
Chapter 6 The Pídolí Series

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Introduction

The Pídolí, the fourth, the uppermost, and the series most recently added to the Silurian System, derives its name from the district of that name, near Velká Chuchle, in the Barrandian area of the Prague Basin. The name, definition, and correlation of this series have provoked more discussion, disagreement, and the smallest majorities in the decisive voting of the members of the Subcommittee on Silurian Stratigraphy of the International Commission on Stratigraphy than any of the others. The history of the final acceptance of the name, and all other related decisions by the Silurian Subcommittee were related by Holland (1989). With a duration of perhaps only two million years (Harland *et al.*, 1990), it is also the shortest of the Silurian series.

In Bohemia, the name Pídolí as a designator of a stratigraphical unit was formerly and originally given to a lithostratigraphical unit — the Pídolí Formation. Upon acceptance of the name as that of the fourth series of the Silurian, the lithostratigraphical unit was renamed the Požáry Formation (Kříž *et al.*, 1983).

The boundary stratotype for the base of the series is defined in the fully marine graptolitic sequence of the Poiary section, near Reporyje (Kříž *et al.*, 1983), where its base is coincident with the base of the *Monograptus parultimus* Biozone. It is the only Silurian series in which stages have not been established.

Occurrence

In Britain, rocks of undoubted Pídolí age are confined to England and Wales (Figure 6.1), (Figure 6.2). The main areas of outcrop are Pembrokeshire, central Wales (Clun Forest, Builth and the Llandovery area), the Welsh Borderland (Shropshire), south Staffordshire, and the Lake District. In these areas, the Pídolí Series is represented by rocks formerly designated as the 'Downtonian', 'Raglan Group' or 'Red Marls' and in the Lake District of north-west England (the Windermere area) as the 'Scout Hill Flags' (Cocks *et al.*, 1971; 1992). The relationship of the Pídolí to older rocks has been shown to have a systematic variation over the main outcrop in England and Wales (Bassett *et al.*, 1982). In Shropshire and the Welsh Borderland there is a conformable sequence from the Ludlow, with a bone bed present; in central Wales, the sequence is conformable but lacks a bone bed, and in southern and western Wales there is an unconformity beneath the Pídolí (Figure 6.2).

In Scotland there is no proved Ludlow to Pídolí transitional sequence. However a sequence of red and purple sandstones and conglomerates interbedded with tuffs immediately south of the Highland Boundary Fault at Stonehaven was considered to be of Pídolí age based on fish and arthropod faunas (Westoll, 1951). More recent work on the palynomorphs (Marshall, 1991; Wellman, 1993), suggests that at least part of this sequence is older (late Wenlock or early Ludlow). Also in Scotland, a red sequence in Ayrshire (the Portencross Inlier; Patterson, 1949) yielded a spore assemblage 'of Downtonian–Dittonian type' (Downie and Lister, 1969); a more precise stratigraphical age has not been determined.

Pídolí rocks with marine faunas occur beneath Mesozoic cover at depth in a series of boreholes in east England (e.g. the Little Missenden borehole) indicating a widespread extension of sedimentation into this area (Butler, 1981). There is no proved Silurian beneath the undoubted Devonian sequences of south-west England (Matthews in House *et al.*, 1977b).

Palaeoenvironmental setting

The Pídolí was a time of change in the palaeogeographical and tectonic setting of Britain. The last stages of the Caledonian Orogeny saw the final hard docking of Avalonia and Laurentia with the consequent demise of the Iapetus

Ocean. Thus the assembly of the Old Red Sandstone continent, on the south margin of which Britain was placed, saw the change in time from marine conditions to a locally highly variable suite of largely continental environments. These fluviatile and lacustrine dominated sediments were variously sourced and deposited in separate basins, correlation between which is difficult on account not only of their geographical isolation but also the lack of biostratigraphically useful suitable floras and faunas. Undoubtedly during Pridoli times the land was being extensively colonized by the earliest land animals (Jeram *et al.*, 1990; Dunlop, 1996), and vascular plants (e.g. Richardson and Edwards, 1989).

Minor marine incursions from the Rheic Ocean, which was situated to the south and south-east, can be recognized in the sequences of the Welsh Borderland, but these were rare. Intriguingly, those Pridoli sections that occur farthest to the south-west in Wales, and thus theoretically nearest to oceanic conditions, exhibit no marine influence at all, even though these Silurian–Devonian sequences were transported from even farther south on thrusts during the Variscan Orogeny. At the base of the Pridoli in the Welsh Borderland, however, strong marine influences are indicated by the occurrence of ostracods, trilobites, and brachiopods for instance. Volcanic intercalations usually of ash-fall type are seen in many, but not all, Pridoli sequences, though their source is moot.

Biostratigraphy

Because the Pridoli of the UK is developed almost entirely in the continental Old Red Sandstone facies, direct biostratigraphical correlation with the type area has so far proved not possible. A 'web of correlation', however, allows recognition of the equivalence of the base of the Downton Group of the Welsh Borderland (i.e. the base of the Ludlow Bone Bed Member; see Ludford Lane and Ludford Corner site report) with the base of the Pridoli Series. The top of the Pridoli is automatically defined by the base of the Devonian System, which has also been defined in the graptolitic sequence of Bohemia, at the base of the *Monograptus ultimus* Biozone (Chlupad, 1972). Correlation of this horizon to, and within, the UK is not possible with any biostratigraphical precision, but by consensus a level at the base of the Ditton Group, which coincides with the base of the 'Psammosteus' Limestone as defined by Greig *et al.* (1968) is accepted as a general approximation in practice.

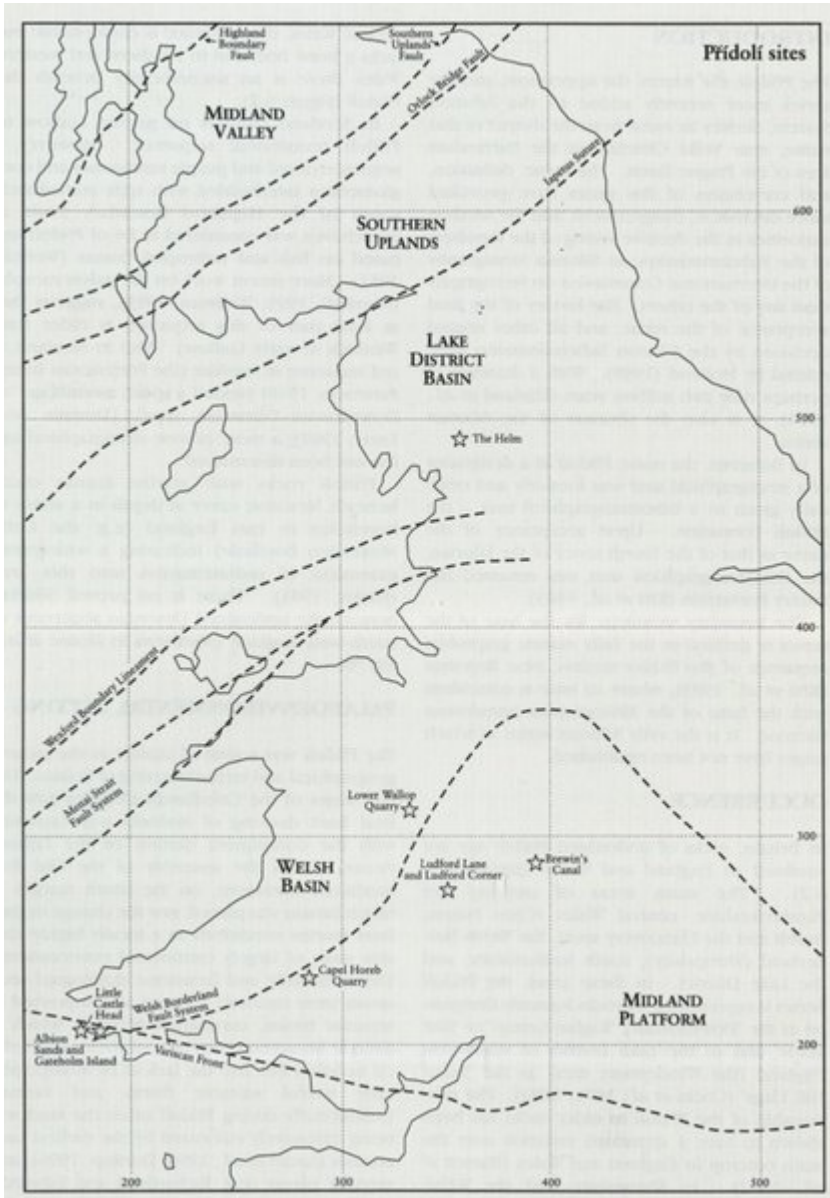
Site selection

Because of the imprecise correlation between Pridoli sequences in the UK, the sites (Figure 6.1) described in this section have not been selected stratigraphically, since in many cases not even the relative stratigraphical levels are known with any precision. Rather the selection tries to reflect not only the variable sequences and the differing settings in which they formed but also a wide geographical coverage and their different relationships to underlying strata. The imprecise dating of these rocks means that it is possible that parts of the sequences described are not wholly of Pridoli age, but the best and most recent geological data have been used to try to minimize the imprecision of correlation. Thus, for example, the Little Castle Head, and the Albion Sands and Gateholm Island sites are from a palaeogeographical position closest to the presumed position of the developing Rheic Ocean; they occur in faulted blocks (Sanzen-Baker, 1972; Powell, 1989), which were displaced an unknown, but probably considerable distance from the south, in the Variscan orogeny. The Capel Horeb site is one that illustrates the sub-Pridoli unconformity seen in the general surrounding area of mid-Wales. Lower Wallop, Ludford Lane and Ludford Corner, and Brewin's Canal sites are all sequences in the Welsh Basin and its shelf showing significant marine influences; in each there is a continuous sequence from Ludlow strata below and a thin Bone Bed is present (Figure 6.2), the base of which is taken to mark the base of the Pridoli. The Helm site, along with two sites in the Ludlow chapter (Hills Quarry and Benson Knott), demonstrate the final silting up of the Lake District sedimentary basin of north England, which itself had been initiated in the early Ordovician.

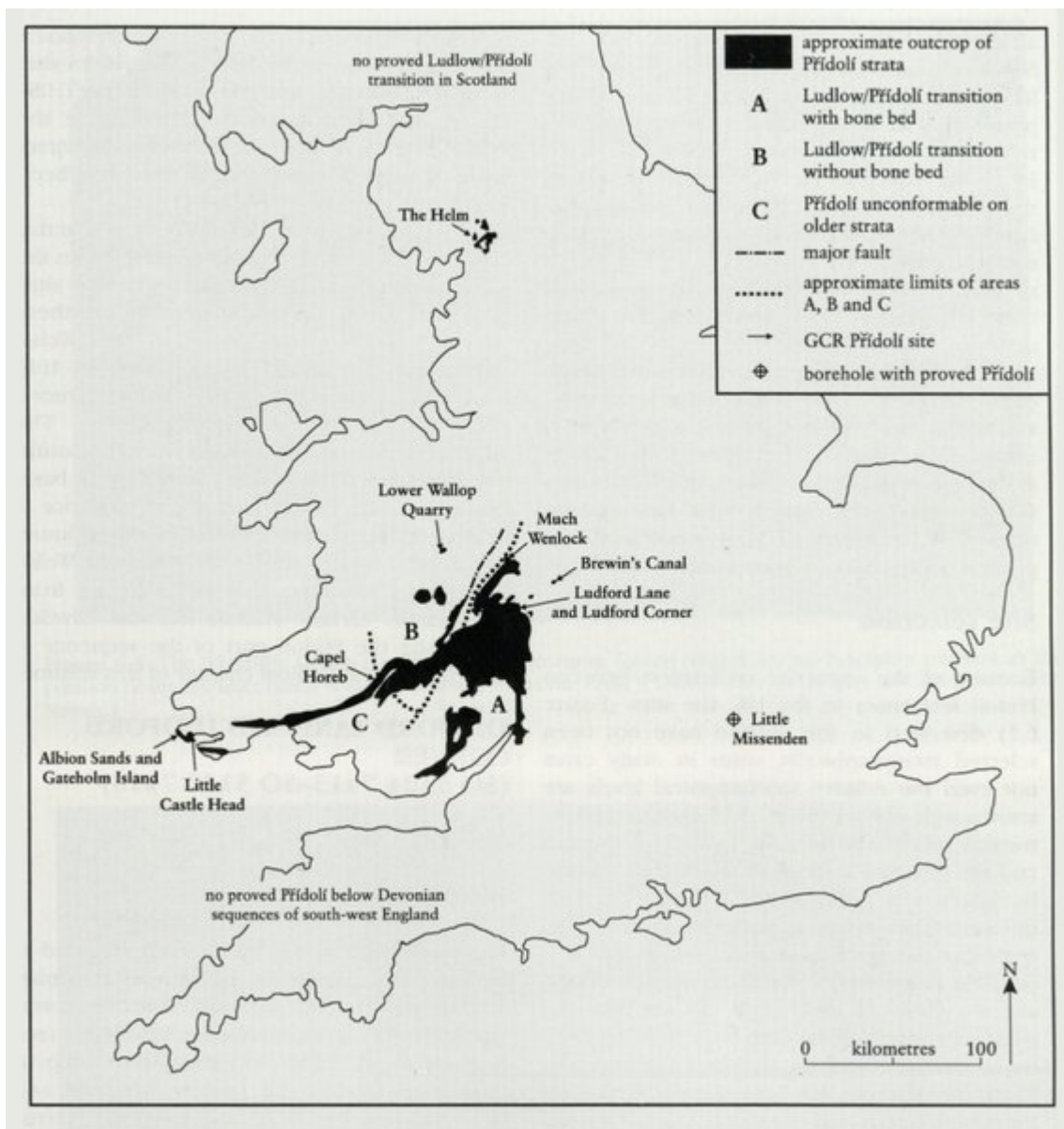
Additional to those GCR sites described in this chapter, Pridoli strata are also present within the geographical boundaries of certain Ludlow sites described in the Ludlow chapter above; these sites — all of which occur in the Welsh Borderland, are Brook House, Longhope Hill, Perton Road and Quarry, Tites Point, Turner's Hill, Wood Green, and Woodbury Quarry. The Silurian section in the Sawdde Gorge in southern Wales has strata of late Llandovery to basal Pridoli age; the Pridoli part of the sequence is treated in the Ludlow chapter of this volume. The Linton Quarry site in the southern Welsh Borderland has strata that range in age from Wenlock to earliest Widoli; like the Sawdde Gorge site

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References



(Figure 6.1) Distribution of the Geological Conservation Review sites for the Pridoli Series, set against the palaeogeographical elements of Silurian Britain.



(Figure 6.2) Approximate outcrop of Přídolí strata in England and Wales, with relationship to older strata (delimited as in Bassett et al., 1982).