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J.R. LAURIE
Australian Geological Survey Organisation

and

J.B. JAGO & JIN-SONG BAO
Department of Applied Geology
University of South Australia
The Levels, SA 5095

Tasmania National Geoscience Mapping Accord Project

Australian Geological Survey Organisation
GPO Box 378 Canberra ACT 2601
Australia

DEPARTMENT OF PRIMARY INDUSTRIES AND ENERGY

Minister for Resources: Hon. David Beddall, MP
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Abstract

In Tasmania, no Lower Cambrian fossiliferous rocks are known, but trilobite faunas are found in Middle and Upper Cambrian sediments in the Dundas, Fossey Mountain, Dial Range, Beaconsfield and Adamsfield Troughs, the Smithton Synclinorium and in the Rocky Boat Inlet-Surprise Bay area. Correlations of these faunas with the standard northern Australian succession are possible mostly using assemblages of agnostoid trilobites.

In the Dundas Trough faunas range in age from possible Late Templetonian to Payntonian. In the Dial Range Trough faunas range in age from Floran to late Mindyallan. The few faunas from the Fossey Mountain Trough are of Boomerangian to Mindyallan age. The Smithton Synclinorium faunas range in age from early Boomerangian to late Idamean. In the Adamsfield Trough faunas range in age from early Boomerangian to possibly Datsonian. The single Cambrian fauna from the Beaconsfield Trough is probably late Undillan to Boomerangian in age and the three faunas from the Rocky Boat Inlet-Surprise Bay area are possibly Middle Cambrian, early and late Iverian in age respectively.

Introduction

The geology of Tasmania is quite complex, with a major discontinuity separating the variably deformed Precambrian to Devonian terrane of western Tasmania from the Ordovician to Devonian turbidite succession of northeastern Tasmania (see Fig.1). This discontinuity, termed the Tamar Fracture System, is obscured by Carboniferous and younger rocks which cover central and southeastern Tasmania. The more complex western terrane consists of variably metmorphosed Precambrian rocks, Late Proterozoic carbonates and clastics, Cambrian volcanic and sedimentary successions, ultramafic-mafic complexes and latest Cambrian to Devonian clastics and carbonates.

The Mt Read volcanic belt in western Tasmania is one of the most heavily mineralised metallogenic provinces in the world, with most of the larger deposits in the area consisting of volcanic-hosted massive sulphide orebodies of Cambrian age. To facilitate mineral exploration in the region an understanding of the relationships of the various rock units and the timing of geological events is necessary. The most reliable method of obtaining the latter is by biostratigraphic analysis. It is therefore imperative that the available biostratigraphic information is up to date, taking account of the most recent developments in the field. This is why this review has been undertaken.

No Lower Cambrian fossiliferous rocks are known, but Middle to late Upper Cambrian successions are found in the Dundas, Fossey Mountain, Dial Range, Beaconsfield and Adamsfield Troughs, the Smithton Synclinorium and in the Rocky Boat Inlet-Surprise Bay area on the south coast (see Figs 1, 2). Although the term 'trough' normally has palaeogeographic connotations, no such interpretation should be placed on these features in western Tasmania. The terminology is used herein simply because of its historical precedence. These 'troughs' simply represent structural belts which include remnant areas of Cambrian sedimentary sequences the original distribution of which was much more extensive. This was subsequently strongly modified by later tectonic activity, during which thrusting played a major role (Leaman et al., 1994). Such interpretations are only now being developed in detail, and the original distribution of the Cambrian successions remains unclear.

Dundas Trough

The most prominent structure of western Tasmania and that which also contains the largest exposed area of Cambrian rocks is the meridional Dundas Trough which lies to the west of the Precambrian Tyennan Block, curving round its northern margin to pass into the latitudinal Fossey Mountain Trough (see Fig.1). The Dial Range Trough is a much smaller entity, running northward of that intersection. It intersects the coast to the west of the Forth Block. To the west and northwest, the Dundas Trough and its offshoots are bounded by the Precambrian Rocky Cape Block.

As noted by Brown (in Burrett & Martin, 1989, p.49), a two phase stratigraphic system characterises the autochthonous sequences within the Dundas Trough. The first phase consists of a probable Late Proterozoic succession of shallow marine clastics (Success Creek Group and correlates) overlain by deeper marine greywacke-mudstone-chert deposits associated with tholeiitic basalts (Crimson Creek Formation and correlates). The second

phase consists of a commonly fossiliferous marine Middle to Late Cambrian succession which is usually rich in conglomeratic flysch. These latter deposits interdigitate with and are partly derived from the contemporaneous calc-alkaline Mount Read Volcanics, the arcuate belt of which forms the eastern margin of the Dundas Trough and the southern margin of the Fossey Mountain Trough.

Dundas Area (see Fig.2)

Elliston (1954) defined the Dundas Group as comprising thirteen formations with an estimated total thickness of 3525m. Subsequent mapping by Blissett (1962) and Brown (1986) among others has demonstrated the difficulty of tracing Elliston's formations away from the type area. Indeed, mapping by Brown (1986) in the type area at Dundas indicates that the Dundas Group consists of two distinct successions which may have been separated by a break in sedimentation (Brown, 1986) and are now faulted against one another. The Dundas area has one of the best known successions of Cambrian trilobite faunas, as detailed below.

Brown (1986), Blissett (1962) and Elliston (1954) agree that the Judith Formation is the oldest unit of the Dundas Group. This is because it reputedly contains the oldest recorded Tasmanian Cambrian macrofauna. Öpik (1951a) initially recorded *Lorenzella*, *?Ptychagnostus*, *?Conaspis* and later *Pagetia*, *Triplagnostus* and *?Peronopsis* (Öpik, 1951b) to which he assigned a *Triplagnostus gibbus* Zone age. This age is unable to be confirmed as the original specimens were destroyed by fire in 1953 and the fauna has not been relocated.

Overlying the Judith Formation is the Red Lead Conglomerate which in turn is conformably overlain by the Hodge Formation. At a locality near Northeast Dundas Tram, a siltstone of the Hodge Formation contains the agnostids *Hypagnostus* sp., *Ptychagnostus affinis*, *?Aotagnostus* sp., *Goniagnostus (Goniagnostus)* sp., *Doryagnostus* sp., *Diplagnostus* sp. and the polymerids *Pianaspis* (Jago & Brown, 1989) and *Kootenia* sp. This locality was assigned an age of *G.(G.) nathorsti* Zone by Jago (1979) based on preliminary identifications. Based on more detailed examination of the fauna, an age of *P. punctuosus* to *D. deltoides* Zone is considered more likely.

Conformably overlying the Hodge Formation is the Razorback Conglomerate which grades up into the Brewery Junction Formation. The 'lower' Brewery Junction Formation is unfossiliferous and is separated from the 'upper' part of the formation by a fault (Brown, 1986). Near the base of the sequence is a lens of tuff which is succeeded by a poorly preserved Middle Cambrian fauna containing pagetiid and dolichometopid trilobites (Locality DB1 of Banks, 1982, p.4). Thirty metres higher in the sequence is a fauna containing *Clavagnostus*, *Aspidagnostus*, *Bergeronites*, nepeids and others, which Jago & Brown (1989) considered to be of *E. eretes* or *C. quasivespa* Zone age. Five hundred metres west of Adelaide Mine is another locality in the Upper Brewery Junction Formation containing *Clavagnostus* sp., *Aspidagnostus* sp., *Oedorhachis* aff. *typicalis*, *Oidalagnostus* sp., *Pseudagnostus* sp. and polymerids. These also indicate an age of *E. eretes* or *C. quasivespa* Zone. Fifty metres below the top of the formation (Dundas Rivulet Locality FE1 of Banks, 1982, p.7) are some richly fossiliferous siltstones containing *Rhyssometopus* sp., *Aulacodigma* sp., *Bergeronites* sp., *Idolagnostus* sp., *Aspidagnostus* sp., *?Ammagnostus* sp. and *Pseudagnostus* sp. which Jago (1979) and Jago & Brown (1989) believed to be of *Glyptagnostus stolidotus* Zone age.

Overlying the Brewery Junction Formation is the Fernfields Formation, a dominantly conglomeratic unit which contains no age diagnostic fossils. This is followed by the Comet Slate, a predominantly siltstone-mudstone unit which contains only rare, indeterminate brachiopods. Succeeding this unit is the unfossiliferous Fernflow Formation which consists largely of conglomerate with interbedded siltstone.

The Climie Formation apparently conformably overlies the Fernflow Formation and consists predominantly of laminated siltstone. There are two fossil horizons known from the unit. The lower one occurs about 200 metres below the top of the unit and contains ?*Micragnostus* aff. *intermedius*, *Neoagnostus (Neoagnostus)* sp., *Pseudagnostus (Pseudagnostus)* sp., *Olenus* sp. *Cermatops thalasta* and possibly *Proceratopyge gordonensis* (see Jago, 1978; Jell et al, 1991, p. 455). It is believed to be from *W. iota/R. apsis* Zone to *P. tertia/P. quarta* Zone in age. The upper fauna also contains ?*Micragnostus* aff. *intermedius,* an indeterminate agnostid and possibly *Wujiajiania distorta* (see Jell et al, 1991, p.455) and may be of similar age.

The Misery Conglomerate rests with apparent conformity on the Climie Formation and is approximately 150m thick. The Misery Conglomerate is in turn overlain, with possible unconformity, by an unnamed unit of siltstone and sandstone from which Jago & Corbett (1990) have recorded *Diemanosaukia miserabilis* and ?*Saukia blissetti*. They considered these forms to be of probable Payntonian age.

SE of Henty Fault (see Fig.2)

On the other (SE) side of the Henty Fault Zone from Dundas the folded Precambrian quartzose metasediments of the Tyennan Block are overlain unconformably by the Sticht Range Formation, a unit of siliciclastic conglomerate, sandstone and minor siltstone up to 1200m thick (Baillie, 1989; Corbett, in Burrett & Martin, 1989, p.162; Corbett, 1992). The unit exhibits a general fining upward, recording the progression from fluvial to marine depositional environments. Two poorly preserved trilobites belonging to the Asaphiscidae have been found in the unit and indicate an age of Middle to Late Cambrian (Jago in Baillie, 1989, p.18), although the stratigraphic position suggests a Middle Cambrian age.

The Sticht Range Formation is overlain by the Murchison Volcanics, a complex sequence of quartz-feldspar porphyritic lavas and volcaniclastics (Corbett, 1992). This interfingers westward with the central volcanic complex of the Mt Read Volcanics (see Corbett, 1992, fig.6) and both are overlain by the Tyndall Group.

The Tyndall Group comprises two formations; the Comstock Tuff at the base and an unnamed unit of volcaniclastic conglomerate and sandstone, with minor tuffs (Corbett et al., in Burrett & Martin, 1989, p.104). Fossils have been found only in the former, from a limestone lens intersected in a corehole near Queenstown. The fauna includes an indeterminate agnostid, ?*Dorypyge* sp., echinoderms, hyolithids, the mollusc cf. *Latouchella* sp. and phosphatic brachiopods, to which Jago et al. (1972) assigned a late Middle Cambrian to early Late Cambrian age.

Unconformably (Jukesian Unconformity) overlying the Tyndall Group is the Jukes Conglomerate which consists of poorly sorted breccia and conglomerate, with clasts being

mostly derived from the Mt Read Volcanics. This is overlain with apparent conformity by the Owen Conglomerate, a formation comprising siliceous conglomerate and quartz sandstone up to 2km thick (Corbett & Turner, in Burrett & Martin, 1989, p.162). The lower part of the unit appears to have been deposited as alluvial fans derived from the Precambrian rocks of the Tyennan Block, whereas higher in the unit, trace and body fossils indicate a marine environment of deposition (Banks & Baillie, in Burrett & Martin, 1989, p.190). On the northern margin of the Tyndall Range the lower part of the Owen Conglomerate includes the Newton Creek Sandstone Member (Corbett, 1975a) which comprises quartzwacke, bioturbated thin bedded sandstone, micaceous siltstone and grey siliceous conglomerate. Fossils found in this unit at Newton Creek include an indeterminate agnostid, *Proceratopyge* sp., an indeterminate polymerid, *Billingsella* sp. and *Eoorthis* sp. The association of *Proceratopyge* with *Billingsella* and *Eoorthis* is common in the Singing Creek Formation of the Denison Group and a similar age of late Idamean to Iverian is suggested.

Although traditionally included within the 'Owen succession', the Pioneer Beds, a unit of pebble conglomerates, sandstones and minor shales, overlie the Owen Conglomerate unconformably (Haulage Unconformity). This unconformity was considered to be a local phenomenon by Solomon (1979), Solomon & Carswell (in Burrett & Martin, 1989, p.125) and Corbett (1990, p.9) whereas Webby (1978, p.46; 1979) considered it to be of much greater significance. At one locality, the Pioneer beds contain gastropods and rhynchonellid brachiopods, the latter having a distinctly middle Ordovician aspect (Laurie, 1995). This, coupled with the interpretation of Jago & Corbett (1990, p.236) that the youngest (pre-Pioneer) unit of the Owen Conglomerate, the 'chocolate sandstone', is a probable correlate of the unnamed Payntonian unit overlying the Misery Conglomerate (see above) tends to support the view expressed by Webby (1978) that a considerable time break is represented by the Haulage Unconformity.

Hellyer-Que River-Cradle Mountain Link Road Area (see Fig.2)

Corbett (1992) described and summarised the stratigraphy of the Mt Read Volcanics of western Tasmania. He introduced the term Mt Charter Group for the volcano-sedimentary sequence containing the host andesite-basalt sequence of the Hellyer and Que River orebodies. The term refers to the sequence between the Central Volcanic Complex below and the Owen Conglomerate above. The bottom three units of the Mount Charter Group are unfossiliferous. The basal unit, the Black Harry Beds comprises interbedded sediments and volcanics; it is overlain by the Animal Creek Greywacke which in turn is overlain by the marine sequence of andesites, dacites and basalts which comprise the Que-Hellyer Volcanics.

Overlying and interdigitating with the Que-Hellyer Volcanics, the fossiliferous Que River Shale comprises black carbonaceous pyritic shale and siltstone. The fossils include hydroids and dendroids (Quilty, 1971), a possible aglaspid (Quilty, 1972), acrotretid brachiopods, sponge spicules, bradoriids and agnostoid trilobites (Jago, 1973, 1977). The latter include *Hypagnostus ?parvifrons*, *Onymagnostus hybridus*, *Onymagnostus ?barrandei*, *Diplagnostus floralis*, cf. *Kormagnostus* sp. and others. These suggest an age of *Euagnostus opimus* Zone to *P. punctuosus* Zone.

The overlying Southwell Subgroup comprises interbedded mass flow units, tuffaceous sandstone, siltstone, greywacke and pumiceous breccia. Clasts of trilobite-bearing

fossiliferous limestone occur in one of the mass-flow units. The trilobites include *'Peronopsis'* sp., *Amphoton* sp., *Leiopeishania* sp., *?Monocephalites* sp.. This is unusual for Tasmanian Cambrian sequences in that it represents a shallow water fauna. It is probably of *Goniagnostus nathorsti* Zone to early *Lejopyge laevigata* Zone age (Jago & McNeill, in prep.).

The Southwell Subgroup is overlain by a lithological correlate of the Tyndall Group, the Mount Cripps Subgroup, which is about 900m thick and comprises three informal units along the Cradle Mountain Link Road (Corbett, 1992). The basal lenticular unit comprises up to 100m of siliciclastic conglomerate and siltstone. Above this is 300m of crystal-rich volcaniclastic sandstone with intercalated fossiliferous siltstone, minor welded pink ignimbrite and minor andesite lavas. The fossils appear to belong to at least three separate late Middle Cambrian faunas within the late *L. laevigata* Zone. Most occur in either a buff coloured mudstone or within a pale orange-brown laminated mudstone. Agnostoid trilobites include *Valenagnostus banksi*, *Clavagnostus* sp., *Lejopyge laevigata*, and *Proagnostus* sp.. Other trilobites include *Helepagetia* sp, *Pianaspis* sp., a nepeid, a dolichometopid and an anomocarid. Rare acrotretid brachiopods are present. Within the pale orange-brown laminated mudstone are thin (1-5mm) horizons of fine sandstone representing turbidity current deposits. They contain broken fossils of hyolithids, the trilobite *?Dorypyge* sp., an anomocarid and other fragmentary trilobites.

The top of the Mount Cripps Subgroup comprises about 600m of purple-weathering volcanolithic conglomerate and sandstone (Corbett, 1992), and it is overlain by the siliciclastic Owen Conglomerate.

Farrell Rivulet-Howards Road Area

Corbett & Lees (1987) revised the stratigraphy and structural relationships along the western margin of the Mt Read Volcanics near Rosebery. They defined the White Spur Formation, which they considered to rest unconformably on the central volcanic complex of the Mt Read Volcanics, as being the base of the Dundas Group in this area. The unit consists of interbedded felsic tuff, siltstone, greywacke and slate and is largely unfossiliferous. A few brachiopods have been found in the upper part of the formation, but they are not age-diagnostic (Jago & Brown, 1989).

The White Spur Formation is apparently conformably overlain by a 1km thick sequence of quartzwacke and conglomerate. Near the top of this sequence in Tom Creek (see Fig.2) are poorly preserved trilobites including *Agnostardis* sp. and *Aulacodigma* sp., both of which are known only from the *Glyptagnostus stolidotus* Zone in northern Australia (Jago, 1986).

Professor Range Area (see Fig.2)

In the northeastern part of the Strahan 1:50,000 sheet area the Cambrian rocks can be divided into two major successions; an older volcanosedimentary succession of siltstone, greywacke and felsic tuff, and a gradationally overlying sedimentary succession of quartzwacke turbidites, siltstone and siliceous conglomerate. To the west these Cambrian rocks are overlain apparently conformably by a correlate of the Owen Conglomerate (Corbett in Baillie & Corbett, 1985, p.11).

Poorly preserved trilobite fossils have been found in the younger of the two Cambrian successions, several hundred metres below the Owen Conglomerate correlate. The fauna includes *Pseudagnostus* sp., *Rhaptagnostus* sp., *Hedinaspis* sp. and an asaphiscid gen. et sp. indet. The co-occurrence of the two agnostid genera indicates an age of early Iverian (*Wentsuia iota/Rhaptagnostus apsis* Zone to *Peichiashania tertia/Peichiashania quarta* Zone; see Shergold, 1993).

Huskisson River Area (see Fig.2)

The Huskisson Group was originally defined along the Huskisson River by Taylor (1954), and is a correlate of part of the Dundas Group. Taylor divided the group into nineteen numbered formations based largely on the appearance and disappearance of conglomerate within the siltstone and mudstone succession. The lenticular nature of the conglomeratic bodies precludes the use of Taylor's formations as mappable units beyond the type area (Brown, 1986, p.45). However, Taylor's numbered units are still used for reference purposes.

Öpik (1951) reported brachiopods, dendroids and hydroids from horizons within Taylor's Formations 1-13 and considered them to be of Middle Cambrian in age. More recently, Brown (1986) and Jago & Brown (1989) have reported three faunas some 5km northwest of the type section along the Huskisson River. The first is along Merton Road and contains *Pseudophalacroma ?dubium, Onymagnostus barrandei.* and *Diplagnostus* sp. and is probably of Undillan age (Jago & Brown, 1989, p.79). The second is in a mudstone and contains ptychagnostid spp. and *Diplagnostus* sp. among others, while the third is in an adjacent sandstone and contains indeterminate agnostids, a dolichometopid and a dorypygid (Jago in Brown, 1986, p.52). The latter two horizons are considered to be Boomerangian in age.

Formation 14 of Taylor contains *Glyptagnostus reticulatus* and an indeterminate agnostid and is of *Glyptagnostus reticulatus* Zone age as is Formation 18 in which are found *Homagnostus* sp., *Glyptagnostus reticulatus reticulatus* and *Pseudagnostus idalis huskissonensis* (Jago & Brown, 1992). Blissett (1962) had suggested, and Clarke (in Brown, 1986, p.151) confirmed that these two units of Taylor's represented the same stratigraphic interval.

More recently, many trilobites have been found near Higgins Creek in rocks which are believed to belong to the upper part of the Huskisson Group (Jell et al., 1991). The faunas come from nine localities, the superpositional sequence of which is uncertain. About half of the taxa are common to more than one horizon, the remainder being resticted to single horizons. A revised list of taxa includes *Acmarhachis ?hybrida, Micragnostus* cf. *intermedius, Pseudagnostus mortensis, Pseudagnostus* aff. *idalis, ?Rhaptagnostus* aff. *impressus, ?Agnostotes tianshanicus, Neoagnostus* sp., aff.*Eolotagnostus tullahensis, Proceratopyge* cf. *gordonensis, Asiocephalus latosuggrundus, Olenus apoxysomatus, Wujiajiania distortus, Cermatops thalasta, Chekiangaspis concavus, Aphelaspis* sp. and indicate an age of early Iverian *Irvingella tropica* Zone to *Wentsuia iota/Rhaptagnostus apsis* Zone.

St Valentines Peak Area (see Fig.2)

Cambrian rocks near St Valentines Peak, at the northern end of the Dundas Trough are exposed in the core of an anticline (Jago et al., 1975: Seymour, 1989, p.17). They comprise siltstone, chert, sandstone, rhyolitic welded tuff and an impure limestone metamorphosed by Devonian granite. A siliceous siltstone, probably near the base of the sequence, is richly fossiliferous about 1.5km west of St Valentines Peak (Seymour, 1986). The following forms have been recorded:, *?Lejopyge laevigata, Clavagnostus? rawlingi, 'Peronopsis' ekip, Proagnostus* sp., *Valenagnostus banksi, Aspidagnostus* sp., *Oidalagnostus personatus, Paraclavagnostus* sp., *Helepagetia argusi, Schmalenseeia gostinensis, Nepea* sp., *Penarosa* sp., *Amphoton* sp., *Bathyuriscus* sp., *Leichneyella* sp. and Proasaphiscidae gen. et sp. nov.. This suggests an age for deposition of *P. agra* Zone.

Macquarie Harbour Area

The only Cambrian fossils reported from the Macquarie Harbour area are found west of Birch Inlet (Quilty, 1971; Jago, 1972c; Bao, 1995). In this area, the base of the Cambrian sediments is faulted against Precambrian slate and quartzite. The lower part of the sequence is poorly known, but in the upper 280 m three fossiliferous horizons occur. The abundance and diversity increases up the section. Recorded from this sequence are the agnostids *Lotagnostus (Lotagnostus) trisectus*, agnostid gen. et sp. nov., *Micragnostus* cf. *serus*, *Micragnostus* sp. and *Neoagnostus* sp.. Polymerids include *Charchaqia halli*, *Skljarella* sp., *Niobella* sp., *Proceratopyge* sp., *Olenus* sp. *Parabolinella triarthra*, *Hedinaspis* sp., *Proteuloma huochengensis*, *Onchonotellus* sp., *Cernuolimbus* sp. and gen. nov. aff. *Naustia* sp.(Bao, 1995). These faunas are probably of Payntonian to early Datsonian age (see Fig.2).

Dial Range Trough (see Fig.2)

The Dial Range trough is a narrow, northward extension of the Dundas Trough lying between the Precambrian Rocky Cape Block to the west and the Forth Block to the east. Burns (1964) distinguished five main stratigraphic units, in ascending order: The Lobster Creek Volcanics; the Cateena Group; Barrington Chert correlate and Motton Spilite; Radfords Creek Group and lastly, the Beecraft and Teatree Megabreccias. However, Jago & Brown (in Burrett & Martin, 1989, p.81) considered that the Barrington Chert correlate and Motton Spilite had been emplaced tectonically and were older than the surrounding fossiliferous Cambrian sequences of the Cateena and Radfords Creek Groups.

The Cateena Group consists of about 100m of mudstone, lithic wacke conglomerate and minor volcanics. The lowest fossiliferous horizons, from an unnamed formation which overlies the basal Isandula Conglomerate, outcrop along Isandula Road and contain *Penarosa* sp., *?Acadagnostus* sp. and an indeterminate pagetiid, which Jago & Brown (1989, p.81) considered to be of *A. atavus* Zone to *P. punctuosus* Zone age. Jell et al. (1985) have described three species of echinoderm from this area. Outcrops at Cateena Point, possibly from near the top of the same unit, contain *?Acadagnostis* sp., *?Amphoton* sp., an indeterminate corynexochid and an indeterminate solenopleurid. These are considered to be of *G. nathorsti* Zone age by Jago (1979)

The Radfords Creek Group, which probably conformably overlies the Cateena Group, consists of several hundred metres of mudstone, lithic wacke and minor volcanics with

conglomerate at the base. A fauna from several hundred metres above the base, in Sugarloaf Gorge, contains *Pianaspis? leveni, Hypagnostus brevifrons, Pseudophalacroma ?dubium, Goniagnostus (Allobodochus) ?spiniger, Lejopyge ?laevigata, Lejopyge armata, Diplagnostus* sp. and *Paraclavagnostus nevel.* These are considered to indicate an age of early *L. laevigata* Zone.

What appear to be the stratigraphically highest fossils within the Dial Range Trough come from Riana. They occur in a siltstone within 120-200m of the top of the Radfords Creek Group. In the Riana area the Radfords Creek Group is unconformably overlain by the Duncan Conglomerate, the oldest unit of the Denison Group correlate. Most of the fossils listed below come from a quarry (lat. 41° 13.0'S, long.146°00.2'E) with the majority of fossils being found in laminae of slightly coarser siltstone. The trilobites include *Clavagnostus burnsi, Aspidagnostus* sp., *Proagnostus* sp., *Tasagnostus* sp., *Nepea* sp., *Bolaspidella* sp. *Amphoton* sp. and Proasaphiscidae gen. et sp. nov. and indicate an age probably in the younger part of the range from late *L. laevigata* Zone to *A. quasivespa* Zone (Bao, 1995).

Fossey Mountain Trough

The Fossey Mountain Trough is the latitudinal extension of the Dundas Trough which curves round the northern margin of the Tyennan Block. The succession here is poorly understood and consists of a sequence of greywacke, mudstone, chert on the northern side of the trough and acid to basic volcanics of the Mount Read Volcanics along the southern margin. The relationships of the various Cambrian rock units are obscure (Jennings, 1979).

There is a rich, well preserved late Middle Cambrian fauna at the western end of the Fossey Mountain Trough at Native Track Tier, the geology of which area was described in Seymour (1989). Baillie & Jago (in Seymour, 1989, p.147) note that the fossils come from within a mixed succession of felsic igneous and sedimentary rocks. Trilobites present include *Nepea* sp., *Fuchouia* sp., *Proagnostus* sp., *Valenagnostus banksi, Clavagnostus burnsi, Tasagnostus* sp., *Innitagnostus* sp., *'Peronopsis'* sp. and *Aspidagnostus* sp. (Bao, 1995). These forms indicate an age of *Erediaspis eretes* Zone to *Acmarhachis quasivespa* Zone

Jago (1979) noted the presence of two poorly known faunas of probable Late Cambrian age from the central part of the Fossey Mountain Trough. In addition to these faunas, there is now a rich late Middle Cambrian fauna known from near Paradise. The fauna occurs within thin (<10m thick) lenses of tuffaceous siltstone from within a sequence of volcanics (mainly felsic lavas and porphyries). Agnostoid trilobites include *Diplagnostus* sp. *Valenagnostus* sp., *Goniagnostus (?Allobodochus)* sp., *?Lejopyge* sp., *?Hypagnostus* sp., *'Peronopsis'* sp. and others. Polymerids include *Nepea* sp. and *Amphoton* sp. These suggest an age of early *L. laevigata* Zone.

Beaconsfield Area

Folded Lower Palaeozoic rocks outcrop over a small area of about 50 km^2 near Beaconsfield. This belt consists mainly of Cambrian slates and Ordovician sediments in four imbricate

thrust slices (Gee & Pike, 1974, p.23). The Cambrian unit is unnamed and consists of slate, slaty siltstone and greywacke. Poorly preserved Cambrian fossils have been found only in the easternmost of the thrust slices. Jago (1980, 1981) has recorded the following trilobites from about 140m below the contact with the overlying Lower Ordovician Cabbage Tree Formation. The fauna includes: Agnostoidea gen. et sp. indet., Solenopleuridae gen. et sp. indet., cf. *Erediaspis* sp., Damesellidae gen. et sp. nov. and *Nepea* sp. Jago (1980) considered these to indicate an age of Late Middle Cambrian, probably *G. nathorsti* to *L. laevigata* Zones.

This unnamed Cambrian succession is disconformably overlain by the Lower Ordovician Cabbage Tree Formation.

Smithton Synclinorium

The Smithton Synclinorium is a broadly triangular area of Late Proterozoic and Cambrian sedimentary and volcanic rocks within the Rocky Cape Block. The lowermost succession in the synclinorium overlies the ?Mesoproterozoic Rocky Cape Group unconformably and consists of conglomerate, sandstone, dolomite, chert and diamictite which are correlates of the probable Late Proterozoic Success Creek Group. These, in turn, are overlain conformably by diamictite, volcaniclastic lithic wacke, tholeiitic basalt and mudstone which are correlates of the Crimson Creek Formation. The relationship between this unit and the overlying Smithton Dolomite is considered to be possibly conformable (Brown, 1989, p.12). This sequence from the basal unconformity to the top of the Smithton Dolomite is known as the Togari Group (Everard et al., in press). The latter is considered to be overlain with probable disconformity, by siltstone, mudstone, greywacke, conglomerate and minor tuff of the late Middle to early Late Cambrian Scopus Formation (Everard, et al., in press). These Cambrian sedimentary rocks outcrop over large areas in the Smithton Synclinorium but fossils are known only at two localities, in the Christmas Hills and Scopus areas. There are two faunas found in close proximity to one another about 2.5km south of Christmas Hills (Jago & Buckley, 1971). The lower fauna contains *Clavagnostus milli, 'Peronopsis' gullini, Valenagnostus ?marginatus, Tasagnostus debori* and *Paraclavagnostus neglectus.* This indicates an age of *A. cassis* Zone. Immediately above is the upper fauna which contains *Clavagnostus* sp., *'Peronopsis' gullini, Hypagnostus brevifrons, Megagnostus ?glandiformis, Acidusus aculeatus, Goniagnostus(Allobodochus) spiniger, Diplagnostus ?planicauda* and *Tasagnostus debori.* This fauna is probably of *A. cassis* Zone to *P. agra* Zone age.

Further north, at Scopus, to the west of Smithton, in a thinly interbedded siltstone/sandstone sequence is a rich dendroid/trilobite fauna (Rickards et al. 1990) of late Idamean age (possibly *S. diloma* Zone). Dendroid taxa include species assigned to *Dendrograptus, Dictyonema, Aspidograptus, Desmograptus, Callograptus, Polygonograptus, Thallograptus, Mastigograptus* and *Archaeolafoea.* Trilobites include *Pseudagnostus idalis, Homagnostus* sp., *Kormagnostella* sp., *?Micragnostus* sp., *Corynexochus* sp., *?Nganasanella* sp., cf. *Olenus* sp. and *Stigmatoa* sp. An indeterminate aglaspidid is known for what is probably the same sequence at Stony Point about 7 km NW of Scopus (Jago and Baillie, 1992; Baillie and Jago, 1995).

Adamsfield Trough

This trough lies between the eastern margin of the Tyennan Block and the northwestern margin of the Jubilee Block (Fig. 1). The oldest fossiliferous unit in the area is the Trial Ridge Beds which is inferred to unconformably overlie probable Late Proterozoic sediments. It consists of a maximum of 500m of sediment which can be divided into three members, of which the upper and lower members are characterised by resistant conglomerate and sandstone. The middle member consists of micaceous siltstones and sandstones (Corbett, 1975; Brown & Turner in Brown et al., 1989) which are fossiliferous. Fossils include the trilobites *Lejopyge laevigata*, *Oidalagnostus* sp., *'Peronopsis'* aff. *ekip*, *Hypagnostus* sp., *Clavagnostus* sp., *Goniagnostus (Allobodochus) ?spiniger* and *Amphoton* sp., which indicate an age of early *Lejopyge laevigata* Zone (Jago et al. in Burrett & Martin, 1989, p.82; Jago & Brown, in prep.). Fossils of similar age are found further to the south in the Island Road and Boyd River Formations (Turner in Burrett & Martin, 1989, p.172).

Unconformably overlying the Trial Ridge Beds is the Denison Group, the basal unit of which is the Singing Creek Formation. This comprises about 700m of interbedded quartzwacke sandstone, laminated micaceous siltstone and siliceous conglomerate. Three faunas, all of similar age, have been found in the type area of the formation. The lowest fauna, from 185-240m above the base of the formation contains the trilobites *Oncagnostus ?tumidosus*, *Pseudagnostus idalis denisonensis*, *Denagnostus corbetti*, agnostid gen. et sp. indet., *Eugonocare* sp., Dokimocephalidae gen. et sp. indet. and *Proceratopyge* sp.(Jago, 1987) and the brachiopods *?Lingulella* sp. and *Billingsella* sp. (Jago, 1989). The middle fauna, from 410-430m above the base of the formation contains the trilobites *Denagnostus corbetti*, *Aphelaspis cantori*, *Proceratopyge gordonensis*, *Proceratopyge* sp., and *Pseudoyuepingia vanensis* (Jago, 1987) and the brachiopods *?Lingulella* sp. and *?Obolus* sp. (Jago, 1989). The upper fauna, from about 540-610m above the base of the formation contains the trilobites *Oncagnostus ?tumidosus*, *Pseudagnostus idalis denisonensis*, *Pseudagnostus idalis sagittus*, *Pseudagnostus* sp., *Denagnostus corbetti*, *Aphelaspis cantori*, *Proceratopyge gordonensis*, *Proceratopyge* sp. and leiostegioidean gen. et sp. indet.

Jago (1987, in Brown et al, 1989, p.50-51) believed these faunas to be of late Idamean age (i.e. *P. cryptica* to *S. diloma* Zones). Herein (see below) it is considered more likely that the faunas belong to the later part of this range (i.e. *S. diloma* Zone).

South of the Denison Range, in the Adamsfield, Clear Hill and Stepped Hills areas fossils have been found within correlates of the Singing Creek Formation (Brown in Brown et al., 1989, p.50). This group of localities is often characterised by the presence of some or all of the following: brachiopods *Eoorthis* sp., *Billingsella* sp., orthoid gen. et sp. nov. and trilobites ?*Prochuangia* sp., *?Toxotina* sp. (referred to *?Toxotis* by Jago in Brown et al, 1989, p.50), pagodiid gen. et sp. indet., and several other ptychoparioids. These indicate a probable age of early Idamean.

The Singing Creek Formation is conformably overlain by the Great Dome Sandstone, a unit composed of about 500 metres of quartz sandstone, conglomeratic sandstone and micaceous siltstone (Corbett, 1975). It contains abundant trace fossils, rare phosphatic brachiopods and

a gastropod, aff. *Kobayashiella* sp., suggesting a Late Cambrian age (Banks in Corbett, 1975; Brown et al., in Burrett & Martin, 1989, p.186).

The Great Dome Sandstone is apparently conformably overlain by the Reeds Conglomerate, a unit of over 1500m of quartzose conglomerate and sandstone (Corbett & Banks, 1974; Corbett, 1975). This formation contains only trace fossils and cannot be dated directly but, its stratigraphic position between underlying Late Cambrian units and the overlying Tremadoc to Arenig Squirrel Creek Formation places lower and upper limits on its age respectively (Corbett, 1975; Brown et al., in Burrett & Martin, 1989, p.186).

South Coast

In the Rocky Boat Inlet-Surprise Bay area the Cambrian sedimentary succession begins with serpentinitic conglomerate, sandstone and mudstone of the Tyler Creek Beds (Berry & Harley, 1983; Bischoff, 1983) which were considered to be Middle to Late Cambrian in age by Berry & Harley (1983, p.61). Bischoff (1983) suggested a correlation with the Trial Ridge Beds in the Adamsfield Trough. The only fossil found in the unit is a sponge spicule (Banks, 1959), which supports a Cambrian age for the unit.

Unconformably overlying the Tyler Creek Beds is the Point Vivian Formation, a unit of conglomerate, sandstone, siltstone, dolomitic siltstone and dolomite. This unit is sparsely fossiliferous, containing only the following brachiopods: obolid gen. et sp. indet., ?paterinid gen. et sp. indet. and ?billingsellid gen. et sp. indet.. These indicate a Middle to Late Cambrian age for the unit.

The Wierah Formation disconformably overlies the Point Vivian Formation and is composed mainly of conglomerate, conglomeratic sandstone, sandstone and siltstone. In one section there is a 30m thick nodular limestone near the base of the unit. Recorded from this unit are the trilobites *Lophosaukia* sp., *Prosaukia* sp., *Pagodia* sp. Asaphidae gen. et sp. indet., Pseudagnostinae gen. et sp. indet. and Agnostidae gen. et sp. indet. among others. These indicate a late Iverian age for the unit.

A fault-bounded block of a probable equivalent to the Wierah Formation contains the trilobites *Rhaptagnostus apsis*, *?Neoagnostus* sp., *"Innitagnostus" aff. medius*, Agnostidae gen et sp. indet.,*?Wuhuia* sp., aff. *Hapsidocare* sp., *Peichiashania* sp., *?Onchonotellus* sp. The presence of *Rhaptagnostus apsis* indicates that the fauna belongs to the early Iverian *Wentsuia iota/Rhaptagnostus apsis* Zone, broadly in agreement with its assumed equivalence to the Wierah Formation.

Concluding Remarks

Despite many years endeavour, the Cambrian biostratigraphy of Tasmania remains relatively poorly known. Without doubt, this is partly due to a combination of terrain and vegetation making access and discovery difficult, but it is also due to the limited number of personnel available for biostratigraphic research.

Several aspects of the Cambrian biostratigraphy of Tasmania immediately present themselves as obvious candidates for more detailed examination with the aim of being able to give a more precise date on their time of deposition. These are:

1. The Sticht Range Formation. This is presently dated as Middle Cambrian because of the discovery of two poorly preserved polymerid trilobites.
2. The Comstock Tuff. More extensive drilling in recent years should allow a more precise dating of the carbonate associated with this unit.
3. The Judith Formation. Original collections were lost or damaged in the BMR fire of 1953. Age determinations based on these collections need confirmation.

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Annotated List of Selected Cambrian Fossil Localities

The localities are named much as in previous revisions of Tasmanian Cambrian biostratigraphy (Jago, 1979; Banks, 1982; Jago & Brown in Burret & Martin, 1989, p.74; Jago, 1990).

The faunal lists below concentrate on trilobites because they are the best known and by far the most useful biostratigraphically. Faunal elements described or listed by various authors are recorded and revisions made subsequently by other workers or herein to any of the names are enclosed in square brackets immediately after the species being revised.

Comments setting out the reasoning for particular correlations are given for many localities. The correlation of a particular fauna to the northern Australian Cambrian biostratigraphic scale follows the comments, with that given by previous workers coming first, and that revised herein being included in square brackets immediately following.

Beaconsfield
Jago, 1980: Indet agnostid
cf. *Erediaspis* sp.
Nepea sp.
Jago, 1981: Damesellidae gen. et sp. indet.
Age: *Goniagnostus nathorsti* Zone to *Lejopyge laevigata* Zone

Birch Inlet: Bottom Fauna
Bao, 1995: *Micragnostus* sp.
agnostid gen. et sp. nov.
Charchaqia halli
Olenus sp.
Hedinaspis sp.

Birch Inlet: Middle Fauna
Bao, 1995: *Lotagnostus trisectus*
Micragnostus sp.
agnostid gen. et sp. nov.
Charchaqia halli
Olenus sp.
Proteuloma huochengensis
remopleuridioidean gen. et sp. indet.

Birch Inlet: Top Fauna
Bao, 1995: *Lotagnostus trisectus*
Micragnostus sp.
Micragnostus cf. *serus*
agnostid gen. et sp. nov.
Neoagnostus sp.
agnostid gen. et sp. indet.
cf *Naustia* sp.
Charchaqia halli
Charchaqia curvata

Charchaqia sp.
Proteuloma huochengensis
Skljarella sp.
Niobella sp.
Proceratopyge sp.
Parabolinella triarthra
Onchonotellus sp.
Cernuolimbus sp.
remopleuridioidean gen. et sp. indet.
Age: Payntonian to early Datsonian

Cateena Point
Jago, 1972c: *Peronopsis* sp.2 [=aff. *'Baltagnostus' rakuroensis*]
Jago & Brown, 1989: *Peronopsis* sp.
?Amphoton sp.
corynexochid indet.
solenopleurid indet.
Comments: *'Baltagnostus' rakuroensis* and its closely related forms *'B.' damesi* and *'B.' australis* (see Jell & Robison, 1978) are most like the form termed *Peronopsis* sp.2 by Jago (1972c). They are all of approximately *E. opimus* Zone age
Age: *Goniagnostus (Goniagnostus) nathorsti* Zone [*Euagnostus opimus* Zone]

Christmas Hills (Upper Fauna)
Jago & Daily, 1974: *Clavagnostus* sp.1
Jago, 1976b: *Peronopsis gullini* [=early *'Peronopsis' minor* group]
Hypagnostus cf. *brevifrons* [=*Hypagnostus brevifrons*]
Grandagnostus sp. [=*Megagnostus ?glandiformis*]
Ptychagnostus (Ptychagnostus) cf. *aculeatus* [=*Acidusus aculeatus*]
Ptychagnostus (Goniagnostus) buckleyi [=*Goniagnostus(Allobodochus) spiniger*]
Diplagnostus sp. [=*Diplagnostus ?planicauda*]
Tasagnostus debori
Jago & Brown, 1989: *Centropleura* sp.
Amphoton sp.
Pianaspis sp.
acrotretid brachiopods
Comments: *A. aculeatus* is known from the Lower *L. laevigata* zone of the western USA (Robison, 1984). It is also found in the *P. cassis* and *P. agra* Zones of northern Australia (Öpik, 1961) and the *Solenopleura brachymetopa* Zone in Sweden. *M. glandiformis* is also known from the *Solenopleura brachymetopa* Zone in Sweden. This zone encompases the early part of the range of *L. laevigata*. *Goniagnostus (Allobodochus) spiniger* is known from the *Proampyx agra* Zone of northern Australia (as *Ptychagnostus (Goniagnostus)* sp. *P.* aff. *nathorsti* by Öpik, 1961, p.84, pl.21, fig.1). In Sweden, *G.(A.) spiniger* is known from the "basal layer" of the *L. laevigata* Zone (Westergård, 1946, p.82). The morphological group referred to above as the *'Peronopsis' minor* group extends from the *G. nathorsti* to *L. laevigata* Zones in Sweden. Present information suggests that the earlier forms of this group have a narrower axis than the later forms. The presence of one of the earlier forms in this fauna suggests an age of early *L. laevigata* zone at the youngest. *Diplagnostus planicauda* is found in the *Solenopleura brachymetopa* Zone in Sweden as is *Hypagnostus brevifrons*.
Age: *Lejopyge laevigata* I or II Zone [Early *Lejopyge laevigata* Zone]

Christmas Hills (Lower Fauna)
Jago & Daily, 1974: *Clavagnostus milli*
Jago, 1976b: *Peronopsis gullini* [=early *'Peronopsis' minor* group]
Valenagnostus brittoni [=*Valenagnostus ?marginatus*]
Tasagnostus debori
Utagnostus neglectus [=*Paraclavagnostus neglectus*]
Jago & Brown, 1989: *Nepea* sp.
agraulids
phosphatic brachiopods
Recorded herein: *"Proampyx"* (sensu Öpik, 1961) sp.
Dorypyge sp.
Comments: The morphological group to which *'P.' gullini* belongs is the early *'Peronopsis' minor* group which extends from the *G. nathorsti* to *L. laevigata* Zones in Sweden. Present information suggests that the earlier forms of this group have a narrower axis than the later forms. The presence of one of the earlier forms in this fauna suggests an age of early *L. laevigata* zone at the youngest. Jago (1976b) differentiated *Valenagnostus brittoni* from *Valenagnostus marginatus* on the basis of the narrower pygidial border of the former. However, specimens of similar size have borders of similar width, as a consequence the two species may be synonymous. *V. marginatus* is known from the *T. lundgreni-G. nathorsti* Zone and the *Solenopleura brachymetopa* Zone in Sweden. *Clavagnostus* cf. *milli* has been recorded from north Greenland in the early *L. laevigata* Zone. Furthermore, *Clavagnostus trispinus*, which may be a synonym of *C. milli* is known from the early *L. laevigata* Zone of China.
Age: *Lejopyge laevigata* I Zone [Early *Lejopyge laevigata* Zone]

Denison Range (Top Fauna)
Jago, 1987: Singing Creek Formation, 540-610m above base
Micragnostus sp.1 [=*Oncagnostus ?tumidosus*]
Pseudagnostus idalis denisonensis
Pseudagnostus cf. *idalis sagittus*
Pseudagnostus sp.
Denagnostus corbetti
Aphelaspis cantori
Proceratopyge gordonensis
Proceratopyge sp.
Leiostegiacea gen. et sp. indet.
Comments: The distinctive agnostoid *Oncagnostus tumidosus* is known extensively from North America from the *Dunderbergia* and *Elvinia* Zones. This indicates an age of *S. diloma* to *I. tropica* Zones. Furthermore, the subspecies *Pseudagnostus idalis sagittus* is also restricted to the *S. diloma* Zones in northern Australia.Therefore, an age of *S. diloma* Zone is considered most likely for the above assemblage.
Age: *Proceratopyge cryptica* Zone to *Stigmatoa diloma* Zone [*Stigmatoa diloma* Zone]

Denison Range (Middle Fauna)
Jago, 1987: Singing Creek Formation, 410-430m above base
Denagnostus corbetti
Aphelaspis cantori
Proceratopyge gordonensis

Proceratopyge sp.
Pseudoyuepingia vanensis
Age: *Proceratopyge cryptica* Zone to *Stigmatoa diloma* Zone [*Stigmatoa diloma* Zone]

Denison Range (Bottom Fauna)
Jago, 1987: Singing Creek Formation, 185-240m above base
Micragnostus sp.2 [=*Oncagnostus ?tumidosus*]
Pseudagnostus idalis denisonensis
Denagnostus corbetti
Agnostoid gen. et sp. indet.
Eugonocare sp.
Dokimocephalidae gen. et sp. indet.
Proceratopyge sp.
Comments: The distinctive agnostoid *Oncagnostus tumidosus* is known extensively from North America from the *Dunderbergia* and *Elvinia* Zones. This coupled with the restriction of the species *Pseudagnostus idalis* to the Idamean (i.e. from *G. reticulatus* to *S. diloma* Zones) indicates an age of *S. diloma* Zone for the above assemblage.
Age: *Proceratopyge cryptica* Zone to *Stigmatoa diloma* Zone [*Stigmatoa diloma* Zone]

Grieve's Tram (Professor Range)
Pseudagnostus sp.
Rhaptagnostus sp.
Hedinaspis sp.
Asaphiscid gen. et sp. indet.
Age: early Iverian (*Wentsuia iota/Rhaapatagnostus apsis* to *Peichiashania tertia/Peichiashania quarta* Zones)

Higgins Creek Area
Jell, Hughes & Brown, 1991:
Locality 1: *Acmarhachis?* sp. [=*Acmarhachis ?hybrida*]
Micragnostus cf. *intermedius*
effaced Pseudagnostid
Rhaptagnostus mji [=*Pseudagnostus mortensis*]
Proceratopyge cf. *gordonensis*
Asiocephalus latosuggrundus
Olenus apoxysomatus
Comments: *Acmarhachis hybrida* and *Pseudagnostus mortensis* are known from the *Wentsuia iota/Rhaptagnostus apsis* Zone of northern Australia.
Age: post-Idamean [Early Iverian, *Wentsuia iota/Rhaptagnostus apsis* Zone]

Locality 2: *Pseudagnostus* sp. [=*Pseudagnostus* aff. *idalis*]
Asiocephalus latosuggrundus
Olenus apoxysomatus
Wujiajiania distortus
Comments: *Wujiajiania distortus* is similar in most respects to the single cranidium assigned to *Plicatolina* aff. *yakutica* by Shergold (1980, p.58) and found in the *W. iota/R. apsis* Zone. *Pseudagnostus idalis* is only known from the Idamean in northern Australia
Age: post-Idamean [Early Iverian, ?*Wentsuia iota/Rhaptagnostus apsis* Zone]

Locality 3: *Pseudagnostus* sp. [=*Pseudagnostus* aff. *idalis* + ?*Rhaptagnostus* aff. *impressus*]
Olenus apoxysomatus
Wujiajiania distortus
Comments: *Pseudagnostus idalis* is only known from the Idamean in northern Australia. The specimens referred to ?*Rhaptagnostus* aff. *impressus* above are very similar in many respects to those assigned to *Rhaptagnostus* cf. *impressus* by Shergold (1980) and found in the *Wentsuia iota/Rhaptagnostus apsis* Zone
Age: post-Idamean [Early Iverian, possibly *Wentsuia iota/Rhaptagnostus apsis* Zone]

Locality 4: *Cermatops thalasta*

Locality 5: Pseudagnostid indet.
Proceratopyge cf. *gordonensis*
Olenus apoxysomatus
Chekiangaspis concavus
Aphelaspis sp.

Locality 6: *Proceratopyge* cf. *gordonensis*

Locality 7: *Pseudagnostus (Sulcatagnostus)* sp. [=?*Agnostotes tianshanicus*]
Olenus apoxysomatus
Wujiajiania distortus
Comments: *Agnostotes tianshanicus* is known from Xinjiang Province in China and gives its name to the lowest Zone in the Guozigou Formation (Xiang & Zhang, 1985). This is considered to correlate with the *Irvingella tropica* Zone of northern Australia.
Age: post-Idamean [Early Iverian, possibly *Irvingella tropica* Zone]

Locality 8: *Neoagnostus clavus* [*Neoagnostus* sp.]
Rhaptagnostus convergens [*Rhaptagnostus* sp.]
Proceratopyge cf. *gordonensis*
Cermatops thalasta
Comments: It is difficult to assign single distorted specimens with certainty to any species of pseudagnostoid, and it is considered better to leave those above under open nomenclature. However, the co-occurrence of these two genera indicates an age of *W. iota/R. apsis* Zone or later.
Age: post-Idamean [Iverian, *Wentsuia iota/Rhaptagnostus apsis* Zone to *Rhapatagnostus clarki maximus/Rhapatagnostus papilio* Zone]

Locality 9: *Lotagnostus tullahensis* [aff.*Eolotagnostus* sp.]
Rhaptagnostus mji [=*Pseudagnostus mortensis*]
Proceratopyge cf. *gordonensis*
Cermatops thalasta
Wujiajiania distortus
Aphelaspis sp.
Conokephalinidae indet.
Aposolenopleura sp.
Comments: *Pseudagnostus mortensis* is known from the *Wentsuia iota/Rhaptagnostus apsis* Zone of northern Australia (Shergold, 1980). *Cermatops* is only known from the *Wentsuia*

iota/Rhaptagnostus apsis and *Peichiashania secunda/Prochuangia glabella* Zones of northern Australia. *'Lotagnostus' tullahensis* does not belong to *Lotagnostus* but its relationships are obscure, having similarities to *Innitagnostus*, *Eolotagnostus* and *'Agnostus' captiosus*.
Age: post-Idamean [Early Iverian, probably *Wentsuia iota/Rhaptagnostus apsis* Zone]

Huskisson River (GDS)
Jago, 1974a: *Glyptagnostus reticulatus*
Age: *Glyptagnostus reticulatus* Zone

Isandula Road (1)
Burns in Banks (1962): *?Amphoton*
Nepea
Age: *Triplagnostus gibbus* Zone (Burns, 1964)

Isandula Road (2, quarry)
Jago, 1972c: Peronopsis sp.1 [=*Acadagnostus* sp.]
Jago, 1973: *Penarosa* sp.
Peronopsis sp.
pagetiid indet.
Jell et al., 1985: *Cambraster tastudorum*
Cambraster cf. *tastudorum*
Ctenocystis jagoi
Comments: *Peronopsis* sp.1 seems to be a member of *Acadagnostus* [recently revised by Robison, 1995; =*Axagnostus* Laurie, 1990], consequently the age given by Jago (1973) is acceptable.
Age: *Acidusus atavus*, *Euagnostus opimus* or *Ptychagnostus punctuosus* Zones

Isandula Road (3)
Banks, 1982: *Nepea*
Age: Middle Cambrian

Isandula Road (4)
Banks, 1982: *?Fuchouia* sp.
Age: Middle Cambrian

Isandula Road (5)
Banks, 1982: *Anomocarella* sp.
Nepea sp.
Age: *Acidusus atavus*, *Euagnostus opimus* or *Ptychagnostus punctuosus* Zone

Location 1079 [CP723762] (Unit 14 of Taylor, 1954)
Clarke, in Brown, 1986; Jago & Brown, 1992: *Glyptagnostus reticulatus*
indet. agnostid
Age: *Glyptagnostus reticulatus* Zone

Location 1143 [CP715766] (Unit 18 of Taylor, 1954)
Clarke, in Brown, 1986: *Pseudagnostus idalis*
Glyptagnostus reticulatus

Jago & Brown, 1992: *Agnostus (Homagnostus)* sp.
Pseudagnostus (Pseudagnostus) idalis huskissonensis
Glyptagnostus reticulatus
Age: *Glyptagnostus reticulatus* Zone

Location 1197 [CP712770] (Unit 18 of Taylor, 1954)
Clarke, in Brown, 1986: *Pseudagnostus idalis*
Glyptagnostus reticulatus
Jago & Brown, 1992: *Glyptagnostus reticulatus*
agnostid gen. et sp. indet.
Age: *Glyptagnostus reticulatus* Zone

MR1 (Merton Road, CP679793)
Brown, 1986, p.52: no faunal list
Jago & Brown, 1989, p.79: *Ptychagnostus* sp.[*Onymagnostus barrandei*]
Diplagnostus sp.
phosphatic brachiopods
Recorded herein
Pseudophalacroma ?dubium
Age: Undillan to Boomerangian (Jago, in Brown, 1986)

Misery Hill
Jago & Corbett, 1990: *Diemanosaukia miserabilis*
Saukia? blissetti
monoplacophora
phosphatic brachiopods
Age: probably Payntonian

Murchison Highway (Upper Fauna)
Jago, 1978: *Agnostus* sp. [=?*Micragnostus* aff. *intermedius*]
Lotagnostus? sp. [indet. agnostoid]
Peltura? sp. [?=*Wujiajiania distorta*, see Jell et al, 1991]
Age: early post-Idamean [Iverian *Wentsuia iota/Rhaptaagnostus apsis* Zone to *Peichiashania tertia/Peichiashania quarta* Zone]

Murchison Highway (Lower Fauna)
Jago, 1978: *Agnostus* sp. [=?*Micragnostus* aff. *intermedius*]
Neoagnostus sp. [=*Neoagnostus (Neoagnostus)* sp. + *Pseudagnostus (Pseudagnostus)* sp.]
Olenus sp.
Ceratopygidae gen. et sp. indet. [?=*Proceratopyge gordonensis*, see Jell et al, 1991]
Trilobita incertae sedis specimen 3 [=*Cermatops thalasta*, see Jell et al, 1991]
Trilobita incertae sedis specimen 2 [=*Cermatops thalasta*, see Jell et al, 1991]
Comments: The illustrated pygidia assigned to *Neoagnostus* sp. fall into two groups. One is probably referrable to *Neoagnostus (Neoagnostus)* and is represented by a more quadrate pygidium with the axial furrows effaced about the posteroaxis (Jago, 1978, Pl. 2, figs 11, 12). The other probably belongs to *Pseudagnostus (Pseudagnostus)* and has the axial furrows outlining the anterior half of the posteroaxis and a more rounded posterior margin between the posterolateral spines. Shergold (pers. comm., 6/2/95) considers this to belong to the *P. communis* group. The range of the genus *Neoagnostus* in northern Australia is from

the *W. iota/R. apsis* Zone to the *N. quasibilobus/T. nomas* Zone (Shergold et al., 1990), whereas that for *Pseudagnostus (Pseudagnostus)* is from the *E. eretes* Zone to the *P. tertia/P. quarta* Zone. Therefore the range of age for this assemblage is from the *W. iota/R. apsis* Zone to the *P. tertia/P. quarta* Zone, i.e. early to middle Iverian.
Age: early post-Idamean [*Wentsuia iota/Rhaptagnostus apsis* Zone to *Peichiashania tertia/Peichiashaania quarta* Zone]

Native Track Tier [DQ 140218]
Bao, 1995: *Valenagnostus banksi*
Clavagnostus burnsi
Tasagnostus sp.
Innitagnostus sp.
Proagnostus sp.
'Peronopsis' sp.
Aspidagnostus sp.
Fuchouia sp.
Nepea sp.
Age: *Lejopyge laevigata* III Zone to *Acmarhachis quasivespa* Zone

Newton Creek Fauna
Proceratopyge sp.
agnostid gen. et sp. indet.
polymerid gen. et sp. indet.
Billingsella sp.
Eoorthis sp.
Age: late Idamean to Iverian

Northeast Dundas Tram (Black Hill Section, RB Fauna)
Jago, 1972c: *Kootenia* sp
Peronopsis (?) sp.1
Hypagnostus sp.
Ptychagnostus (Ptychagnostus) hodgei [=*Ptychagnostus affinis*]
Ptychagnostus (Ptychagnostus) sp. [=*?Aotagnostus* sp.]
Ptychagnostus (Goniagnostus) rubenacha [=*Goniagnostus (Goniagnostus)* sp.]
Ptychagnostus (?) sp.1 [=*Doryagnostus incertus* or *D. deltoides*]
Diplagnostus sp.1
Agnostid gen. et sp. indet. 5 [=?Diplagnostoid]
Agnostid gen. et sp. indet. 6
Jago & Brown (in Burrett & Martin, 1989): *Pianaspis* sp.
Comments: The presence of *Doryagnostus* sp (either *D. incertus* or *D. deltoides*) and *Goniagnostus (Goniagnostus)* sp. indicates an age of *P. punctuosus* to *G.(G.) nathorsti* Zone, that of *Ptychagnostus affinis* indicates an age of *P. punctuosus* to *D. deltoides* Zone.
Age: *Goniagnostus (Goniagnostus) nathorsti* Zone (Jago, 1979)[*Ptychagnostus punctuosus* to *Doryagnostus deltoides* Zone]

Paradise Fauna
Goniagnostus (?Allobodochus) sp.
'Peronopsis' aff. *ekip*
Diplagnostus sp.

Oidalagnostus sp.
?Hypagnostus sp.
agnostoid gen. et sp. indet.
?Nepea sp.
dolichometopid gen. et sp. indet.
Age: Early *Lejopyge laevigata* Zone

PR1 (Mudstone, CP682788)
Jago in Brown, 1986, p.52: *Ptychagnostus* spp.
Diplagnostus sp.
Grandagnostus sp.
indet agnostid
Age: possible *Lejopyge laevigata* I-III Zone

PR1 (Sandstone, CP682788)
Jago in Brown, 1986, p.52: *Peronopsis* sp.
dolichometopid
dorypygid
Age: possible *Lejopyge laevigata* I-III Zone

Que River
Jago, 1977: *Hypagnostus* aff. *parvifrons* [=*Hypagnostus ?parvifrons*]
Grandagnostus? sp.
cf. *Valenagnostus* sp.
Ptychagnostus (Ptychagnostus) stenorrhachis [=*Onymagnostus hybridus*]
Ptychagnostus? murchisoni [=*Onymagnostus ?barrandei*]
Diplagnostus sp. [=*Diplagnostus floralis*]
cf. *Kormagnostus* sp.
Comments: *Onymagnostus hybridus* is known from the *Hypagnostus parvifrons* Zone and possibly the *Ptychagnostus punctuosus* Zone in Sweden, the *P. punctuosus* Zone in western North America and from the *Acidusus atavus* Zone and *P. punctuosus* Zone in Greenland (Robison, 1984). *Onymagnostus barrandei* is known from the *A. atavus* Zone in Sweden (as *O. convexus*) and the *A. atavus* Zone and *P. punctuosus* Zone as *O. ciceroides* in Newfoundland (Robison, 1994). *Diplagnostus floralis* is known from the late *Euagnostus opimus* Zone to early *P. punctuosus* Zone of northern Australia (Öpik, 1979).
Age: *Ptychagnostus punctuosus* to *Goniagnostus (Goniagnostus) nathorsti* Zones [*Euagnostus opimus* to *Ptychagnostus punctuosus* Zones]

Riana Quarry
Jago & Daily, 1974: *Clavagnostus burnsi*
Jago & Brown, 1989: *Ferenepea* sp.
Aspidagnostus sp.
Bao, 1995: *Aspidagnostus* sp.
Proagnostus sp.
Tasagnostus sp.
Nepea sp.
Bolaspidella sp.
Amphoton sp.
Proasaphiscidae gen. et sp. nov.

Age: *Lejopyge laevigata* to *Acmarhachis quasivespa* Zones

Scopus (CQ335806)
Rickards et al., 1990: *Pseudagnostus idalis*
Homagnostus sp.
Kormagnostella sp.
?Micragnostus sp.
Corynexochus sp.
?Nganasanella sp.
cf. *Olenus* sp.
Stigmatoa sp.
Ceratopygidae gen et sp. indet.
Age: *?Stigmatoa diloma* Zone

St Valentines Peak
Jago, 1972a: *Opsidiscus argusi* [=*Helepagetia argusi*, see Jell, 1975]
Schmalenseeia gostinensis
Jago & Daily, 1974: *Clavagnostus? rawlingi*
Jago, 1976b: *Peronopsis ekip* [=late *'Peronopsis' minor* group]
Valenagnostus banksi
Aspidagnostus sp.
Tasagnostus compani [=*Oidalagnostus personatus*]
Utagnostus? sp. [=*Paraclavagnostus* sp.]
Bao, 1995: *Proagnostus* sp.
Nepea sp.
Amphoton sp.
Bathyuriscus sp.
?Leichneyella sp.
Proasaphiscidae gen. et sp. nov.
Comments: *Clavagnostus? rawlingi* is similar in most respects to species assigned to *Clavagnostus (Leptagnostus)* by Lu & Lin (1989) from the *Lejopyge armata* Zone
The morphological group referred to above as the *'Peronopsis' minor* group extends from the *G. nathorsti* to *L. laevigata* Zones in Sweden. Present information suggests that the earlier forms of this group have a narrower axis than the later forms. The presence of one of the later forms in this fauna suggests an age of *L. laevigata* Zone at the oldest. *V. marginatus* is known from the *T. lundgreni-G. nathorsti* Zone and the *Solenopleura brachymetopa* Zone in Sweden. *Oidalagnostus personatus* is known from the *Lejopyge armata* Zone in China and from the *L. laevigata* II Zone in northern Australia.
Age: *Lejopyge laevigata* III to *Damesella torosa-Ascionepea janitrix* Zone [*Lejopyge laevigata* II Zone?]

Sugarloaf Gorge W1
Jago & Daily, 1974: *Clavagnostus* sp. 2
Jago, 1976a: *Valenagnostus* sp.
Aspidagnostus sp.
Agnostascus sp. [=*Proagnostus* sp.]
Herein: *Nepea* sp.
Age: *Lejopyge laevigata* III to *Damesella torosa-Ascionepea janitrix* Zone

Sugarloaf Gorge (Unit 13)
Jago, 1974b: *Pianaspis? leveni*
Jago, 1976a: *Hypagnostus* cf. *brevifrons* [=*Hypagnostus brevifrons*]
Pseudophalacroma? sp. [=*Pseudophalacroma ?dubium*]
Ptychagnostus (Goniagnostus) sp. [=*Goniagnostus (Allobodochus) ?spiniger*]
?Lejopyge laevigata
Lejopyge laevigata armata [=*Lejopyge armata*]
Diplagnostus sp.
Utagnostus? nevel [=*Paraclavagnostus* sp.]
Comments: *Hypagnostus brevifrons* is known from the *Solenopleura brachymetopa* Zone in Sweden and (Westergård, 1946) from the *L. armata* Zone in China. *Pseudophalacroma dubium* is known from the *L. laevigata* Zone in northern Australia. In Sweden, *G.(A.) spiniger* is known from the "basal layer" of the *L. laevigata* Zone (Westergård, 1946, p.82). L. armata is known from the *L. laevigata* Zone in Sweden, where it is most common in the 'basal layer'.
Age: *Lejopyge laevigata* II or III Zone [early *Lejopyge laevigata* Zone]

Sugarloaf Gorge (Unit 15)
Jago, 1976a: *Tasagnostus* sp. [=*Tasagnostus ?debori*]
Age: Late Middle Cambrian

Tom Creek
Jago, 1986: *Agnostardis* sp.
Aulacodigma sp.
Age: *Glyptagnostus stolidotus* Zone

Trial Ridge
Jago, Brown & Turner, 1979: *Tasagnostus* sp. [*Oidalagnostus* sp.]
Hypagnostus sp.
Clavagnostus sp.
Goniagnostus sp. [*Goniagnostus (Allobodochus) ?spiniger*]
Herein: *Lejopyge laevigata*
'Peronopsis' aff. *ekip*
Amphoton sp.
Papyriaspidae gen. et sp. indet.
Age: *Lejopyge laevigata* Zone [Early *Lejopyge laevigata* Zone]

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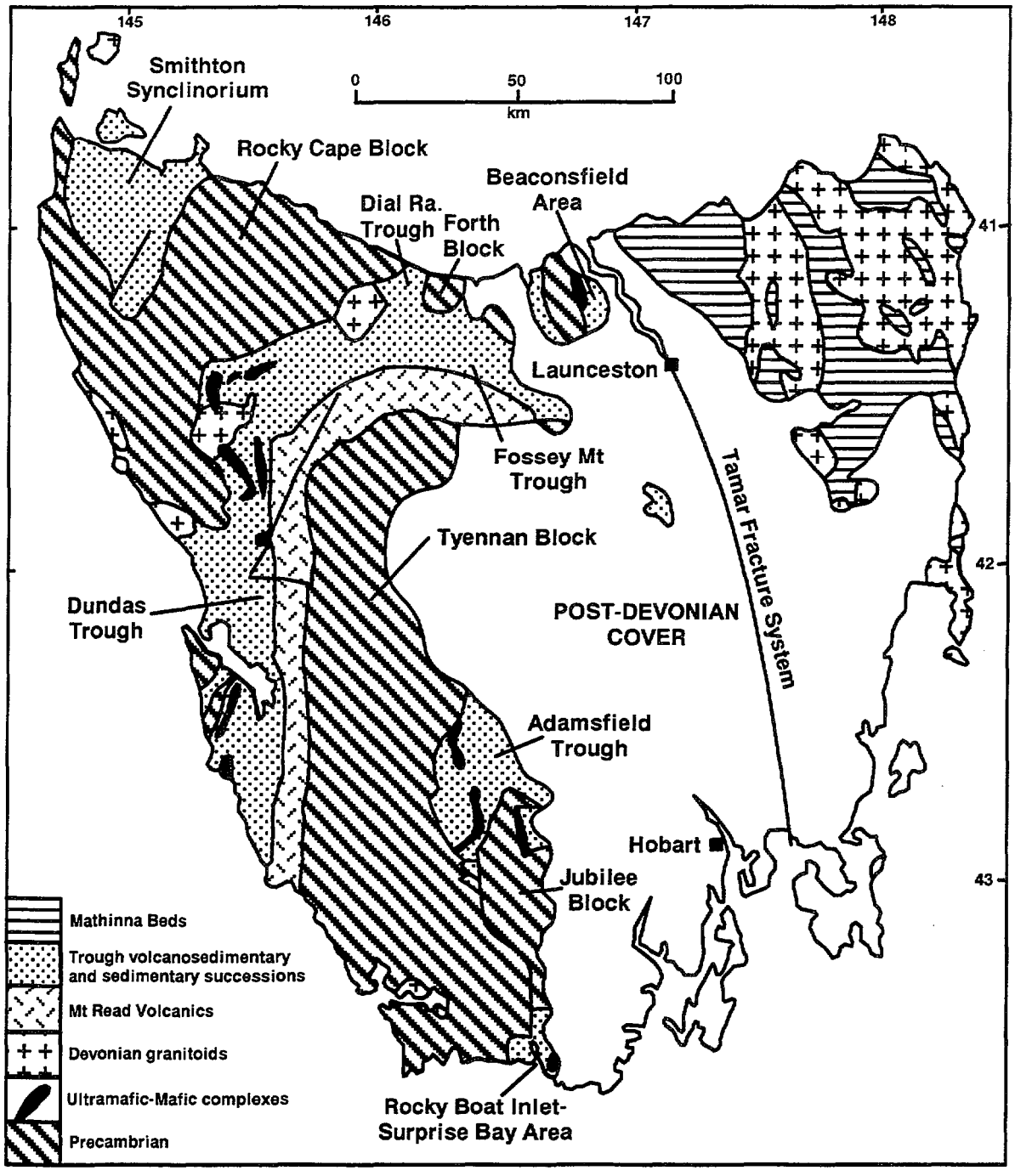

Figure 1. Simplified geological map showing distribution of tectonic elements of western Tasmania. Most of the Ordovician to Devonian cover rocks in western Tasmania are not shown. Simplified from Corbett & Turner (in Burrett & Martin, 1989, p.155).

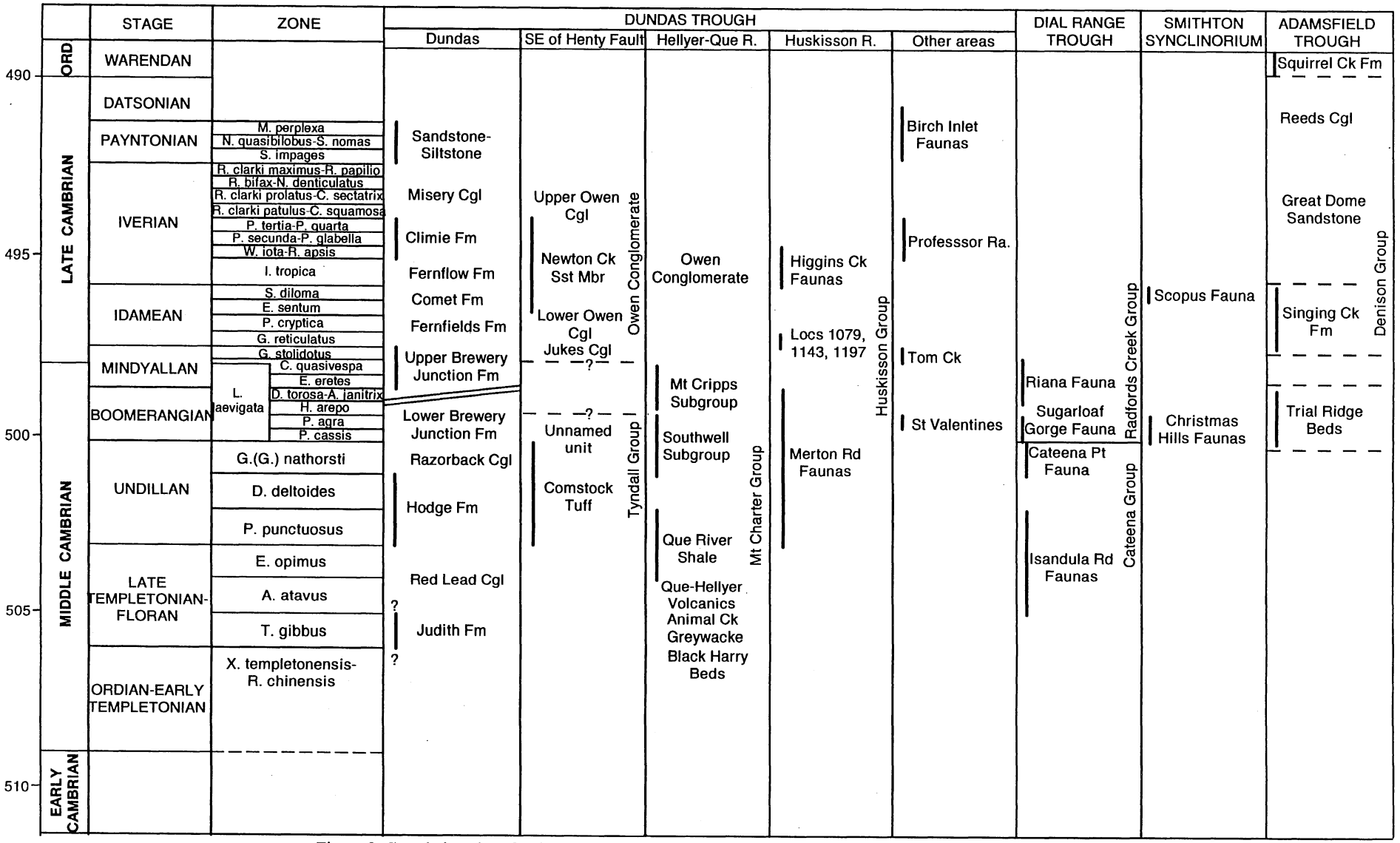

Figure 2. Correlation chart for the major Middle and Late Cambrian successions of Tasmania. The temporal scale, and the stadial and zonal schemes are taken from the recent compilation by Shergold (1995). The vertical lines in the stratigraphic columns indicate the range of possible correlation of the unit or fossil locality concerned. Fossey Mountain Trough and Beaconsfield Area are not illustrated because of a paucity of information.