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## General Discussion

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## General discussion

M. G. BASSETT (*National Museum of Wales, Cardiff, CF1 3NP, U.K.*). Professor Holland's emphasis on the refinement of a stratigraphical framework to improve correlation and recognize synchronicity of events through the late Silurian–early Devonian interval is especially pertinent when linked to Professor Allen's description of the physical changes involved in the transition from marine to non-marine environments. The suturing of Laurentia and Baltica to form the 'Old Red Sandstone continent' was important in establishing for the first time in the Phanerozoic extensive and persistent terrestrial areas, whose relevance to biological evolution and colonization of the land are discussed elsewhere in this symposium. Dating of the marine to non-marine transition throughout the Caledonide Orogen is now sufficiently refined to demonstrate clearly that this was by no means a synchronous event, but extended at least from late Llandovery–early Wenlock times until the early–mid Devonian.

For example, in the Caledonides and adjacent platform areas of Baltoscandia there is a progressive north to south (or more strictly northwest to southeast) diachronism in the cessation of marine conditions. Old Red Sandstone facies of late Llandovery–early Wenlock age in Jämtland, central Sweden (Bassett *et al.* 1982) replace marine Llandovery sediments. Southwards through Dalarna and the Oslo Region, similar facies replacement takes place in the early and then late Wenlock, respectively (see also Bassett 1981). In Skåne (southern Sweden) the transition is in the late Ludlow–Přídolí, and then southwards and southeastwards through Poland and adjacent regions the diachronism is progressively younger through the late Silurian and early Devonian.

Similar diachronism with an essentially north to south component can be demonstrated in other segments of the Caledonide Orogen, such as the British Isles and the Canadian–Appalachian region. The overall pattern suggests a 'scissors-like' closure of Iapetus and a con-comitant diachronism of orogeny and spread of molasse facies. In considering the timing of biotic evolution related to colonization of terrestrial environments, this diachronous development of the physical environment should constantly be borne in mind.

### References

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A. BLIECK (*Université de Lille, France*). Some vertebrates such as the thelodonts have different geographical distributions in late Silurian and early Devonian times. Turner (1973) and Turner & Tarling (1982) showed that in the late Silurian the thelodonts were distributed in four different 'provinces' and particularly in a 'Scotto-Norwegian province', that Bassett does not recognize for the brachiopods of the same period. However, I do think that each group of vertebrates, as each group of invertebrates, has its own provincialism. Early Devonian pteraspimid heterostracans and thelodonts do not have the same distribution: the former were distributed in an 'arctic' and a 'non-arctic' province while the latter were living in a world-wide

'*Turinia* province' and an 'angaran' (Siberian) province (see Blicek (1982, 1985); Turner & Tarling (1982, figure 2). So we do not have to speak of the provincialism of 'the' vertebrates, but to consider each group as its own.

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