAŹDZICKI 1996), asteroids, cidaroid echinoids (RADWAŃSKA 1996), gadiform fish remains (JERZMAŃSKA, *personal communication*), and shark teeth, indicate a shallow shelf marine community of normal salinity. Further, the first material of *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n. was collected during the 1985 American Expedition to Seymour Island, but the poorly preserved nature of the specimens prevented any certain taxonomic determinations at that time (STILWELL & ZINSMEISTER 1992, Pl. 4, Figs a-b). The new material clearly shows that these large specimens belong to the Limidae.

The aim of this paper is to describe this new limid bivalve from Seymour Island and to provide an assessment of the possible affinities of this unusual taxon. The material used in this paper is housed at the Institute of Paleobiology of the Polish Academy of Sciences, Warsaw, abbreviated ZPAL. Additional material of *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n., not studied in detail here, is housed at the Department of Earth and Atmospheric Sciences, Purdue University, West Lafayette, Indiana, USA, abbreviated PU, and also the United States National Museum, Washington, D.C., USA, abbreviated USNM.

SYSTEMATIC PALEONTOLOGY

Phylum Mollusca LINNÉ, 1758
Class Bivalvia LINNÉ, 1758
Order Pterioida NEWELL, 1965
Suborder Pteriina NEWELL, 1965
Superfamily Limoidea RAFINESQUE, 1815
Family Limidae RAFINESQUE, 1815

Genus *Acesta* H. ADAMS & A. ADAMS, 1858
Type species: *Ostrea excavata* FABRICIUS, 1779, by monotypy.

Subgenus *Antarcticesta* subgen. n.

Type species: *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n., designated herein.

DIAGNOSIS: Large limid bivalve with small, only slightly elevated umbones, and a moderately long and sloping posterior auricle and obsolete anterior one; sculpture very coarse of widely spaced, squamiform radial ribs with a fine commarginal element of wavy, undulating, closely spaced threads; hinge plate quite narrow with a shallow, small chrondrophore; inner shell with deep radial furrows.

DISCUSSION: Although the subovate outline and obsolete anterior auricle is comparable to described species of *Acesta* (*Acesta*) ADAMS & ADAMS, 1858, and *Acesta* (*Plicacesta*) VOKES, 1963, *Acesta* (*Antarcticesta*) subgen. et sp. n. is distinct from other members of the *Acesta* clade in having very broad and coarse, squamiform radial ribs and a very narrow hinge plate with a shallow, small chronodrophore. *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n. can be differentiated from the Recent Norwegian type species, *A.* (*Acesta*) *excavata* (FABRICIUS, 1779) (SOWERBY 1842, p. 85, Pl. 21, Figs 8-9; COX & HERTLEIN *in* MOORE 1969, p. N386, Fig. C104-2; ABBOTT & DANCE 1983, p. 320, coloured figure) and the Recent Japanese type species, *A.* (*Plicacesta*) *smithi* (G. B. Sowerby, 1888) (COX & HERTLEIN *in* MOORE 1969, p. N386, Fig. C104-1), in having a much more shallow chondrophore and the very coarse, squamiform radial rib configuration described above. *Acesta* (*Plicacesta*) differs from *Acesta* (*Acesta*) in having much stronger radial ornament and a thicker shell. The differences between *Acesta* (*Antarcticesta*) subgen. n. and related limid taxa are beyond the limits of species variability, and thus we erect a new subgenus to accommodate this new, endemic group. The phylogeny of *Acesta* (*Antarcticesta*) subgen. n. is uncertain, but the pre-Eocene ancestor was probable comparable to a coarsely ribbed early species of *A.* (*Plicacesta*).

Acesta (Antarcticesta) laticosta subgen. et sp. n.
Text-figs 3a-e, 4a-c

1992. *"Chlamys"* sp. A; Stilwell & Zinsmeister, pp. 60-61, Pl. 4, Figs a-b.

TYPES: Holotype ZPAL L.VI/1a-b (Text-figs 3a, 4a); paratypes ZPAL L.VI/4b (Text-fig. 3b), ZPAL L.VI/3 (Text-fig. 3c), ZPAL L.VI/2 (Text-fig. 3d), ZPAL L.VI/6 (Text-fig. 3e), ZPAL L.VI/4a (Text-fig. 4b), ZPAL L.VI/5a (Text-fig. 4c).

DIMENSIONS: Holotype ZPAL L.VI/1a-b length 90 mm, height 104 mm; paratypes ZPAL L.VI/4b length of fragment 20 mm, ZPAL L.VI/3 length 45 mm, height 60 mm, ZPAL L.VI/2 length 78 mm, height 80 mm, ZPAL L.VI/6 length of fragment 41 mm, ZPAL L.VI/4a length of fragment 30 mm, ZPAL L.VI/5a length of dorsal fragment of shell 34 mm.

Type horizon and locality: Lowermost facies of Telm1, La Meseta Formation, *Bill Hill* (locality ZPAL 1; 64°15'30"S, 56°44'20"W), Seymour Island, Antarctic Peninsula.
Age: Lower Eocene.

DERIVATION OF THE NAME: The new subgenus name reflects the taxon's endemicity to

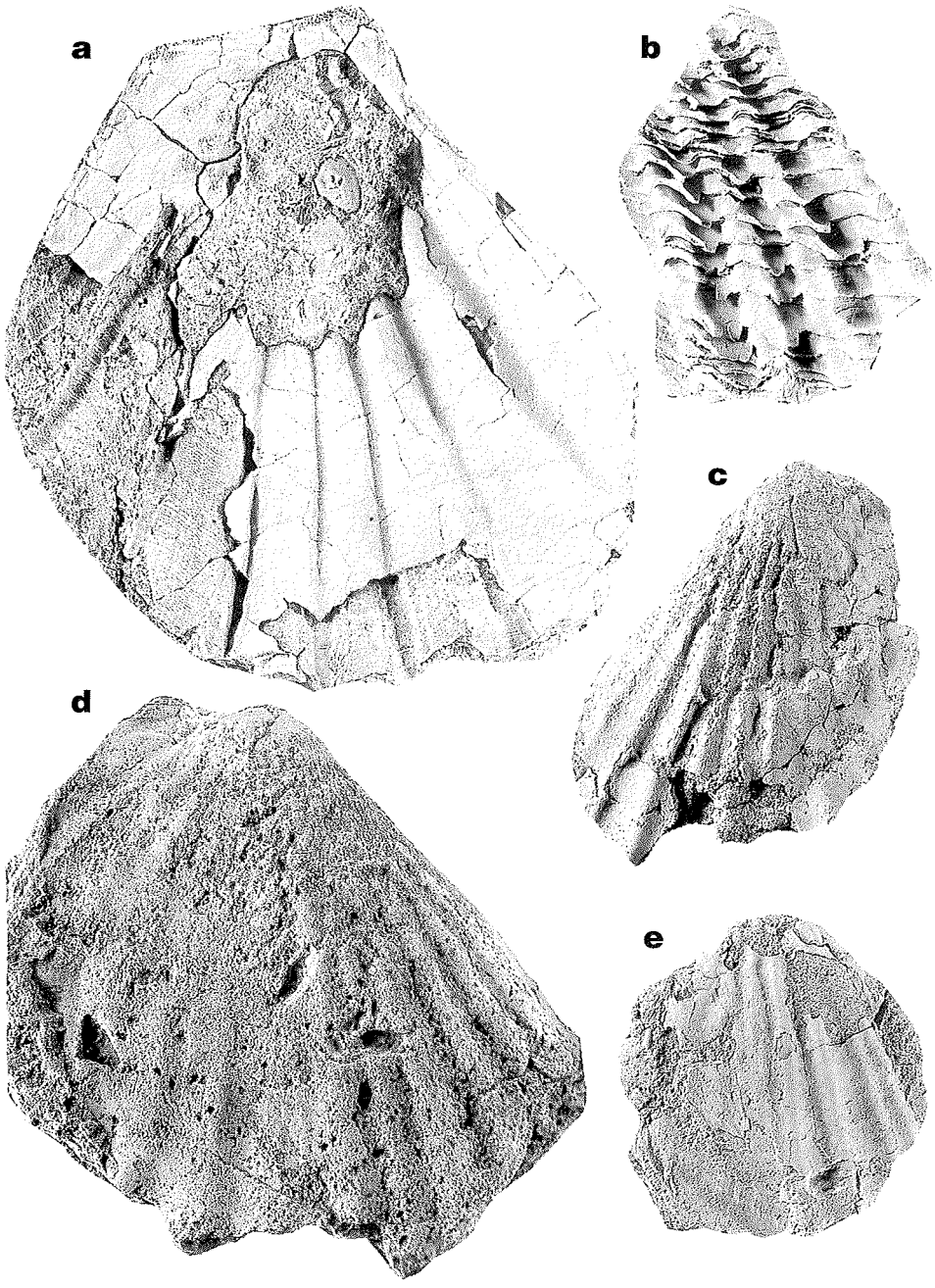

Fig. 3. *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n.; **a** – left valve internal of holotype ZPAL L.VI/1a, × 1 ; **b** – well preserved fragment with squamiform ornament, paratype ZPAL L.VI/4a, × 2; **c** – paratype, left valve, ZPAL L.VI/3, × 1; **d** – paratype ZPAL L.VI/2, right valve, × 1; **e** – fragment, paratype ZPAL L.VI/6, × 1

Antarctica and the trivial name is derived from the Latin *latus* (equivalent to "broad") and the Latin *costa* (equivalent to "rib, ridge") for its exceptionally widely spaced radial ribs.

DIAGNOSIS: Same as for subgenus.

DESCRIPTION: Shell relatively large for family (approximately 90 mm long in largest specimen, holotype), subovate, moderately thin, equivalve, inequilateral, moderately oblique, moderately inflated; length about 87% of height; umbones quite small, elevated slightly above dorsal margin; moderate byssal gape; auricles unequal, anterior one obsolete; posterior auricle moderately long, sloping gently; anterodorsal margin long, steeply inclined, very slightly concave, merging with a moderately rounded anterior margin; posterodorsal margin moderately short, subhorizontal, weakly concave, merging

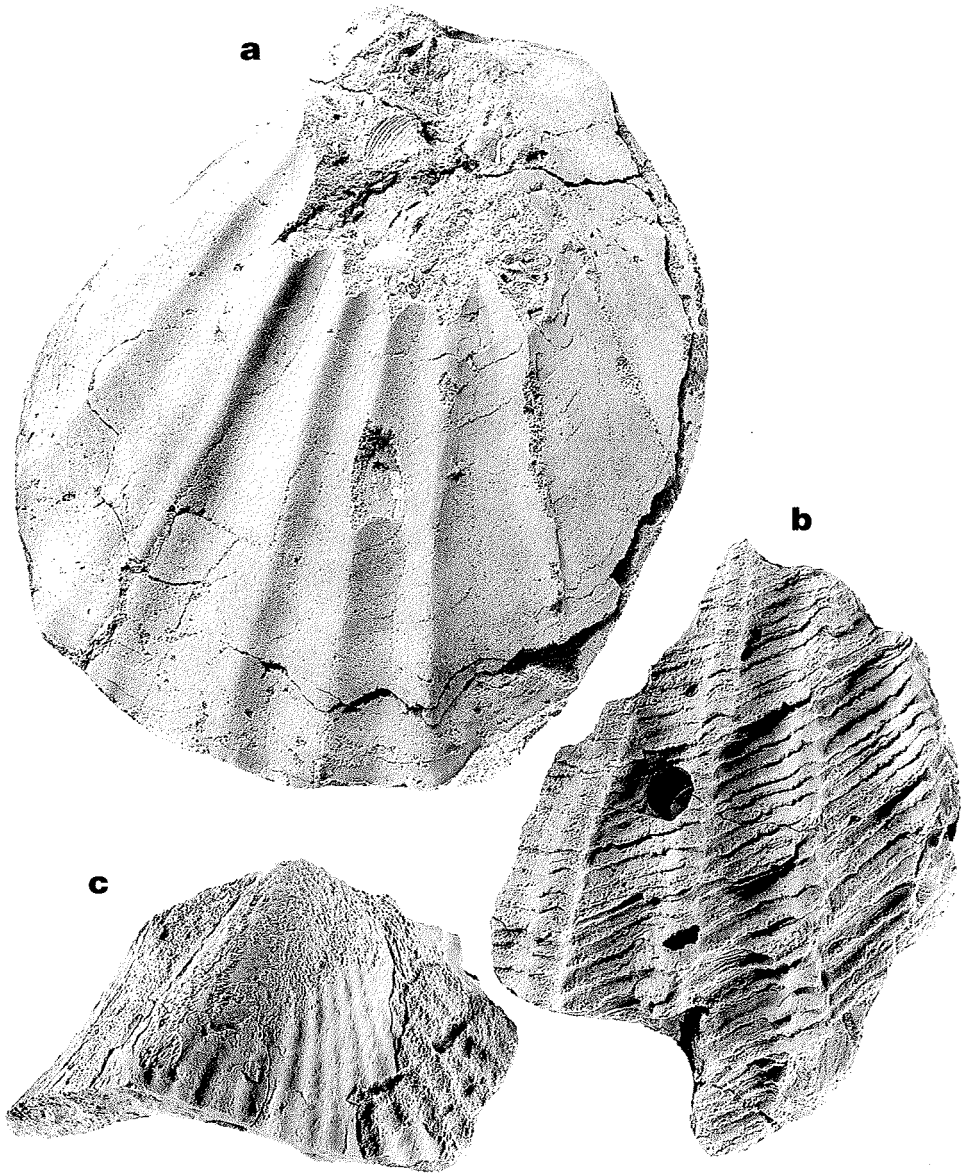

Fig. 4. *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n.; **a** – decorticated left valve of holotype ZPAL L.VI/1b, showing the coarse nature of radial ribbing in the species, × 1; **b** – fragment showing squamiform texture and a drillhole made by a probable naticid gastropod, a candidate being the only recorded naticid from Telm1, *Polinices* (*Polinices*) cf. *P.* (*P.*) *subtenuis* (VON IHERING), paratype ZPAL L.VI/4a, × 2; **c** – dorsal margin fragment of paratype, ZPAL L.VI/5a, × 2

with broadly rounded posterior margin; ventral margin broad, coarsely crenulated; sculpture unusual for family of very widely spaced, very strong, radial ribs, spaced some 15 mm apart on posterior and anterior margins of holotype, becoming more closely spaced on central part of disc; radial ribs with distinct squamiform texture of shingled, relatively coarse, scale-like processes, creating an undulating commarginal element of 1.0-4.0 mm spaced ribs and weak, secondary commarginal threads that are irregular and wavy; hinge plate quite narrow for family and moderately short; chondrophore shallow, relatively small; inner shell with moderately deep radial furrows.

DISCUSSION: *Acesta* (*Antarcticesta*) *laticosta* subgen. et sp. n. is one of the most distinctive limid bivalves described from Antarctica and its ancestry is uncertain. Although the available specimens of this new group are generally incomplete, there is enough information preserved to make meaningful comparisons. There are no pre- or post-Eocene Antarctic limid taxa with such robust scultpure, comparable to *A.* (*Antarcticesta*) *laticosta*. *Acesta shackletoni* ZINSMEISTER & MACELLARI (1988, p. 267, Fig. 9.4) from Unit 9 (latest Maastrichtian) of the López de Bertodano Formation of Seymour Island has much more subdued radial ornament and more projecting umbones, compared to *A.* (*Antarcticesta*) *laticosta*. These taxa are not closely related. *Acesta bibbyi* STILWELL and ZINSMEISTER (1992, pp. 61-62, Pl. 4, Figs g and i) from unit Telm2 of the La Meseta Formation has also quite weak radial sculpture and a distinct, but small, anterior auricle, absent in *A.* (*Antarcticesta*) *laticosta*.

Few recorded limid taxa have comparable coarse sculpture as *A.* (*Antarcticesta*) *laticosta*. *Acesta* (*Plicacesta*) *wilsoni* MOORE (1984, pp. 26 and 28, Figs 118, 132, 134) from the Lower Miocene of southwestern Washington, USA, has coarse sculpture, but it is not as nearly developed as that present in *A.* (*Antarcticesta*) *laticosta*. *Lima* (*Lima*) *insignis* (STOLICZKA, 1871, p. 418, Pl. 30, Fig. 9) from the Late Cretaceous of southeastern India has quite elevated, irregular, radial costae, but the Antarctic species has broader radials. We know of no other fossil or Recent limid taxa in the southern hemisphere that has the unique sculptural configuration of *A.* (*Antarcticesta*) *laticosta*.

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