GCR1996
_04

AGSO

AUSTRALIAN GEOLOGICAL SURVEY ORGANISATION

MACROFOSSILS FROM THE WIERAH FORMATION AND POWENA BEDS, SOUTH COAST, TASMANIA.

by

John R. Laurie

A CONTRIBUTION FROM
MARINE, PETROLEUM AND SEDIMENTARY RESOURCES DIVISION

Professional Opinion

1996/011

GEOSCIENCE FOR AUSTRALIA'S FUTURE

A Research Bureau of the Department of Primary Industries & Energy

Macrofossils from the Wierah Formation and Powena Beds, south coast, Tasmania

by J. Laurie

Sample Localities

Five lithological units of Proterozoic to earliest Ordovician age are exposed along the south coast of Tasmania from Point Cecil to Pretty's Point. These units are, in ascending order: the Rocky Boat Beds, Tyler Creek Beds, Point Vivian Formation, Powena Beds and Wierah Formation.

Samples collected by Bischoff (1983) from the Wierah Formation and the Powena Beds, which outcrop along the south coast between Prion Beach and Surprise Bay, were examined to try to obtain better age resolution than that currently in use (Laurie et al., 1995).

Powena Beds

The Powena Beds are a 15m thick succession outcropping within the Cecil Fault Zone, to the west of Frolic Cave (GR679767) and consisting of 3m of laminated fine quartz wacke and dolomitic quartz wacke, overlain by 10m of thin-bedded and nodular fossiliferous calcilutite and calcareous siltstone. This is capped by a 2m thick massive sandstone. The Powena Beds contain a diverse fauna of trilobites and phosphatic brachiopods (Bischoff, 1983).

Wierah Formation

The Wierah Formation (Berry & Harley, 1983) is a sequence of conglomerate, sandstone and minor mudstone outcropping from the eastern side of of Point Cecil, where it is probably in fault contact with the Rocky Boat Beds (GR677767), to the eastern end of Prion Beach where it is in faulted contact with the Prion Beach Beds (GR678774).

In Pretty's Inlet, the base of this succession is marked by thin-bedded grey-brown sandstones and siltstones, whereas at Pretty's Point the basal unit is a fossiliferous reddish limestone from 1m to 4m thick. The latter then passes into about 50m of grey, bioturbated, pyritic siltstone with intercalated thin-bedded or nodular grey fossiliferous limestone and graded sandstone. This unit is referred to herein as the Nodular Limestone Member. This is overlain by laminated, bioturbated siltstone and fine sandstone. This, in turn, is overlain by a thick bedded siliceous conglomerate, bioturbated sandstones and sandy siltstones (Bischoff, 1983).

Sample Preparation

Included in the samples are many trilobites, those in the limestones usually being very well preserved, whereas those in the siltstones tend to be flattened and less well preserved. The fauna is preserved as moulds and specimens were mechanically excavated using a compressed air powered vibrotool.

Results

Powena Beds

The fauna from the Powena Beds (Sample 122674, Grid Ref. 678767) includes the following species:

Oncagnostus spp.
Rhaptagnostus bifax
Rhaptagnostus clarki
Neoagnostus canadensis

Pseudagnostus (Pseudagnostus) parvus
?Loganopeltoides sp.
Parabolinoidid sp.
aff. *Quebecaspis* sp.
aff. *Fatocephalus* sp.
Onchonotellus sp.
Wuhuia sp.
?Maladioidella sp.
?Solenopleurid

The co-occurrence of *Rhaptagnostus bifax* and *R. clarki* indicates an age of late Iverian, probably from either the *Rhaptagnostus clarki prolatus/Caznaia sectatrix* or *Rhaptagnostus bifax/Neoagnostus denticulatus* Assemblage Zones of Shergold (1975, 1993). This is supported by the occurrence of *Neoagnostus canadensis* which is known from the Late Sunwaptan (Late Iverian-Payntonian) of Newfoundland (Ludvigsen et al., 1989). However, the occurrence of *Pseudagnostus (Pseudagnostus) parvus* is anomalous; it has previously been recorded extending upwards only as far as the zone preceding the appearance of *R. bifax*. Despite this, an age of *Rhaptagnostus clarki prolatus/Caznaia sectatrix* or *Rhaptagnostus bifax/Neoagnostus denticulatus* Assemblage Zones is considered most likely for this fauna.

This age determination differs from the early Iverian age given by Laurie et al. (1995, p.11) for this unit. The current work is based on more detailed examination of the faunas and supersedes the older estimate.

Wierah Formation
Trilobite fossils have been obtained from two horizons within the Wierah Formation on Pretty's point. These are: Sample 122676 (Grid Ref. 710742), about 30m from the base of the unit, and Sample 122677 (Grid Ref. 708739) about 50m from the base of the unit (Bischoff, 1983).

Sample 122676 yielded the following species:
Neoagnostus longicollis
n.gen. aff. *Micragnostus*
indet. pseudagnostid A
Diemanosaukia sp.
?*Lophosaukia* sp.

Sample 122677 yielded the following species:
n. gen. aff. *Micragnostus*
indet. pseudagnostid A
indet. pseudagnostid B
indet. ?metagnostid
Diemanosaukia sp.
?*Lophosaukia* sp.

This is an unusual fauna with several of the agnostids being of unusual appearance and previously unknown, making correlation difficult. However, the presence of numerous saukiid trilobites in association with *Neoagnostus longicollis* indicates a very late Cambrian,

probably Payntonian age. *Diemanosaukia* has been recorded from probable Payntonian rocks on the western flank of Misery Hill, western Tasmania (Jago & Corbett, 1990) and from Northern Victoria Land, Antarctica (Wright et al, 1984, see Jago & Corbett, 1990, p.240). The latter occurrence is in association with a conodont fauna of probable Payntonian age.

Bischoff (1983, p.36) and Banks (in Burrett & Martin, 1989, p.188) considered the Powena Beds to be a probable equivalent of the Wierah Formation at Pretty's Point. In general, this is not the case, the trilobites from the Powena Beds being somewhat older than those from the Wierah Formation. However, it is possible that the thin, basal, reddish limestone of the Wierah Formation at Pretty's Point (Bischoff, 1983, p. 28) is an equivalent of the Powena Beds, as no fauna from this basal limestone was available for examination.

References

Berry, R.F. & Harley, S., 1983. Pre-Devonian Stratigraphy and structure of the Prion Beach-Rocky Boat Inlet-Osmiridium Beach coastal section, southern Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* 117, 59-75.

Bischoff, K., 1983. *The geology of the Rocky Boat Inlet-Surprise Bay area.* Unpublished B.Sc. (Hons) Thesis, University of Tasmania.

Burrett, C.F. & Martin, E.L. (eds), 1989. Geology and mineral resources of Tasmania. *Geological Society of Australia, Special Publication* 15, 1-574.

Jago, J.B. & Corbett, K.D., 1990. Latest Cambrian trilobites from Misery Hill, western Tasmania. *Alcheringa* 14, 233-246.

Laurie, J.R., Jago, J.B. & Bao Jin-song, 1995. Review of Tasmania Cambrian biostratigraphy. *Australian Geological Survey Organisation Record* 1995/69, 31p.

Ludvigsen, R., Westrop, S.R. & Kindle, C.H., 1989. Sunwaptan (Upper Cambrian) trilobites of the Cow Head Group, western Newfoundland, Canada. *Palaeontographica Canadiana* 6, 175p.

Shergold, J.H., 1975. Late Cambrian and Early Ordovician trilobites from the Burke River Structural Belt, Western Queensland, Australia. *Bureau of Mineral Resources, Geology and Geophysics, Bulletin* 153, vol.1, 251p., vol.2, 58pls.

Shergold, J.H., 1993. The Iverian, a proposed Late Cambrian Stage, and its subdivision in the Burke River Structural Belt, western Queensland. *AGSO Journal of Australian Geology & Geophysics* 13, 345-358.

Wright, T.O., Ross, R.J. & Repetski, J.E., 1984. Newly discovered youngest Cambrian or oldest Ordovician fossils from the Robertson Bay terrane (formerly Precambrian), northern Victoria Land, Antarctica. *Geology* 12, 301-305.