

1979/12. The probable Middle Cambrian sequence on the Gordon River Road, south-west Tasmania.

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Abstract

There are four stratigraphic units in the sequence overlying the Wedge River beds and underlying the Denison Sub-group in the Gordon River Road area. They are the Marsden Conglomerate which unconformably overlies the Wedge River beds; the Mt Wedge Formation which transitionally overlies the Marsden Conglomerate; the Ragged Range Formation which unconformably underlies the Denison Sub-group and which is faulted against the Mt Wedge Formation; and the Boyd Formation which is faulted into the Ragged Range Formation. Polymerid trilobites occur in the Marsden Range Conglomerate. Polymerid trilobites from the Boyd Formation indicate a probable Middle Cambrian age.

INTRODUCTION

The sequence under consideration outcrops along the Gordon River Road between the base of the Denison Sub-group (Corbett and Banks, 1974; Corbett, 1975) at DN485595 and the Wedge River beds (Corbett and Banks, 1974, fig. 1) at DN379558. Contacts of the sequence with both the Wedge River beds and the Denison Sub-group are angular unconformities.

Siliceous pebble and cobble conglomerate form the base of the Denison Sub-group at Gordon River Road. The age of similar deposits in the type section of the sub-group at Denison Range is close to the Cambro-Ordovician boundary. However, the deposits do not occur at the base of the sub-group but are underlain conformably by middle Late Cambrian strata which are absent at Gordon River Road. The sequence below the Denison Sub-group at Gordon River Road is considered to be older than middle Late Cambrian.

The Wedge River beds consist of metamorphosed and strongly deformed equivalents of boulder conglomerate, cobbly and pebbly sandstone and mudstone. Metamorphism is regional-dynamic and of low grade. Although some of the constituent lithologies are dissimilar to those occurring in the nearby Precambrian strata, the degrees of metamorphism and deformation are similar, therefore the Wedge River beds are also considered to be of Precambrian age.

STRATIGRAPHY

The formation names employed in the following description have not yet been formalised by publication.

MARSDEN CONGLOMERATE AND SANDSTONE

The Marsden Conglomerate and Sandstone overlies the Wedge River beds with angular unconformity. It is a well-bedded unit consisting of pebble, granule and minor cobble conglomerate, pebbly sandstone and sandstone. A thin (5m), poorly bedded breccia rests directly on the unconformity which is exposed at DN377556. The best exposure of the formation is the section at Gordon River Road. Elsewhere outcrop is poor. The formation extends east-south-east from the road thence south-eastward to underly the crest of Marsden Range [DN435514], from which the formation name is derived.

The formation is about 360m thick near the road and at Marsden Range it is about 700m thick.

Lithologies comprising the formation are dominantly siliceous, although the finest sandstones contain substantial pelitic material and the basal breccia contains pelitic clasts. Bed thickness ranges up to about 1.5m, with fine sandstone and minor mudstone commonly forming thin interbeds between coarser-grained beds. Cross-cutting erosional surfaces are present within some coarse-grained beds. Some of the finer sandstone is graded.

Clasts in the conglomerate and pebbly sandstone are moderately to poorly rounded and consist of quartz, quartzite and micaceous quartzite which are compositionally and structurally similar to rocks occurring in the nearby Precambrian strata. The clasts contain no fabric elements that are concordant with fabric elements in their matrix, therefore, it is inferred that the bulk of the deformation in the Precambrian rocks occurred prior to deposition of the Marsden Conglomerate.

Fossils. Macrofossils occur in fine-grained sandstone horizons in the southerly cutting on the Gordon River Road at the corner near the crest of the hill at DN379558. Polymerid trilobites from an initial collection are poorly preserved and unidentifiable (J. Jago, pers. comm.). A collection of better samples has been made but these have yet to be examined by Jago.

MT WEDGE FORMATION

Conformably overlying the Marsden Conglomerate and Sandstone is a sequence of quartzwacke, minor poorly-sorted siliceous granule conglomerate and interbedded siltstone and mudstone. There is sporadic good exposure of the formation in creeks on the northern and eastern slopes of Mt Wedge [DN425560], from which the formation name is derived. There is also good exposure along Gordon River Road, formed-tracks west of Island Road and along the southern shore of Lake Gordon.

Quartzwacke and granule conglomerate beds range up to about one metre in thickness. They are graded and contain other structures typical of turbidite deposits. Siltstone and mudstone occur in thinner beds and are subordinate to coarser lithologies at Gordon River Road. They are more common east-south-east of Mt Wedge and form beds up to about one metre thick. Impure carbonate and very minor, small-pebble conglomerate is also present east-south-east of Mt Wedge.

The contact between the Mt Wedge Formation and the Marsden Conglomerate and Sandstone is transitional on Marsden Range. At Gordon River Road the character of the contact is obscured by faulting and folding. Although the steady trend of the contact east-south-east thence south-east from Gordon River Road demonstrates that the Mt Wedge Formation is not tightly folded on a regional scale, variation in strike and dip of beds within the formation indicate that there is fairly tight folding at a scale of about 200m. Structural profiles are yet to be compiled, therefore the thickness of the formation in any locality is yet to be determined.

RAGGED RANGE FORMATION

Extending east from the Mt Wedge Formation to the Denison Sub-group is the Ragged Range Formation, which consists of a distinctive suite of

lithologies. The lithologies are wacke and orange to green mudstone, red mudstone, chert, basic volcanics and carbonate. The best outcrops are along the Gordon River Road, Clear Hill Road and parts of Island Road, There is good outcrop of chert at the crest of Ragged Range. Outcrop in creeks is generally poor and, with the exception of chert, the lithologies provide little float. The nature of the contact with the Mt Wedge Formation is unknown. It is at least partly faulted.

The most abundant rock type is medium-grained wacke. Almost everywhere the wacke is very deeply weathered and comprises largely orange clay showing relict granular texture, quartz and abundant muscovite, commonly of coarse (up to 4mm) grain size. Unweathered wacke occurs in only a few places, such as on parts of the western slopes of Ragged Range [e.g. DN 431645]. The unweathered rock is medium green and contains carbonate, chlorite and detrital biotite, pink garnet and plagioclase as well as quartz and muscovite. A second type of wacke is uncommon but widespread. No unweathered examples of it were found. It contains very little quartz and it does not contain the abundant coarse-grained muscovite which characterises the first type. Interbanded with the wacke in all areas is mudstone ranging in colour through orange, fawn and khaki to green.

Due to widespread disruption by shearing and probable soft-sediment slumping, bedding in wacke-mudstone sections is commonly obscured. In many cases lithological interfaces at the outcrop scale are shears. It would appear that the mudstone formed thin interbeds between thicker wacke units. Little evidence of grading was found in most exposures of wacke. However, there are typical turbidite beds in relatively unshered exposures at DN485595 and DN418661. It is inferred that the wacke in other areas also formed as turbidite deposits.

Shaly, red to purple mudstone occurs in some places as thin lenses within sections of wacke and orange to green mudstone. However, it commonly occurs as thicker (1-?100m) units in association with chert and/or basic volcanics. In places, black amorphous and dendritic manganiferous material is present in the mudstone. Bedding was recognised in only a few places and is defined by thin (0.5 - 10m) lighter and darker colour bands.

Chert is a widespread and prominent rock type but comprises only a relatively small proportion of the formation. It is much more abundant in some zones than in others. The thickest section consisting predominantly of chert underlies the crest of Ragged Range where it appears to be about 600m thick. This estimate is based on the assumption that facing is of uniform direction throughout the section. Elsewhere, chert units generally range in thickness from a few centimetres to about 10 metres. Many units in the range 300mm - 10m contain a flaggy bedding parting and a closer-spaced (50-100mm) planar bedding parting is common. Two types of colour banding are present in many exposures. One has a wispy, lenticular morphology and band thickness of a few millimetres. It is commonly discontinuous, confined to thin zones and non-planar. It is thought to be related to recrystallisation. The other type is planar, more continuous and has a band thickness of a few millimetres to about 20mm. It is parallel to the bedding partings and to bedding in interbedded chert/mudstone and is regarded as an expression of bedding. Colours of bands include white, pale grey and green, dark grey and green, pale pink and, rarely, red.

Fine grained basic rocks comprise a small part of the formation but are widespread. Like the wackes, they are generally deeply weathered and

in many places have been reduced to characteristic red and orange mottled clays with relict granular texture. The basic rocks are considered to be extrusive because of their grain size and ubiquitous association with red mudstone.

Fairly pure, grey carbonate units occur in the Ragged Range Formation around DN462561. Some units are at least five metres thick and may be thicker since a number of small (five metres across) sinkholes occur in the area. Grain size is generally fine, although coarse, recrystallised patches are present. Thin (10mm) dark- and light-grey colour bands are present in parts of some units.

In a few places on the western slopes of Ragged Range [e.g. DN440625] there are thin (?2m) units of well sorted, medium-grained, pink quartz sandstone. Angular fragments of chert and phyllitic mudstone are common in such sandstone and range in size from a few millimetres to several centimetres. The chert occurs both randomly and concentrated in bands, which are taken to be bedding. No other sedimentary structures were identified but outcrop is poor.

BOYD FORMATION

In the vicinity of where the Gordon River Road crosses the Boyd River, there is a formation of medium- and coarse-grained lithic quartzwacke, pebbly wacke and conglomerate with interbedded mudstone. Outcrop is good on the road and on the formed track north of the road. There is also good outcrop in the Boyd River south of the road.

The formation is well bedded with quartzwacke and conglomerate beds ranging up to about one metre in thickness and mudstone beds being generally thinner. There is a zone north of the Gordon River Road in which pebble and minor cobble conglomerate is much more common than elsewhere. Some of the conglomerate has a continuous framework [e.g. DN423605]. Both conglomerate and wacke contain predominantly siliceous detritus. The wackes are graded and are regarded as turbidite deposits.

The Boyd Formation is surrounded by the Ragged Range Formation and probably all contacts are faults. A fault forms the eastern boundary. It is expressed in the cuttings of the Gordon River Road as a shear zone about 20m wide in which there are serpentinitic pods. Serpentinite and minor gabbro occur in or adjacent to the fault zone further to the south [DN472574].

Insufficient structural data has been obtained to make an estimate of the thickness of strata in the Boyd Formation.

Fossils. Macrofossils occur in a 400mm band of pink mudstone in the south-south-west face of a cutting on a formed track which trends north-north-west from the Gordon River Road about 460m past the Clear Hill Road. The fossil site is about 130m from the junction of the track with the Gordon River Road [DN458590]. Polymerid trilobites from an initial collection are well preserved and probably represent a Middle Cambrian member of the Anomocaridae (J. Jago, pers. comm.). Well preserved specimens of an articulate brachiopod have also been collected at the site.

REFERENCES

- CORBETT, K.D. 1975. The Late Cambrian to Early Ordovician sequence on the Denison Range, southwest Tasmania. *Pap.Proc.R.Soc.Tasm.* 109: 111-120.
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[9 April 1979]