

REPORT BOOK 91/59

**THE GASTROPOD FAMILY
ARCHITECTONICIDAE IN THE
SOUTHERN AUSTRALIAN TERTIARY**

DEPARTMENT OF MINES AND ENERGY

GEOLOGICAL SURVEY

SOUTH AUSTRALIA

BY

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DME

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**THE GASTROPOD FAMILY ARCHITECTONICIDAE IN THE SOUTHERN AUSTRALIAN
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N H LUDBROOK

The family Architectonicidae is sparsely represented by several species in Middle Miocene and Pliocene sediments in South Australia and Victoria. *Architectonica* s.str. is recorded for the first time and a new species, *Architectonica* (*Architectonica*) *rogersi*, described from well spoil on 'Old Koomooloo' Station on the CHOWILLA 1:250 000 Geological Map Sheet. A new species, *Architectonica* (*Discotectonica*) *cliftonensis*, is described from Muddy Creek, Victoria. The genus *Mangoniua* (*Claraxis*) is also recognised in a new species, *Mangoniua* (*Claraxis*) *cadellensis* from the Cadell Marl. A species of *Heliacus* (*Claraxis*) close to the living *H. (C.) foveolatus* (Tate) is present in the Late Pliocene Dry Creek Sands.

INTRODUCTION

The Architectonicidae are a small specialised family of marine gastropods closely related to the Mathildidae and bearing characteristics of both the prosobranchs and the opisthobranchs (Robertson, 1973; Bieler, 1984; Haszprunar, 1985, 1988). Four species are living today in tropical or subtropical seas from NW Australia to New South Wales. The shells are depressed-conical to discoidal and are popularly referred to as 'sundials'. They have a fossil range of Late Cretaceous to the present (Wenz, 1939). Four species occur also in Early Middle Miocene marls of the Murray and Otway Basins of South Australia and Victoria: in the Muddy Creek Marl exposed at Muddy Creek 8 km W of Hamilton, and in the Gellibrand Marl 1.2 km NW of the mouth of the Gellibrand River in Victoria. Three of these belong to the sub-genus *Discotectonica* Marwick, 1931, restricted to the Oligocene-Miocene of Australia and New Zealand, one found so far only in well spoil from marls equivalent to the Cadell Marl recovered on 'Old Koomooloo' Station on the CHOWILLA 1:250 000 Map Sheet Geological Atlas of South Australia.

The early Middle Miocene was a relatively warm interval in the Tertiary (Shackleton and Kennett, 1975) with a climatic peak reflected in both the flora and fauna at this time (McGowran, 1979). *Architectonica* is an important indicator of this climatic optimum. A new species *Heliacus* (*Claraxis*) *cadellensis* was collected from the type section of the Cadell Marl and a second species of *Heliacus* (*Claraxis*) close to the living *H. (C.) foveolatus* (Tate) and also to *Heliacus* (*Claraxis*) *colmani* Garrard from Western Australia was found in the Late Pliocene of the St Vincent Basin.

SYSTEMATIC DESCRIPTIONS

Architectonica Röding, 1799

Architectonica s.str

Architectonica (Architectonica) rogersi Ludbrook sp. nov. figs 1a,b,c.

Shell of medium size, trochoid, with a moderately high spire, whorls slightly concave, sculpture somewhat variable with beaded spiral riblets the one on the periphery strongly beaded, four smaller beaded ribs above the peripheral ribs on the penultimate whorl; aperture rhombicd, outer lip extended by the peripheral ribe, columellar lip thickened and folded back on the columella; base flat with about 8 fine spiral riblets crossed and tuberculated by collabral growth lines; umbilicus moderately wide, deep.

Dimensions: height 9, diameter 9 mm.

Holotype: GSSA 10409.

Number of specimens: 4.

Type locality: well spoil from approximately 67 m depth, 1½ km SSE of 'Old Koomooloo' H.S. CHOWILLA map sheet, Geological Atlas of South Australia, 1:250 000 Series. Cadell Marl equivalent, Early Middle Miocene.

The species is named for Mr Paul Rogers of the Geological Survey of South Australia who collected the specimens in 1976.

Subgenus *Discotectonica* Marwick, 1981.

Architectonica (Discotectonica) balcombensis Finlay, 1927 figs 2b,g,h.

Solarium acutum Tenison Woods, 1879, *Proc. Linn. Soc. N.S.W.*, 3 (3):236, pl. 21, fig. 11 *non* Conrad, 1860.

Type species of *Discotectonica* Marwick, 1931.

Shell conical-discoidal, with a very low spire and medium width flange; Base convex, umbilicus wide, with all the whorls visible to the apex; sculpture variable, or numerous spiral riblets and lirae on the upper side increasing in strength towards the outer edge on the umbilical side, about 2 ribs around the umbilicus surrounded by fine lirae all tuberculated over the entire rib, followed by a band of fine riblets or striae crossed by collabral growth lines, then a row of tuberculated ribs on the edge of the flange. Aperture transversely ovate, acutely produced at the flange.

Dimensions: height 8, diameter 15 mm.

Type locality: Muddy Creek, Vict., Muddy Creek Marl, Middle Miocene.

South Australian localities: Cadell Marl (type section), Bend Well, Mundy Well, well 1½ km SSE of 'Old Koomooloo' H.S.

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Architectonica (Discotectonica) cliftonensis Ludbrook sp. nov. Figs, 3b,c.

Shell solid, of average size for the genus, conico-discoidal, with a low spire, base convex, umbilicus wide and deep with all the whorls visible to the apex; sculpture of spiral tuberculated riblets of which the two near the suture are larger than the intermediate fine tuberculated lirae; those towards the umbilicus coarser than those towards the margin.

Dimension: Height 8, diameters 14 and 13 mm.

Type locality: Clifton Bank, Muddy Creek Vic., Muddy Creek Marl.

Holotype: NMV P127207, paratype NMV P127208.

Victorian localities: Muddy Creek, Gellibrand River (Gellibrand Marl), between Curdie's Steps and Gibson's Steps.

South Australian locality: 'Old Koomooloo' well spoil, 1½ km SSE of 'Old Koomooloo H.S. (One specimen).

Genus *Heliacus* d'Orbigny, 1892

Subgenus *Claraxis* Iredale, 1936

Heliacus (Claraxis) cadellensis Ludbrook sp. nov. figs 1 d,e.

Shell very small, discoidal, with a depressed spire and anastrophic protoconch, apical side flat; protoconch of two smooth whorls ending in a high, narrow varix, adult whorls 2½ with deep sutures and sharp spinose periphery, the first adult whorl on the flat apical side sculptured with numerous axial riblets and tuberculating a single peripheral rib, a spiral lira just below the suture' between the subsutural lira and the peripheral rib three riblets developing by intercalation, all cancellated by the axial riblets; the peripheral rib on the last whorl rises just above the attachment of the outer lip of the aperture to the shell wall; whorls on the umbilical side convex, umbilicus deep, with all the whorls including the smooth protoconch visible to the apex, both spiral and axial ribs strong, spiral ribs crossed and tuberculated by the axial ribs; from the suture on the last whorl two medium sized spiral ribs followed by 2 strong spiral ribs, then 2 fine riblets with a finer riblet between them; peripheral rib with low, sharp, hollow spines. Aperture subrounded, drawn out apically in the low, sharp, hollow, peripheral spine.

Dimensions: diameter 4, height 1.0 mm.

Material: the holotype GSSA 10410 only

Type locality: Cadell Marl, 6.4 km S of Morgan, RENMARK 1:250 000 map sheet, Geological Atlas of South Australia.

Although the species is founded on the single specimen, it is described as new because the genus and species have not previously been known from South Australia and in the hope that further specimens will be found in the Cadell Marl and its equivalents.

Heliacus (Claraxis) ? foveolatus (Tate, 1893) pl. fig.

Torinia foveolata Tate, 1893, *Trans. R. Soc. S. Aust.*, 17: 191, pl. 1, figs 13-13a.

Shell small, depressed, apical side weakly convex, whorls of umbilical side convex, protoconch broken but apparently rather flat, of 2 smooth whorls, adult whorls 3, separated by linear incised suture, whorls on apical side sculptured with spiral lirae which are crossed and tuberculated by axial grooves, the lirae above and below the suture are larger than the two intermediate rows, which are similarly crossed and tuberculated by axial grooves. On the umbilical side there are 4 rows of fine lirae from the periphery followed by 4 rows of increasing width towards the umbilicus, all crossed and tuberculated by axial grooves. Periphery weakly angulated and carrying one of the strong ribs.

Dimensions: diameters 5 and 5.2 mm, height 3 mm, aperture height 2.2, width 2.5 mm.

Material: a single specimen GSSA 15158 from Weymouth's Bore, depth 310-330 feet (94-100 m).

This specimen bears similarities to both *H.(C.) foveolatus* (Tate) and to *H.C. colmani* Garrard described from 370 km W of Roebuck Bay, W. Aust. Both of these are living Australian species. There is only one specimen of the fossil available and in the absence of sufficient material no attempt is made to name the Late Pliocene species as new.

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EXPLANATION OF FIGURES

- Fig. 1** a-c *Architectonica (Architectonica) rogersi* Ludbrook sp. nov. GSSA 10409
 a. apical view; b. umbilical view X 8
 d-e *Heliacus (Claraxis) cadellensis* Ludbrook sp. nov. GSSA 10410
 d. apical view; e. umbilical view X 15
- Fig. 2** a. *Heliacus (Claraxis) wannonensis* (Tenison Woods, 1879) holotype AM C 107433
 umbilical view X 18
 b. *Architectonica (Discotectonica) balcombensis* Finlay GSSA M3152 umbilical view X 21
- Fig. 3** a,d *Heliacus (Claraxis) wannonensis* (Tenison Woods, 1879)
 a. holotype AM C 107433 umbilical view X 18
 d. holotype AM C 107433 apical view X 15
 b,c *Architectonica (Discotectonica) cliftonensis* Ludbrook sp. nov. NMV P 17207
 b. apical view; c umbilical view X 5
 e,f *Architectonica (Discotectonica) cliftonensis* Ludbrook sp. nov. NMV P 17207
 e. apical view, f. umbilical view X 1.5
 g,h *Architectonica (Discotectonica) balcombensis* Finlay, 1927 GSSA M 3152
 g. apical view; h umbilical view X 2.4

Fig. 1 a-c *Architectonica (Architectonica) rogersi* Ludbrook sp. nov. GSSA 10409
a. apical view; b. umbilical view X 8

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Fig. 2

- a. *Heliacus (Claraxis) wannonensis* (Tenison Woods, 1879) holotype AMC 107433 umbilical view X 18
- b. *Architectonica (Discotectonica) balcombensis* Finlay GSSA M3152 umbilical view X 21

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Fig. 3

- a,d *Heliacus (Claraxis) wannonensis* (Tenison Woods, 1879)
a. holotype AM C 107433 umbilical view X 18
d. holotype AM C 107433 apical view X 15
b,c *Architectonica (Discotectonica) cliftonensis* Ludbrook sp. nov. NMV P 17207
b. apical view; c. umbilical view X 5
e,f *Architectonica (Discotectonica) cliftonensis* Ludbrook sp. nov. NMV P 17207
e. apical view; f. umbilical view X 1.5
g,h *Architectonica (Discotectonica) balcombensis* Finlay, 1927 GSSA M 3152
g. apical view; h. umbilical view