INARTICULATE BRACHIOPODA FROM THE SHACKLETON RANGE AND THEIR STRATIGRAPHICAL SIGNIFICANCE

By M. R. A. THOMSON

ABSTRACT. Inarticulate Brachiopoda (*Lingulella* (*?*) sp.) are the first fossils to be described from the Shackleton Range. The brachiopods, collected from moraine, were supposedly derived from unexposed intermediate beds of the Blaiklock Glacier Group, and are probably of Cambro-Ordovician age.

DURING the Shackleton Range geological survey of 1970–71 (Clarkson, 1971) fragments of poorly fissile silty shale, containing numbers of small inarticulate Brachiopoda up to 1 cm. or more in size, were collected by R. B. Wyeth from a moraine about 3 km. south of Mount Provender (Clarkson, 1972, fig. 1). "Poorly preserved inarticulate brachiopods" were also noted in similar moraine specimens, collected from the same general area in October 1957, during the Trans-Antarctic Expedition (Stephenson, 1966, p. 39, 41). The erratic specimens have a distinctive lithology and faunal content which have not been observed in rock exposures anywhere in the Shackleton Range, but they are *assumed* to have been derived from intermediate strata of the Blaiklock Glacier Group at present hidden beneath Blaiklock Glacier (Stephenson, 1966, p. 38–39; Clarkson, 1971, 1972, fig. 1).

All of the brachiopods may be referred to the same species and they are the only fossils so far discovered in the Shackleton Range. The treatment of samples for micro-fossils has proved unrewarding.

BRACHIOPODA

The brachiopods occur as dissociated valves lying within the plane of the bedding; in any one slab the valves tend to be largely of one size and have a similar way-up orientation. These factors suggest that considerable sediment re-working and current sorting took place after the death of the animals. Most examples have much of the test preserved, although there are a few which occur as moulds only. The material of the test is dark in colour, usually shiny black, and sometimes has patches of pale greyish blue, suggestive of the mineral vivianite and hence a phosphatic content of the shell.

CLASS INARTICULATA HUXLEY 1869

FAMILY OBOLIDAE KING 1846

Genus *Lingulella* Salter 1866

Lingulella (*?*) sp.

Fig. 1a–d

Material

About 40 specimens on slabs of dark grey silty shale (specimen numbers Z.1037.1–7) from a moraine at lat. 80°25′26″S., long. 29°53′00″W., situated about 3 km. south of Mount Provender in the western part of the Shackleton Range. The description is based on nine individuals which are better preserved than the rest.

Description

The valves vary in outline (Fig. 1a–d) from sub-triangular to sub-rounded; they are usually slightly wider than long and are only feebly inflated. Most examples, which still have the test, are preserved with their concave sides uppermost on the rock surface and thus the internal morphology of the shell is better known than that of the outer surface. On the internal surface of the test (Fig. 1c and d) is an ornament of fine radial riblets and concentric growth rugae; closely spaced growth lines are sometimes visible but they are best seen where the test is

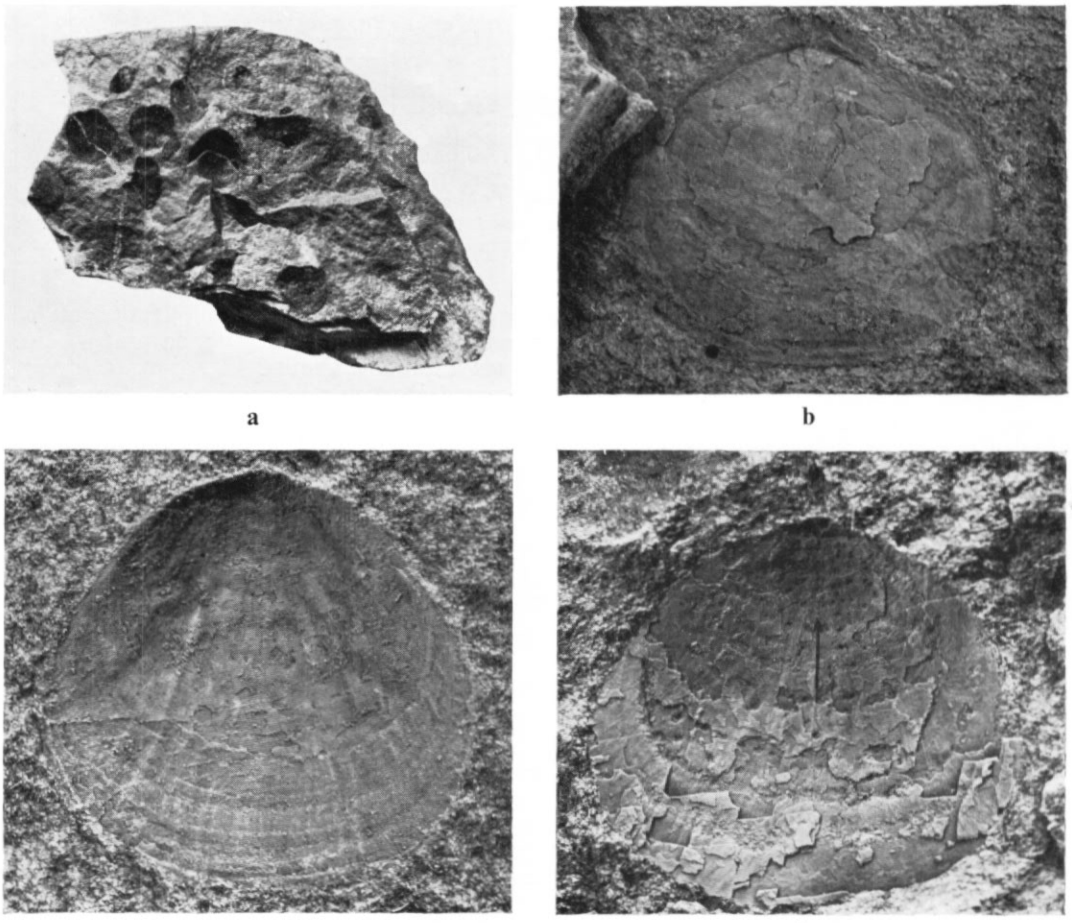

Fig. 1. a. *Lingulella* (*?*) sp.; a small slab of silty shale bearing several isolated valves, all with their inner surfaces uppermost; ×1 (Z.1037.6).
b. *Lingulella* (*?*) sp.; an internal mould showing the pseudo-interarea with grooves (here seen as ridges) which are discussed in the text; ×6, coated (Z.1037.5a).
c. *Lingulella* (*?*) sp.; internal surface of a large valve showing concentric and faint radial ornament; ×6, coated (Z.1037.5a).
d. *Lingulella* (*?*) sp.; internal surface of a large valve on which concentric rows of pits are clearly visible. A median septum (arrowed) is also present; ×6, coated (Z.1037.2).

broken away to reveal its outer layers or where the external mould is preserved. It is not clear how much, if any, of the radial ornament is visible on the external surface of the test but there are indications that it may only be noticeable in the early stages and then not on every specimen.

On several of the specimens the internal surface of the test bears concentric rows of pits (Fig. 1d). Since no punctae are visible in thin sections of the test, it is probable that these pits represent an original surface feature rather than shell punctae enlarged by corrosion.

There is no trace of pallial markings or muscle scars but two specimens (Z.1037.2 and 4; Fig. 1d) have a distinct internal ridge, extending half-way or more from the umbo towards the anterior margin, which would seem to correspond to the median septum of many brachiopod genera. One of these specimens (Z.1037.2) appears to have a less well-developed lateral septum on either side of the median septum.

One example (Z.1037.5a; Fig. 1b), preserved as an internal mould, shows the pesudo-interarea. This has a maximum width of about two-thirds the width of the valve and consists of two obtusely triangular propareas divided medially by a pedicle groove. Each proparea bears an elongate groove with a V-shaped cross-section and a forked termination near the pedicle groove. The grooves trend parallel to the outer margins of the propareas and fade out laterally as they approach the visceral cavity of the shell.

Measurements

Specimen number	*Length* (mm.)	*Width* (mm.)	*Valve thickness* (mm.)
Z.1037.1	10.8	10.7	–
Z.1037.2	8.2	9.0	0.8
Z.1037.3	10.2	10.8	–
Z.1037.4	11.2	11.6	1.0
Z.1037.5a	8.7	8.7	0.7
Z.1037.5a	6.5	6.8	–
Z.1037.5b	7.6	7.8	0.7
Z.1037.6	6.7	7.3	–
Z.1037.6	6.5	6.5	0.3

Remarks

Despite the lack of muscle scars, the sub-triangular to sub-rounded shape, the fine external ornament and the phosphatic test of these Brachiopoda indicate obolid affinities. The presence of elongate pits or grooves on the propareas of the only specimen showing this region recalls the genus *Dicellomus* Hall, one of the few inarticulates in which some form of rudimentary articulation has been described. However, even among the many species of *Dicellomus* which have been documented, there are few in which the pseudo-interarea is well known, e.g. *D. politus* (Walcott, 1912, pl. LII, fig. 1i) and *D. occidentalis* (Bell, 1944, pl. 19, fig. 10). In both of these examples the grooves are rounded and are contained within the confines of the propareas; those of the present example are angular and their lateral extremities all but pass into the visceral cavity.

Possible affinities to *Dicellomus* are therefore regarded as doubtful and Professor A. J. Rowell (University of Kansas), who kindly examined casts and photographs of the specimens described here, has questioned whether the grooves on the propareas may have been produced by "the proparea of the pedicle valve squashed against the brachial". If these grooves are truly secondary features, the specimens may better be tentatively referred to the genus *Lingulella*. The pits on the internal surface of the test, which are so well developed in some of the present examples, have been reported in such species as *L. davisii* from the Upper Cambrian of Wales.

Discussion

The age of the Blaiklock Glacier Group has been a problem ever since its discovery. Stephenson (1966, p. 18, table I) doubtfully included it in the Permian but later in the same paper (p. 41) he noted that it was petrographically distinct from the Upper Devonian to early Mesozoic Beacon Supergroup and could be of appreciably different age to the latter. Finally, Stephenson (1966, p. 69) compared this group to some conglomerates and sandstones in the Neptune Range which lie above a sedimentary sequence containing Cambrian fossils. A similar comparison was made by Williams (1969, p. 1461), who more specifically suggested a correlation with the (?) Middle Palaeozoic Dover Sandstone, although he also noted that the Blaiklock Glacier Group was more feldspathic than the latter. On a composite geological map of Antarctica, Craddock (1970) tentatively included the Blaiklock Glacier Group with Upper Precambrian sedimentary and volcanic rocks of the Ellsworth Mountains, Trans-antarctic Mountains and east Antarctica.

Radiometric dating recently carried out by Rex (1971) places the age of the Blaiklock Glacier Group somewhere between the late Precambrian and the Upper Carboniferous. It

rests unconformably on the Shackleton Range Metamorphic Complex (cut by a diorite dyke dated at 1,446 ± 60 m. yr.) and is itself cut by a dolerite dyke at The Dragons Back (Clarkson, 1972, fig. 1), dated at 297 ± 12 m. yr.

The stratigraphical value of the Brachiopoda described here is limited by the fact that they are known only from loose slabs on a moraine. However, *assuming that the evidence for referring the brachiopod-bearing shale fragments to unexposed intermediate beds of the Blaiklock Glacier Group is justified* (p. 17), then the identification of the brachiopods as obolids would restrict the age of these beds to the Lower Cambrian–Upper Ordovician, while their identification as a species of *Lingulella* would suggest that these beds range no higher than Middle Ordovician.

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