Section 5: Palaeontology

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40. The fauna and age of Malbina A

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In its type area in S Tasmania (fig. 45) the Malbina Formation (Banks and Read, 1962) comprises a characteristic sequence of siltstone and sandstone which is readily distinguished from the essentially calcareous Cascades Group below, and the essentially ill-sorted mudstone of the Ferntree Group above. Elsewhere in Tasmania away from the Mt Nassau section the Cascades Group, the Malbina Formation and, to a lesser extent, the Ferntree Group show rapid lateral facies changes and soon cease to exist in their true definition as lithological groupings. The correlation of Permian sequences outside the Hobart area must therefore rest with palaeontological criteria.

The Cascades Group is richly fossiliferous and its fauna includes *Anidanthus springsurensis* (Booker), *Cancrinella farleyensis* (Etheridge and Dun), *Taeniothaerus subquadratus* (Morris), strongly auriculate *Terrakea* of the *T. pollex* Hill group, *Wyndhamia jukesi* (Etheridge), *W. preovalis* (Maxwell), *Grantonia hobartensis* Brown, *Martiniopsis ovata* (Campbell) and *M. profunda* (Campbell). This fauna may be readily correlated with that of the Cattle Creek Formation, Middle Bowen Beds, Queensland (Banks, 1957 *et seq.*) which is Fauna II (Dickins, 1964), and with the fauna of the Farley Formation in New South Wales (Dickins, 1968; Runnegar, 1969). Unfortunately for the most part the Malbina Formation is poorly fossiliferous. However, near its base Member A yields *Stenopora crinita* Lonsdale and *Wyndhamia dalwoodensis* Booker, and towards its top Member E yields a rich fauna which includes *Terrakea brachythaera* (Morris), *Wyndhamia ovalis* (Maxwell), *Stenopora crinita* Lonsdale (Banks and Read, 1962; Banks, 1962), *Astartila intrepida* Dana, *Megadesmus grandis* (Dana), *Myonia carinata* (Morris), *M. corrugata* Fletcher, *Vacunella curvata* (Morris) (Runnegar, 1967), *'Spirifer' duodecemcostatus* M'Coy (Armstrong, 1968), and *Martiniopsis undulosa* (Campbell), so that Member A has been correlated with the Branxton Sub-Group in New South Wales and the Ingelara Formation in Queensland, and Member E with the Mantuan Productus Bed in Queensland (Banks and Read, 1962; Banks, 1962). The Ferntree Group is sparsely fossiliferous. The sole definitive fauna recorded to date is that from about 200 ft below its summit at Blackmans Bay about 12 miles S of Hobart (Runnegar, 1967). The fauna includes *Astartila intrepida* Dana, *Megadesmus grandis* (Dana) and *Vacunella curvata* (Morris). *Merismopteria macroptera* (Morris) also occurs at this locality. As noted by Runnegar (*op. cit.*) this fauna is not significantly younger than that of Malbina E which is best correlated with the Peawaddy Formation and its equivalents in Queensland.

Two very diverse, post-Fauna II and apparently pre-Fauna IV faunal assemblages from the Beaconsfield and Friendly Beaches areas in N and E Tasmania respectively, were briefly listed and discussed in Clarke (1969). In that paper both assemblages were correlated with the Ulladulla Fauna as developed on the S coast of New South Wales (Runnegar, 1969), and by implication, with

the fauna of Malbina A of the Mt Nassau section. In order to clarify this suggested correlation with the Mt Nassau section it has been necessary to investigate the faunas of the Cascades Group and Malbina A in their type area.

At the base of the Cascades Group the Nassau Siltstone contains a rich fauna of which *Cancrinella farleyensis* (Etheridge and Dun), *Wyndhamia preovalis* (Maxwell), *Grantonia hobartensis* Brown and *Martiniopsis ovata* (Campbell) are the most important. Characteristic fossils from the Berriedale Limestone include *Anidanthus springsurensis* (Booker), *Cancrinella farleyensis* (Etheridge and Dun), *Taeniothaerus subquadratus* (Morris), strongly auriculate *Terrakea* of the *T. pollex* Hill group, *Wyndhamia jukesi* (Etheridge), *Grantonia hobartensis* Brown, *Martiniopsis ovata* (Campbell), *M. profunda* (Campbell), *M. profunda valida* (Campbell), *Deltopecten limaeformis* (Morris), *Eurydesma hobartensis* (Johnston), *E. sacculum* Dana, *Stenopora crinita* Lonsdale and *Lyroporella*. The Grange Mudstone contains a similar fauna including *Stenopora crinita* Lonsdale, *Cancrinella farleyensis* (Etheridge and Dun), *Wyndhamia jukesi* (Etheridge), *Grantonia hobartensis* Brown, *G. cracovensis* Wass and *Deltopecten limaeformis* (Morris). In addition *Taeniothaerus* and *Eurydesma hobartensis* (Johnston) are listed by Runnegar (1969) but it is not made clear whether these specimens are from the Mt Nassau section. Overall the fauna of the Cascades Group can be wholly and confidently assigned to Fauna II.

By way of contrast Malbina A is sparsely fossiliferous. However, a surprisingly varied and well-preserved fauna has been obtained following persistent collecting over the outcrop between Rayner and Geiss Creeks (fig. 45). The fossils are restricted to the lowest 50-60 ft of the unit and tend to occur in pockets; they include:

Acanthopecten sp.
Megadesmus sp.
Merismopteria cf. *carrandibbiensis* (Dickins)
Stutchburia cf. *costata* Morris
Vacunella curvata (Morris)
Walnichollsia sp. nov.
Stenopora crinita Lonsdale
Fletcherithyris parkesi Campbell
?*Fusispirifer* sp.
Grantonia hobartensis Brown
Martiniopsis sp. nov. A (similar to *M. undulosa* (Campbell) but crural plates short and low)
Martiniopsis sp. nov. B (similar to *M. magna* (Campbell) but umbo sharper and crural plates short and low)
Martiniopsis sp. nov. C (similar to *M. profunda* (Campbell) but more transverse and ventral umbonal lateral regions more heavily thickened)
Pterospirifer sp. nov.
Terrakea brachythaera (Morris)
Wyndhamia dalwoodensis Booker.

This fauna may be divided into three separate groups:

(1) Those species which characterise Fauna II or even older horizons;

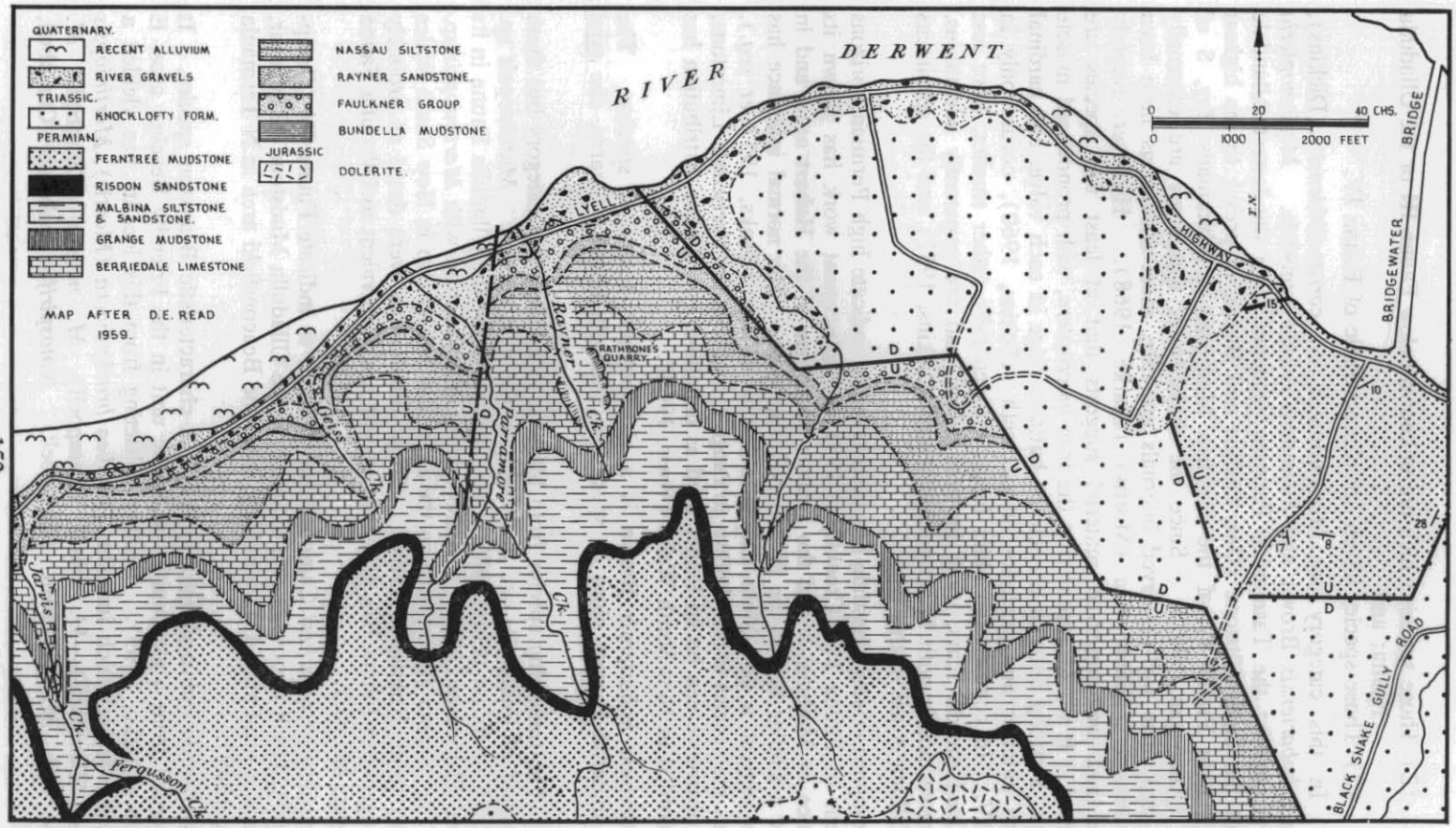

FIGURE 45. Geological map of the area west of Granton.

5 cm

(2) Those species which are unknown below Fauna III or the Ulladulla Fauna; and

(3) Those species which are characteristic of Fauna IV.

(1) In this category are *Merismopteria* cf. *carrandibbiensis* (Dickins), *Grantonia hobartensis* Brown and *Stenopora crinita* Lonsdale. *Merismopteria* ranges throughout the Tasmanian Permian sequence from the lowest Allandale Fauna of the Inglis Siltstone (Gee, Gulline and Bravo, in press) to the highest known marine Fauna IV of the Ferntree Mudstone at Blackmans Bay, S of Hobart (Runnegar, 1967). Since the majority of specimens are externally similar, and since well-preserved internals are rare, most allocations have been to *Merismopteria macroptera* (Morris) (Clarke, 1968). However, recently collected and well-preserved material suggests that at least two species are represented. It would appear that the true *macroptera,* with pronounced muscle platforms, a strong anterior clavicle or buttress ridge in each valve, and cardinal and both anterior and posterior lateral teeth (Dickins, 1960), occurs only in Fauna IV. In contrast the older forms are generally rather smaller, have less well-defined muscle scars, weak buttress ridges, and are apparently edentulous. These agree closely with *M. carrandibbiensis* (Dickins, 1957) and the specimens from Malbina A are of this type.

Stenopora crinita Lonsdale has been taken to indicate high Permian horizons equivalent to Fauna IV (Crockford, 1951). Subsequent work has shown its occurrence in Malbina A and the Grange Mudstone of the Hobart area, and in rocks of a similar age in the N and NE Tasmania. The normal inference has been to suggest a post-Main Cascades Fauna II age (Banks, 1957 *et seq.*). However, the species is now known to range throughout the Berriedale Limestone, and its ocurrence can be no longer used as definitive. A similar distribution has been recorded in New South Wales (Wass, 1969).

Grantonia hobartensis Brown is a characteristic Fauna II species. The present material is very close to specimens from Rathbone's Quarry, the type locality.

(2) The remaining species from Malbina A fall into this category but those more typical of Fauna IV are dealt with in the next section. *Martiniopsis* sp. nov. aff. *M. undulosa* (Campbell) is the index fossil for the Ulladulla Fauna in its type area (Runnegar, 1969). It also occurs in association with *Martiniopsis* sp. nov. aff. *M. magna* (Campbell) in the Branxton Sub-Group in New South Wales (Dickins, 1968; Runnegar, 1969). These occurrences were dated as probably not younger than Fauna IIIA (Dickins, *op. cit.*), or equivalent to Ulladulla Fauna (Runnegar, *op. cit.*).

Fletcherithyris parkesi Campbell was thought to indicate Fauna IV (Campbell, 1965), but it is now known to occur in the Ulladulla Mudstone (Runnegar, 1969) and a pre-Fauna IV assemblage from the Beaconsfield area in N Tasmania (Clarke, 1969).

Wyndhamia dalwoodensis Booker is a characteristic Branxton species. It was recorded from a glauconitic sandstone unit in the Friendly Beaches area, E Tasmania (Clarke, 1969). Further collecting from this locality has yielded a very diverse fauna which includes *Terrakea brachythaera* (Morris), *Martiniopsis undulosa* (*Campbell*)—*M. isbelli* (Campbell), *M. magna* (Campbell), *M.* sp. nov. aff. *M. profunda* (Campbell), *Notospirifer minutus* Campbell,

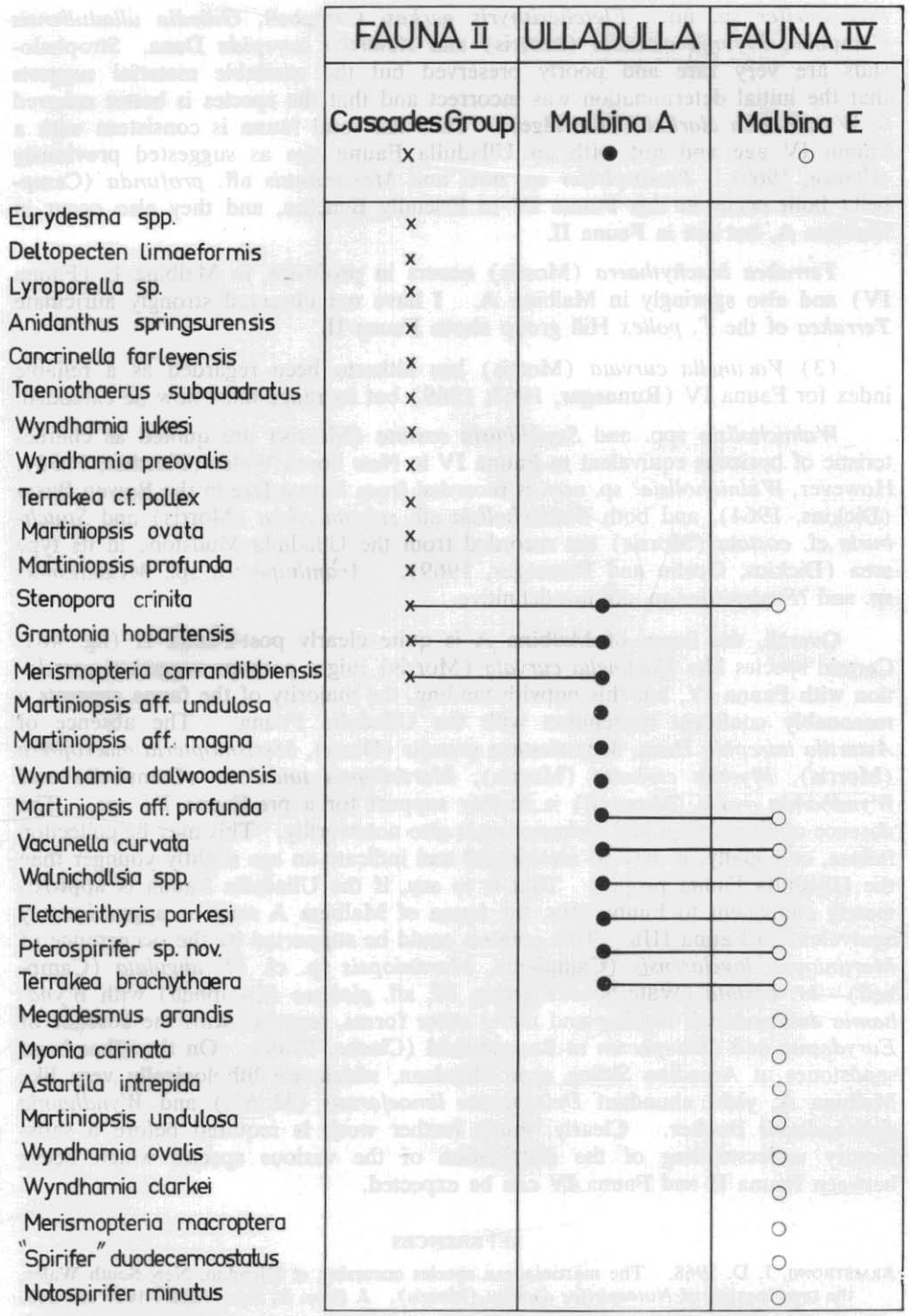

FIGURE 46. Stratigraphic distribution of fossils in the Cascades Group, Malbina A and Malbina E.

Pterospirifer sp. nov., *Fletcherithyris parkesi* Campbell, *Gilledia ulladullensis* Campbell, *Myonia carinata* (Morris) and *Astartila intrepida* Dana. Strophalosiids are very rare and poorly preserved but the available material suggests that the initial determination was incorrect and that the species is better referred to *Wyndhamia clarkei* (Etheridge). Thus the total fauna is consistent with a Fauna IV age and not with an Ulladulla Fauna age as suggested previously (Clarke, 1969). *Pterospirifer* sp. nov. and *Martiniopsis* aff. *profunda* (Campbell) both occur in this Fauna IV at Friendly Beaches, and they also occur in Malbina A, but not in Fauna II.

Terrakea brachythaera (Morris) occurs in profusion in Malbina E (Fauna IV) and also sparingly in Malbina A. I have not observed strongly auriculate *Terrakea* of the *T. pollex* Hill group above Fauna II.

(3) *Vacunella curvata* (Morris) has hitherto been regarded as a reliable index for Fauna IV (Runnegar, 1967; 1969) but its range must now be extended.

Walnichollsia spp. and *Stutchburia costata* (Morris) are quoted as characteristic of horizons equivalent to Fauna IV in New South Wales (Fletcher, 1958). However, *Walnichollsia?* sp. nov. is recorded from Fauna IIIB in the Bowen Basin (Dickins, 1964), and both *Walnichollsia* aff. *subcancellata* (Morris) and *Stutchburia* cf. *costata* (Morris) are recorded from the Ulladulla Mudstone in its type area (Dickins, Gostin and Runnegar, 1969). *Acanthopecten* sp., *Megadesmus* sp. and *?Fusispirifer* sp. are not definitive.

Overall, the fauna of Malbina A is quite clearly post-Fauna II (fig. 46). Certain species like *Vacunella curvata* (Morris) might perhaps suggest a correlation with Fauna IV, but this notwithstanding, the majority of the fauna suggests a reasonably confident correlation with the Ulladulla Fauna. The absence of *Astartila intrepida* Dana, *Megadesmus grandis* (Dana), *Merismopteria macroptera* (Morris), *Myonia carinata* (Morris), *Martiniopsis undulosa* (Campbell) and *Wyndhamia ovalis* (Maxwell) is further support for a pre-Fauna IV age. The absence of *Eurydesma* and *Deltopecten* is also noteworthy. This may be collection failure, or equally, it may be meaningful and indicate an age slightly younger than the Ulladulla Fauna proper. That is to say, if the Ulladulla Fauna is approximately equivalent to Fauna IIIA, the fauna of Malbina A may be approximately equivalent to Fauna IIIB. This opinion could be supported by the occurrence of *Martiniopsis ingelarensis* (Campbell), *Martiniopsis* sp. cf. *M. angulata* (Campbell)—*M. costata* (Waterhouse) group, *M.* aff. *globosa* (Campbell) with *Wyndhamia dalwoodensis* Booker and many other forms, together with the absence of *Eurydesma* and *Deltopecten* at Beaconsfield (Clarke, 1969). On the other hand sandstones at Arcadian Siding near Maydena, which are lithologically very like Malbina A, yield abundant *Deltopecten limaeformis* (Morris) and *Wyndhamia dalwoodensis* Booker. Clearly, much further work is required before a satisfactory understanding of the distribution of the various species which occur between Fauna II and Fauna IV can be expected.

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