The base of the Silurian System in Tasmania

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Synopsis

The base of the Silurian System in Tasmania lies within the Westfield Sandstone, probably just below an horizon exposed in the road cutting immediately east of Westfield Quarry and containing a rich fauna including ?Akidograptus, Atavograptus, Climacograptus normalis and Glyptograptus persculptus.

Introduction

The base of the Silurian System in Tasmania lies within the uppermost formation of the Gordon Group, the Westfield Sandstone (this includes the Westfield Beds of Corbett & Banks 1974 and equals the Arndell Sandstone of Baillie 1979). The Gordon Group is a predominantly shallow water sequence, deposition of which began in the Canadian and continued apparently without interruption into the early Silurian. Within this group in the Florentine Valley (lat. 42° 37' S, long. 146° 22' E) the uppermost carbonate formation, the Benjamin Limestone, is overlain by the Westfield Sandstone. Stratigraphically equivalent limestones are overlain by siltstones and/or sandstones in the Linda Valley in western Tasmania and Mole Creek in northern Tasmania, but only in the Florentine Valley are the sequences sufficiently exposed, structurally simple enough and known well enough for consideration in the context of this volume.

The relevant sections in the Florentine Valley lie within the Westfield Syncline and the Tiger Syncline of the Florentine Synclinorium (Corbett & Banks 1974). These structures in the relevant areas appear to be simple and most of the dips lie between 30° and 50° (Fig. 1). The two areas of particular importance are the Westfield Syncline and the eastern flank of the Tiger Syncline.

Biostratigraphy

In the Westfield Syncline the top of the Benjamin Limestone, e.g. at Corbett & Banks (1974) locality 13, contains stromatoporoids (Webby & Banks 1976), rugose corals including Foerstephyllum sp., Palaeophysillum spp., Favistina sp., Cyathophylloides sp., favositid including Palaeofavosities sp., auloporids including Eofletcheria sp., heliolitids including Calapoezia sp. and Coccoseris, halyxitids including Catenipora sp. and Falsicateinipora cf. chillagoensis (Etheridge), ?Beloioceras sp., Dinorthis sp. (Laurie 1982) and the conodonts Belodina compressa and Phragmodus undatus (Banks & Burrett 1980). The assemblage suggests correlation with the P. linearis Zone (Webby et al. 1981) and is clearly Ordovician.

No contact between the Benjamin Limestone and the Westfield Sandstone is exposed. Localities F1 of Baillie & Clarke (1976) and C.&B.15 of Corbett & Banks (1974) are clearly close to the base of the Sandstone. F1 and F9 of Baillie & Clarke (1976) are closely similar faunally (see Table 1) as are GB15 and GB16 of Corbett & Banks (1974), and differences between F1 and F9 on the one hand and C.&B.15 and 16 on the other may be ecological rather than temporal since F1 and F9 are in sandstone and the other two in siltstone. The fauna from F3 of Baillie & Clarke (1976) is similar to that of C.&B.15 and 16 and is also in siltstone. All five localities can conveniently be grouped together as different from other and higher horizons. Glossograptus sp. and a trinucleid related to Guandacolithus suggest that these horizons are late Ordovician. A few metres stratigraphically above F1 is an horizon, L6 of Laurie (1982), containing Hirnaniatia sp. and Isorthis (Ovalella) n. sp. (Laurie 1982). A further 40 m stratigraphically higher is a richly fossiliferous horizon (C.&B.18, B.&C.F.2, L11) with Onniella sp., Eospirifer sp., and other brachiopods, Pterinea sp., Orthodesma sp., Encrinuraspis sp., Brongniartella sp., Eokosovopeltis sp.,


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Fig. 1 Ordovician–Silurian Boundary outcrops in Tasmania. 1a, The Tiger Syncline; 1b, The Westfield Syncline; 1c, The Florentine Valley, also showing the positions of Figs 1a and 1b; 1d, The Florentine and Linda Valleys and Mole Creek within Tasmania.
Bumastoides sp., Gravicalymene sp., ?Akidograptus sp., Atavograptus sp., Climacograptus normalis Lapworth, Glyptograptus persculptus (Salter) and G. cf. persculptus. The graptolites suggest either the persculptus Zone or an horizon low in the acuminatus Zone (Baillie et al. 1978). In view of the recent decision to place the base of the Silurian System at the base of the acuminatus Zone (Cocks 1985), this horizon must lie close to the base of the System.

Horizons (L2, L3 of Laurie) contain Hirnantia sp. and one of these also contains Kinnella cf. kielanae (Laurie 1982). The stratigraphical positions of these horizons are not clear and one
or both could be stratigraphically below F2 (both are some tens of metres topographically lower).

The brachiopods *Bekkeromena* sp., *Hedstroemina* sp. and *Onniella* sp. have been collected from an horizon (F4 of Baillie & Clarke 1976) on the eastern flank of the Tiger Syncline. A slightly higher horizon (F5 of Baillie & Clarke) on the flank of the Tiger Range contains *Eospirifer tasmaniensis* Sheehan & Baillie (1981) in abundance. This occurs 65 m below the top of the Westfield Sandstone which is over lain by the Gell Quartzite and then the Richea Siltstone of the Tiger Range Group (Baillie 1979). The Richea Siltstone contains graptolites in an horizon 300 m above that with *E. tasmaniensis* and the graptolites indicate a very late Llandovery age (Baillie 1979).

References


