

## LATE CAMBRIAN BRACHIOPODS FROM THE DENISON RANGE, SOUTHWESTERN TASMANIA

by J. B. Jago

(with one text-figure and two plates)

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Eight unnamed species of brachiopods and one indeterminate hyolithid species are described and figured from three stratigraphic intervals within the early Late Cambrian Singing Creek Formation, Denison Range, southwestern Tasmania.

**Key Words:** brachiopod, hyolithid, Cambrian, Tasmania.

### INTRODUCTION

The purpose of this paper is to document the brachiopods and hyolithids from the Singing Creek Formation of the Denison Range in southwestern Tasmania. The Middle Cambrian to Lower Ordovician stratigraphy of the Denison Range area (Corbett 1975) may be summarised as follows:

Denison Group —	
Squirrel Creek Formation	600 m
Reeds Conglomerate	1560 m
Great Dome Sandstone	510 m
Singing Creek Formation	720 m
————— angular unconformity —————	
Trial Ridge Beds	500 m

The upper part of the Trial Ridge Beds contains fossils of the late Middle Cambrian *Lejopyge laevigata* Zone (Jago 1979). The Great Dome Sandstone is a shallow marine–deltaic–fluvial sequence which contains abundant trace fossils, rare inarticulate brachiopods, and a gastropod similar to *Kobayashiella* (Corbett 1975).

The Singing Creek Formation comprises 720 m of quartzwacke turbidites interbedded with fossiliferous siltstone, siliceous conglomerate and slump sheets, deposited as a submarine fan complex in a fault-controlled basin (Corbett 1972, 1973, 1975). In the Denison Range, fossils are found over three stratigraphic intervals (fig. 1). Jago (1987) described the trilobites; the brachiopods and hyolithids are described herein.

The specimens were collected by K.D. Corbett in 1967 and 1968 as bulk samples rather than on a bed-by-bed basis, because of the nature of the

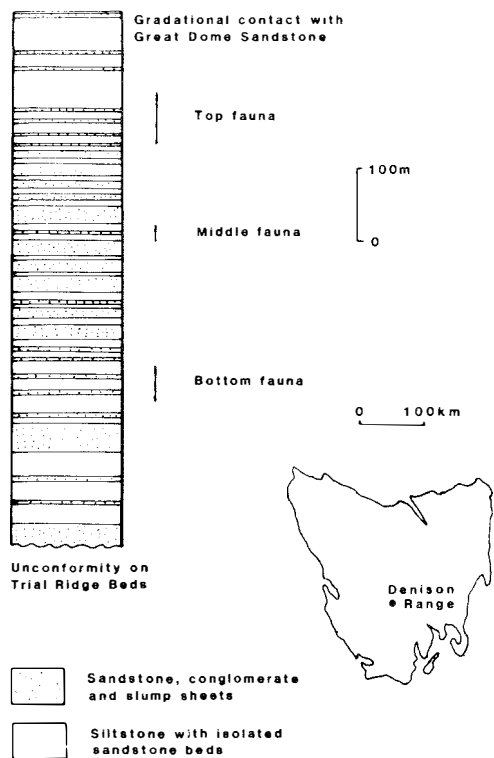


FIG. 1 — Stratigraphic position of the faunas from the Singing Creek Formation, Denison Range, southwestern Tasmania. Rock types after Corbett (1975: fig. 2). The location of Denison Range is shown.

outcrop and the difficulties of collection in this rather inaccessible area.

The lowest fauna, occurring between about 185 and 240 m above the base of the Singing Creek Formation, contains the following:

Trilobita (see Jago 1987): *Micragnostus*, *Pseudagnostus idalis denisonensis*, *Denagnostus corbetti*, *Eugonocare*, Dokimocephalidae and *Proceratopyge*.

Brachiopoda: *Lingulella* (?) sp., Acrotretidae, gen. et sp. indet. 1, and *Billingsella* sp. 1.

Only *Pseudagnostus idalis denisonensis* and *Billingsella* sp. 1 are reasonably abundant.

The middle fauna, occurring between about 410 and 430 m above the base of the Singing Creek Formation, contains the following:

Trilobita: *Denagnostus corbetti*, *Aphelaspis cantori*, *Proceratopyge gordonensis*, *P.* sp., *Pseudoyuepingia vanensis* and trilobite tracks.

Hyalolithida: Hyolithid, gen. et sp. indet.

Brachiopoda: *Lingulella* (?) sp., and *Obolus* (?) sp. In this fauna *Proceratopyge gordonensis*, *P.* sp. and *Pseudoyuepingia vanensis* are common.

By far the richest fauna is the top one which occurs between about 540 and 610 m above the base of the Singing Creek Formation. The following fossils are present:

Trilobita: *Micragnostus*, *Pseudagnostus idalis denisonensis*, *P.* sp., *Denagnostus corbetti*, *Aphelaspis cantori*, a member of the Leiostegiacea, *Proceratopyge gordonensis*, *P.* sp., and trilobite tracks.

Hyalolithida: Hyolithid, gen. et sp. indet.

Brachiopoda: *Obolus* (?) sp.; Obolidae, gen. et sp. indet. 1; Obolidae, gen. et sp. indet. 2; Acrotretidae, gen. et sp. indet. 2 and *Billingsella* sp. 2.

Jago (1987) suggested that the faunas of the Singing Creek Formation are of early Late Cambrian age and fall within the range of the top

three Idamean Zones, i.e. *Proceratopyge cryptica*, *Erixanium sentum* and *Stigmatoa diloma* Zones. All specimens described here are preserved as internal and external moulds in weathered siltstone or very fine sandstone. In order to prepare them for description, silicone rubber casts were prepared. These rubber casts were then photographed after being whitened with magnesium oxide. Unfortunately the brachiopods, particularly the inarticulate brachiopods, are generally poorly preserved.

The terminology used for brachiopods is after Williams & Rowell (1965a,b). All specimens are housed in the collection of the Geology Department, University of Tasmania. The catalogue numbers refer to this collection.

#### SYSTEMATIC DESCRIPTIONS

Phylum BRACHIOPODA Dumeril 1806  
Class INARTICULATA Huxley 1896  
Order LINGULIDA Waagen 1885  
Family OBOLIDAE King 1846  
Subfamily LINGULELLINAE Schuchert  
1893  
Genus *LINGULELLA* Salter 1866

**Type species:** *Lingula davisii* M'Coy 1851: 405.

*Lingulella* (?) sp. (pl. 1A-C)

**Remarks:** The available material comprises three internal and one external mould, all of which appear to belong in the one species. They belong in *Lingulella* or a related genus, as is indicated by their outline and ornamentation. They are too poorly preserved to warrant description.

#### PLATE 1

(A-C) *Lingulella* (?) sp.1: (A) UT89445, internal mould of pedicle valve,  $\times 7$ . (B) UT89515, internal mould of pedicle valve,  $\times 6$ . (C) UT89449, external mould of pedicle valve,  $\times 5$ .

(D-H) *Obolus* (?) sp.4: (D) UT89430, internal mould of brachial valve,  $\times 6$ . (E) UT88427, internal mould of pedicle valve,  $\times 4.5$ . (F,G) UT89431, counterparts showing both valves; (F)  $\times 5$ , (G)  $\times 6$ . (H) UT88433, internal mould of (?)pedicle valve,  $\times 6$ .

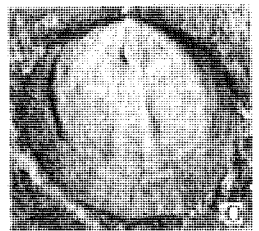
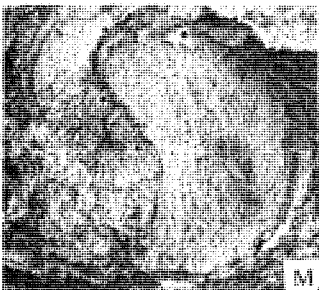
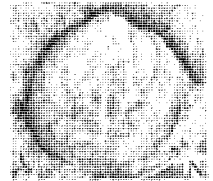
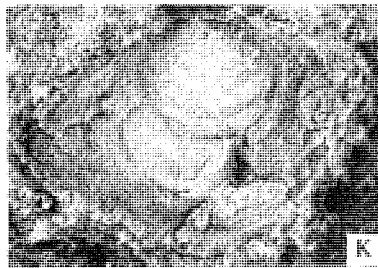
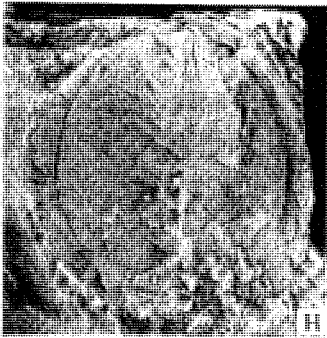
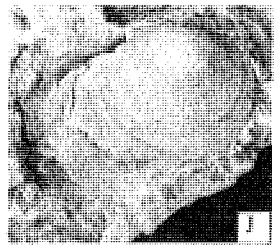
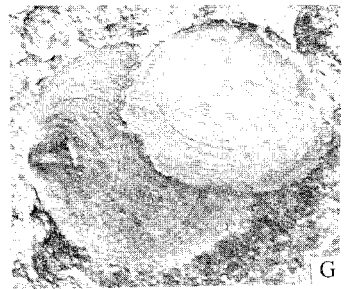
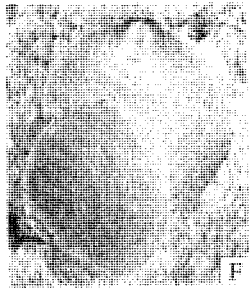
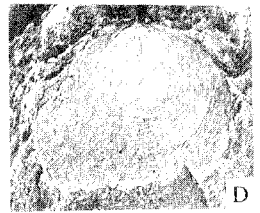
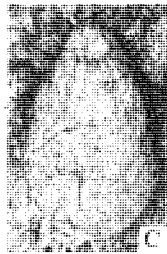
(I) Acrotretidae, gen. et sp. indet. 1, UT89515, internal mould of pedicle valve,  $\times 12$ .

(J-L) Obolidae, gen. et sp. indet. 1: (J) UT88432, internal mould,  $\times 3.5$ ; (K) UT88423, internal mould,  $\times 6$ . (L) UT88435, internal mould,  $\times 5.5$ .

(M) Obolidae, gen. et sp. indet. 2. UT88429, internal mould,  $\times 3.5$ .

(N,O) Acrotretidae, gen. et sp. indet. 2: (N) UT88431, external mould of brachial valve,  $\times 6$ .

(O) UT88410, internal mould of brachial valve,  $\times 9$ .



Subfamily OBOLINAE King 1846  
Genus *OBOLUS* Eichwald 1829

**Type species:** *Obolus apollinis* Eichwald 1829: 274 (pl. 4, figs 5A-B).

*Obolus* (?) sp. (pl. 1D-H)

**Material:** Three pedicle and two brachial valves preserved as either internal or external moulds.

**Remarks:** If it is assumed that the two valves which occur together on specimen UT89431 (pl. 1F,G) originally belonged to the same individual, then the pedicle valve is slightly larger than the brachial valve. Both valves are gently convex and have a circular to oval outline; both show fine concentric growth lamellae. The general appearance of the available specimens suggests that they belong in *Obolus*, to which genus they are tentatively assigned.

Obolidae, gen. et sp. indet. no.1 (pl. 1J-L)

**Remarks:** Internal moulds of three valves of a probable member of the Obolidae are figured. The details are such that it can not be determined whether they are brachial or pedicle valves.

Obolidae, gen. et sp. indet. no.2 (pl. 1M)

**Remarks:** One partially preserved valve exhibits closely spaced growth lamellae. There are minute spines on the surface of the valve, particularly in the posterior region. Discontinuous vascular markings are visible, particularly in the anterior part of the valve.

Order ACROTRETIDA Kuhn 1949  
Suborder ACROTRETIDINA Kuhn 1949  
Superfamily ACROTRETACEA Schuchert 1893  
Family ACROTRETIDAE Schuchert 1893  
Acrotretid, gen. et sp. indet.1 (pl. 1I)

**Remarks:** One poorly preserved small conical pedicle valve of an acrotretid is present. It is too poorly preserved to allow generic identification.

Acrotretid, gen. et sp. indet. no.2 (pl. 1N,O)

**Material:** Four poorly preserved brachial valves are available.

**Remarks:** These valves which have an almost semicircular outline show faintly developed growth

lamellae. Their outline is similar to that of *Quadrisonia minor* of Rowell & Henderson (1978) from the Upper Cambrian of North America, but until better preserved material is available this material must be left in open nomenclature.

Class ARTICULATA Huxley 1869  
Order ORTHIDA Schuchert and Cooper 1932

Suborder ORTHIDINA Schuchert and Cooper 1932

Superfamily BILLINGSSELLACEA  
Schuchert 1893

Family BILLINGSSELLIDAE Schuchert 1893  
Genus *BILLINGSSELLA* Hall and Clarke 1893

**Type species:** *Orthis pepina* Hall 1863: 134, pl. 6, figs 23-27.

**Comment:** As noted by Mackinnon in Shergold *et al.* (1976) *Billingsella* is a cosmopolitan genus of Middle Cambrian to Early Ordovician age. Although it has been recorded from Late Cambrian sequences in Tasmania by various authors (e.g. Banks 1962, Corbett 1975, Jago 1979), the specimens dealt with below are the first to be described and figured from Tasmania.

*Billingsella* sp.1 (pl. 2A-J)

**Material:** All specimens are disarticulated. Six brachial and twelve pedicle valves are available.

**Description:** Gently convex pedicle valve with subtrapeziform outline, widest at hinge line; apsacline ventral interarea about four times as wide as long; posterolateral margins of ventral interarea slightly concave; gently convex pseudodeltidium covers apical half of delthyrium; cardinal extremities angular, acute to right-angled; low median fold; slightly concave posterolateral slopes; external ornamentation parvicostellate with costellae most prominent on fold margins; variably developed concentric growth lines; details of teeth and musculature not clear on available material.

Almost flat, subrectangular brachial valve, widest at hinge line; cardinal extremities almost right-angled; shallow median sulcus; dorsal interarea details not visible on available material; external ornamentation parvicostellate with costellae most prominent in, and on the margins of the sulcus; variably developed concentric growth lines; in brachial valve interior are widely divergent socket ridges; notothyrial platform bears narrow ridge-like cardinal process.

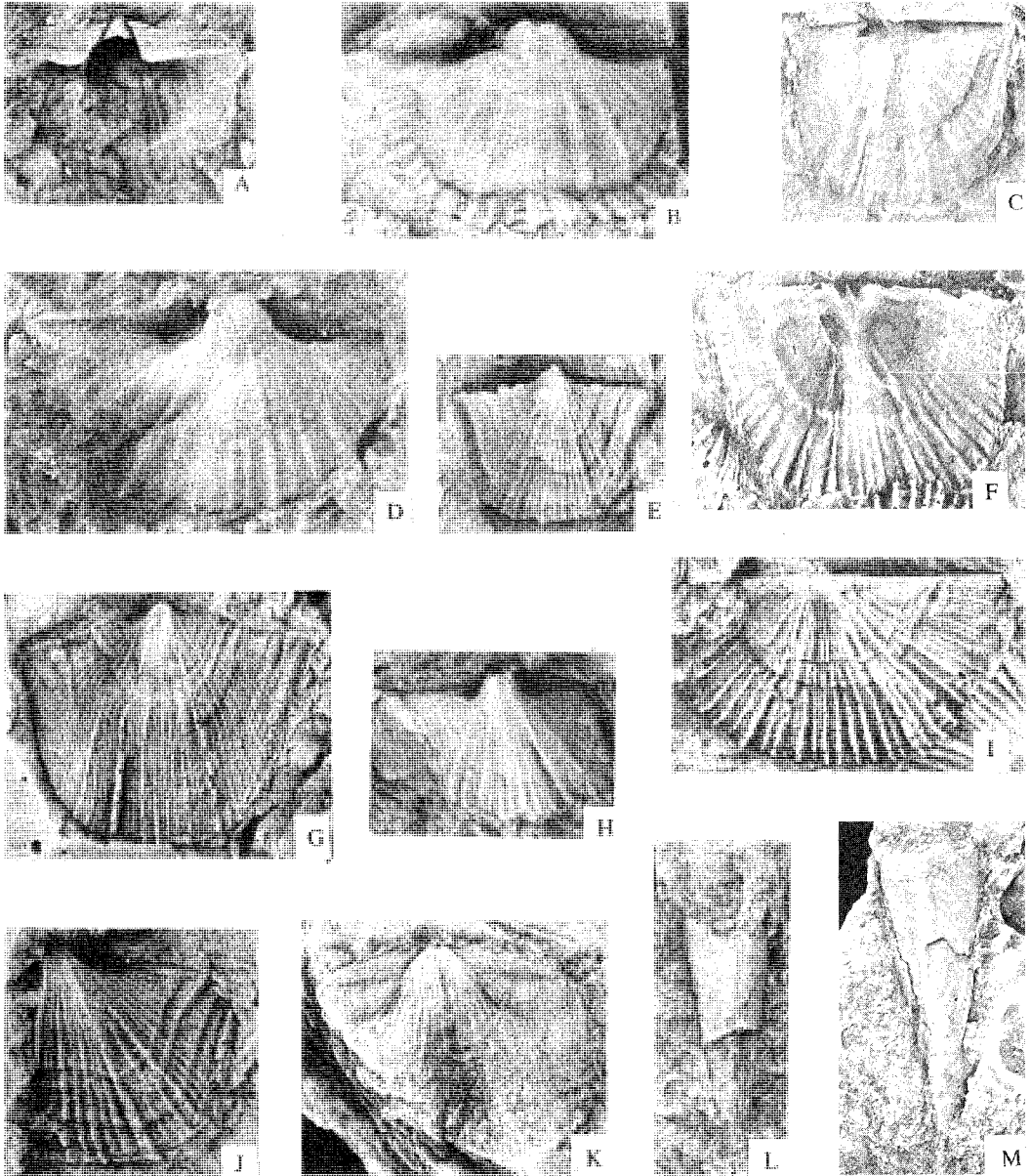


PLATE 2

- (A-J) *Billingsella* sp.1: (A) UT89514, internal mould of pedicle valve,  $\times 4$ . (B) UT89515, internal mould of pedicle valve,  $\times 5$ . (C) UT89514, internal mould of brachial valve,  $\times 6$ . (D) UT89513, internal mould of pedicle valve,  $\times 5$ . (E) UT89514, external mould of pedicle valve,  $\times 3$ . (F) UT89516, internal mould of brachial valve,  $\times 2$ . (G) UT89514, external mould of pedicle valve,  $\times 3$ . (H) UT89515, internal mould of pedicle valve,  $\times 4$ . (I) UT89516, external mould of brachial valve,  $\times 2$ . (J) UT89515, external mould of brachial valve,  $\times 6$ .
- (K) *Billingsella* sp.2, UT88508, internal mould of pedicle valve,  $\times 3$ .
- (L-M) *Hyolithid*, gen. et sp. indet.: (L) UT88390, internal mould, dorsal view,  $\times 3$ . (M) UT88393, internal mould, ventral view,  $\times 4$ .

**Discussion:** As noted by Mackinnon in Shergold *et al.* (1976) there is little published data on southern hemisphere species of *Billingsella*. *Billingsella* sp.1 (described above) differs from both *Billingsella* sp. indet. (described by Mackinnon in Shergold *et al.* (1976) from northern Victoria Land, Antarctica) and *Billingsella* sp. (described by Percival in Powell *et al.* (1982) from western New South Wales) in having a lower ventral interarea. The external ornamentation on both valves of the Tasmanian specimens is stronger than those on either the New South Wales or Antarctic species noted above. No species of *Billingsella* other than those mentioned above have been described from Australia or Antarctica; all three are of Idamean age.

*Billingsella* sp.2 (plate 2K)

**Remarks:** Several generally poorly preserved disarticulated valves are available. The only reasonably well preserved specimen, an internal mould of a pedicle valve, is figured. This pedicle valve differs from those described as *Billingsella* sp.1 in that it is widest somewhat to the anterior of the hinge line, whereas *Billingsella* sp.1 is widest at the hinge line. This, plus the fact that it comes from a higher stratigraphic horizon than *Billingsella* sp.1, suggests that it belongs in a different species of *Billingsella*.

Phylum MOLLUSCA

Class HYOLITHA Marek 1963

Order HYOLITHIDA Matthew 1899

Hyalolithid, gen. et sp. indet. (pl. 2L,M)

**Remarks:** Five poorly preserved hyolithid specimens are available. The dorsal side is gently convex; the ventral side bears a prominent longitudinal rib, the divergence angle is 15–20°. The available material does not allow assignment of the specimens to a particular genus or species.

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