A REVISED STRATIGRAPHY FOR THE PRECAMBRIAN IN NORTH-WEST TASMANIA

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(With one text figure)

ABSTRACT

Within the Proterozoic rocks of the Rocky Cape Geanticline in north-west Tasmania, three contrasting sedimentary assemblages are recognised. The Rocky Cape Group, which has been previously used very broadly, is redefined to include only one of these assemblages. The revised definition includes the orthoquartzite, siltstone and shale which form a continuous sequence in the Rocky Cape area. Some new formations are defined. The Smithton Dolomite, and related rocks, unconformably overlie the Rocky Cape Group to the west at Black River. The Burnie Formation is a thick sequence flanking the Rocky Cape Group to the east. The Rocky Cape Group and the Burnie Formation are separated by the Keith Metamorphics, which is a belt of low grade regional metamorphic greenschist, amphibolite and pelitic schist.

INTRODUCTION

The Rocky Cape Geanticline (Carey, 1953, p. 1115) consists of deformed, unfossiliferous, and dominantly unmetamorphosed sedimentary rock of presumed Proterozoic age. Stratigraphical terminology in the Proterozoic succession in north-west Tasmania is mainly after Spry (1957a) who introduced several formation names. The sequence proposed was later modified (Spry, 1962, p. 111), as follows:

Top—Cave Quartzite
Port Slate and Quartzite
Bluff Quartzite
Cowrie Siltstone

Base—Burnie Quartzite and Slate.

These formations were taken to constitute the Rocky Cape Group which was defined (Spry, 1957a, p. 81) as "those sediments chiefly quartzite slate dolomite and siltstone, outcropping intermittently from Penguin to Smithton and lying unconformably below the Dundas Group at Penguin. Its thickness is in excess of 10,000 feet ".

In addition, other formations have been named in north-west Tasmania, for example, Bryant Hill Quartzite (Carey and Scott, 1952), Smithton Dolomite (Spry, 1957b), Black River Dolomite (Spry, 1957a), and Forest Conglomerate and Quartzite (Spry, 1964, p. 47). Although these formations fall within the definition of the Rocky Cape Group, it is not clear, either from the original definitions or from current usage, whether they should be included in the Rocky Cape Group. Recent work (Gee, 1967) has shown that the succession between Penguin and Smithton consists of three assemblages of contrasting lithological characteristics, each assemblage corresponding to a different basin of deposition. In accordance with the Australian Code of Stratigraphic Nomenclature (1964), it is unjustified to call this succession a group. Furthermore, there is a proved angular unconformity separating two of these assemblages.

Figure 1 summarises the stratigraphical relations of the rocks comprising the Rocky Cape Geanticline.

ROCKY CAPE GROUP

It is proposed that the Rocky Cape Group be restricted in definition to include only the formations of orthoquartzite siltstone and shale, some of which have been defined by Spry (1957a), which form a continuous sequence in the Rocky Cape and Dip Range area. This would include all those formations listed previously, with the exception of the Burnie Quartzite and Slate. It would also exclude the Smithton Dolomite, the Black River Dolomite and the Forest Conglomerate which unconformably overlie the sequence in question. This procedure retains much of the meaning of the original definition. The Rocky Cape Group is redefined below.

The Rocky Cape Group is that group of rocks, mostly quartzite, siltstone and mudstone, at least 16,000 feet thick, consisting of the Cowrie Siltstone (at the bottom), Detention Sub-group, Irby Siltstone, Jacob Quartzite (at the top), and including any other formation which can be shown to be conformably above the Jacob Quartzite or conformably below the Cowrie Siltstone. It occurs in the general area around Rocky Cape, Sisters Hills, Dip Range, and Mawbanna.

The Rocky Cape Group consists of one sub-group and three additional formations.

Cowrie Siltstone

Spry (1957a) proposed the name Cowrie Siltstone for the well-bedded siltstone which outcrops along the foreshore between Rocky Cape and Black River. At that time its stratigraphic position was not understood, but later Spry (1962, 1964) recognised that it lay beneath the orthoquartzite at Rocky Cape. In accordance with the usage of Spry, it is formally defined as follows.
The Cowrie Siltstone is that formation of finely laminated shale, well-bedded flaggy or laminated siltstone, and black mudstone, with some cross-bedded sandstone layers, lying conformably beneath the Detention Sub-group; it is approximately 8,000 feet thick, and its type locality is on the western foreshore of Rocky Cape, 11 miles from the point of Rocky Cape (966,300y N, 332,500y E).

It occurs extensively on the flat plains between Sisters Hills and Black River, and also in the headwaters region of the Black and Dip Rivers but its outcrop is limited because of the cover of Tertiary siltstone, and mudstone, with some outcrops along the foreshore of Sisters Hills, forming the contorted southern block of the major east-west transcurrent fault, is about 300 feet of siltstone and mudstone overlying the Jacob Quartzite. This un-named siltstone is taken as the top of the Jacob Quartzite.

**SMITHTON DOLOMITE**

The Rocky Cape Group is overlain in the west by a blanket of dolomite which in places has a basal conglomerate layer. The widespread occurrence of dolomite in the Smithton district was first noted by Nye, Flucnace and Blake (1934), and has been referred to frequently by many writers, including Carey and Scott (1952), and Hosking and Huerber (1954). Spry (1957b) formally defined the Smithton Dolomite as 'the formation, chiefly dolomite, lying below the Dundas Group and above the Bryant Hill Quartzite of Carey and Scott (1952), being approximately 3,000 feet thick, with its type locality being immediately west of the Duck River, just north of the Smithton-Marrawah Road'.

Both Longman and Matthews (1962), and Spry (1962, p. 112, 1964, p. 47) noted the regionally transgressive nature of the Smithton Dolomite and have suggested an unconformity at the base.

The dolomite at Black River was named by Spry (1957a) the Black River Dolomite, who thought it was low down in the Rocky Cape Group. Later, Spry (1964) ascertained that the Cowrie Siltstone at Black River was overlain by conglomerate, quartz sandstone, chert, and then the Black River Dolomite. The Black River Dolomite is correlated with the Smithton Dolomite by lithological identity and close proximity to the Smithton Dolomite near South Forest and Irishtown (Gulline, 1959). Spry (1964) named the conglomerate and quartz sandstone that underlie the dolomite at Black River the Forest Conglomerate and quartzite after the village.
STRATIGRAPHIC SECTIONS IN THE PROTEROZOIC OF THE NORTH WEST COAST OF TASMANIA
fine-pebble infillings of depressions between small strike ridges on an erosional surface which truncates the bedding at an acute angle. The sharpness of these ridges indicates that the siltstone must have been compacted prior to the erosion. It is noteworthy that the cast ridges are present only when the size of the pebbles is less than the spacing of the strike ridges.

**KEITH METAMORPHICS**

The Rocky Cape Group is bounded on the east by a belt of low-grade greenschists. This belt can be followed from Wynyard south-west through Meunna to the Arthur River, and is a direct continuation of the Keith Beds of McNeil (1961). This ribbon-like belt is about four miles wide, and separates the Rocky Cape Group and the Burnie Formation. The schists are considered to be derived mainly from the surrounding sediments and partly from intrusive dolerite. The western contact, although gradational, is parallel to bedding in the adjacent Rocky Cape Group. These formations strike north-east with steep dips facing the south-east and in places are overturned. Thus the metamorphic rocks stratigraphically overlie the Rocky Cape Group. It is defined below as a rock-unit, considered to have been derived from sedimentary rocks which lie stratigraphically above the Jacob Quartzite.

The Keith Metamorphics is that assemblage of phyllite, muscovite schist, calcite schist, amphibolite and quartzite, originally named the Keith Beds; which forms a linear belt between Wynyard and the Arthur River near the Keith River, and probably extends much further to the south-west. It lies stratigraphically above the Rocky Cape Group, and its type locality may be taken as the area of best exposure which is where Hilder’s timber road from Meunna meets the Arthur River (346, 000y E, 934,000y N).

**BURNIE QUARTZITE AND SLATE**

The Burnie Quartzite and Slate was defined (Spry 1957a, p. 81) as the “formation of subgreywacke quartzite and slate outcropping along the foreshore at West Burnie, and which appears to outcrop from Howth to Doctors Rocks, except where covered by later superficial material”.

Spry (1962, 1964) suggested that the formation was the lowest in the Rocky Cape Group and the general dip was toward the west. Detailed mapping between Penguin and Doctors Rocks has shown that large tracts are overturned, and that formation is generally younging to the east. Therefore, the Burnie Formation appears to lie above the Rocky Cape Group, and to be separated from it by the Keith Metamorphics.

The Burnie Formation has a minimum thickness of 14,500 feet. It is a quartz wacke and slate assemblage containing minor pillow lavas, and is unlike the Rocky Cape Group. It was laid down in a different basin of deposition. Therefore it is not included in the Rocky Cape Group.

**SUMMARY**

In order to clarify the stratigraphic position of the Proterozoic rocks of the Rocky Cape Geanticline in north-west Tasmania, the Rocky Cape Group is redefined to include a conformable sequence of shale, quartzite and siltstone which has a discrete lithogenetic significance.

Unconformably overlapping the Rocky Cape Group in the west is the Smithton Dolomite which has a basal conglomerate. The Burnie Formation to the east is younger than the Rocky Cape Group, but onlaps it rather than overlies it.

Separating the Rocky Cape Group and the Burnie Formation is a belt of metamorphic rocks called the Keith Metamorphics. This belt is interpreted as a high-angle shear zone of Proterozoic age.

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