
Chapter 8 Arenig to Ashgill in South Wales

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Introduction

In South Wales, rocks of the Arenig to Ashgill Series extend in a broad and complex tract about 160 km long, from Ramsey Island off the north-west coast of Pembrokeshire eastwards to Llandeilo (Figure 8.1), and thence north-east along the Tywi Lineament to Abbeycwmhir, north of Builth. This classic area of British geology, which includes the localities Llanvirn, Llandeilo and Llandovery, has long been studied and has influenced the development of the stratigraphy and nomenclature of both the Ordovician and the Silurian systems.

The southern margin of this tract, throughout its length, lies close to the break in slope between the Welsh Basin to the north and west and the shallow marine shelf bordering the Midland Platform to the east and south. Sporadic movement along the Tywi Lineament during the Ordovician seems to have maintained the shelf-to-basin slope (Bevins *et al.*, 1992; Cave and Rushton, 1996), and in consequence the rocks show a variety of lithofacies and biofacies. Fortey and Cocks (1986) indicated that deposition in south-central Wales (e.g. the area around Carmarthen), although not outstandingly thick, was demonstrably more continuous than elsewhere in Wales. In broad outline, arenaceous deposits of shallow-water origin accumulated during the early Arenig transgressive episode and were succeeded by later Arenig and early Llanvirn graptolitic mudstones deposited in deeper water. The later Llanvirn to early Caradoc saw the formation of calcareous and sandy strata of the Llandeilo Flags along the shelf margin, again overlain during the later Caradoc by dark graptolitic mudstones, whilst the contemporaneous basinal rocks to the north consist of turbiditic sandstones with graptolitic mudstone interbeds. Along the shelf margin the Ashgill consists of shelly mudstones and limestones of various lithologies, whereas the contemporaneous basinal beds consist of rapidly deposited sandstones, mudstones and mass-flow deposits.

Although volcanism in South Wales was less extensive and prolonged than in North Wales, there was activity particularly during the Llanvirn (Bevins *et al.*, 1992) and also in the early Caradoc (Cave and Rushton, 1996), and at Builth the volcanic edifice was of sufficient relief to create rapid lateral changes from shelly to graptolitic facies (Jones and Pugh, 1949). The localities are shown in (Figure 8.1).

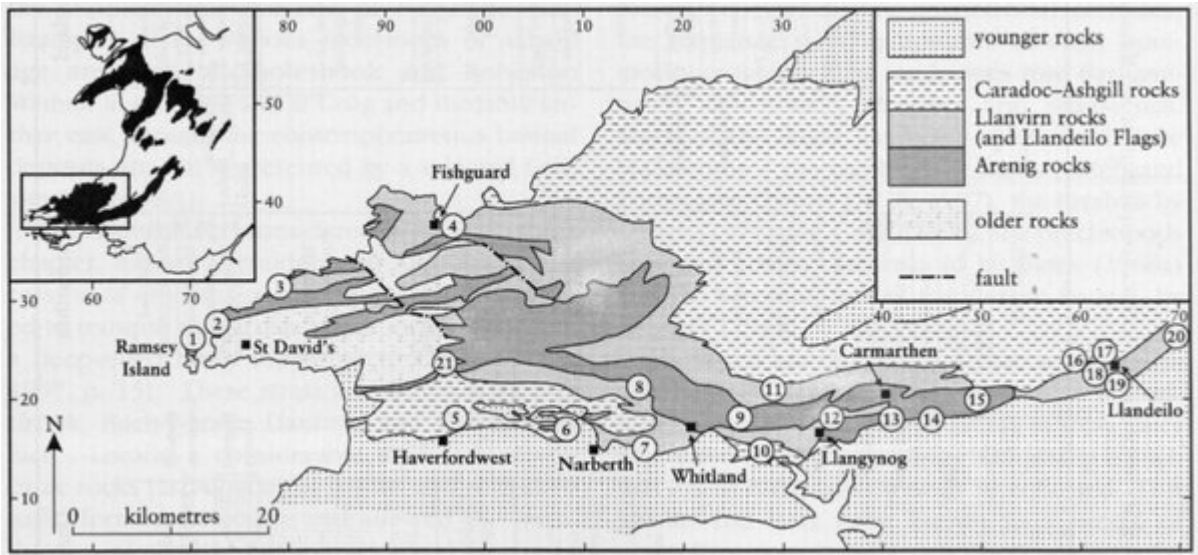
Fortey and Owens (1987) proved that South Wales has the fullest Arenig succession in Wales and used the faunal succession there to propose the Moridunian, Whitlandian and Fennian stages. The basal Arenig is displayed in the west at Ogof Hên and in the Carmarthen area at Dan-ian-y-castell, where the Bolahaul Member contains a particularly significant shallow-water fauna. In the Carmarthen area, the overlying Carmarthen Formation contains a succession of Moridunian trilobite faunas that inhabited an oxygen-poor environment in a postulated graben (Fortey and Rushton, fig. 04b, in Bevins *et al.*, 1992). This succession is exemplified at Glan Pibwr, Allt Pen-y-coed and Cwm yr Abbey. The Whitlandian is seen at Pwlluog, the Fennian at Pontyfenni and Road Uchaf, and the passage up into the Llanvirn at Llanfallteg (Figure 8.2).

The Llanvirn Series (Abereiddian and Llandeilian stages) is exemplified by the Abereiddi Bay site, which includes Llanvirn itself, and the volcanic pile is biostratigraphically dated at Abergwaun. Farther east the upper Abereiddian is developed in a shallow-water facies and passes up into the Llandeilian at Ffairfâch, the typical Llandeilo Flags being seen at Dynevor Park and Talar Wen. The passage from Llandeilian to Aurelucian (lower Caradoc Series) is shown in a mixed shelly and graptolitic facies at Meidrim and an important calcareous development of the Aurelucian at Bryn-banc Quarry.

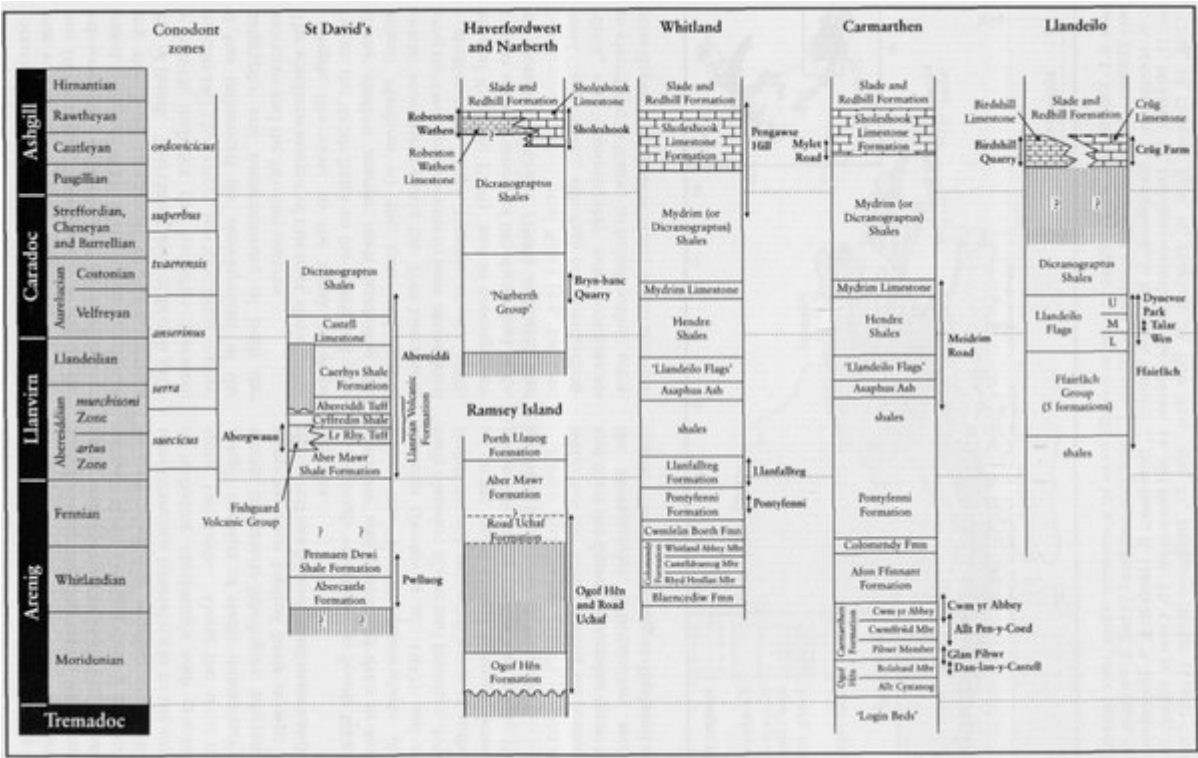
Much of the higher Caradoc is developed in dark-coloured graptolitic mudstones. These pass up into the Sholeshook Limestone at Mylet Road, and the same sequence is clearly seen at the supplementary section at Pengawse Hill. Examples of the various limestones of Ashgill age are seen at Sholeshook and Robeston Wathen in the west and at Crug and Birdshill farther east, though the contemporaneous basinal deposits are not represented by a selected GCR site (Figure 8.1).

The Builth Inlier, considered at the end of this chapter, has an Abereddian to Aurelucian succession of mudstones (see (Figure 8.25)) deposited in tranquil dysaerobic conditions, possibly in a deep-silled basin (Sheldon, in Davies *et al.*, 1997, p. 15). These strata are shown at Howey Brook, Bach-y-graig, Llanfawr and Gwern yfed &ch. Locally, a considerable thickness of volcanic rocks (ash-flow tuffs, basalts and reworked tuffs) formed an edifice and allowed the introduction of shallow-water brachiopod faunas to the basin. These are found at the Newmead site, where Jones and Pugh (1949) described an Ordovician shoreline and contemporaneous subaerial erosion of the volcanic pile, and also at Howey Brook.

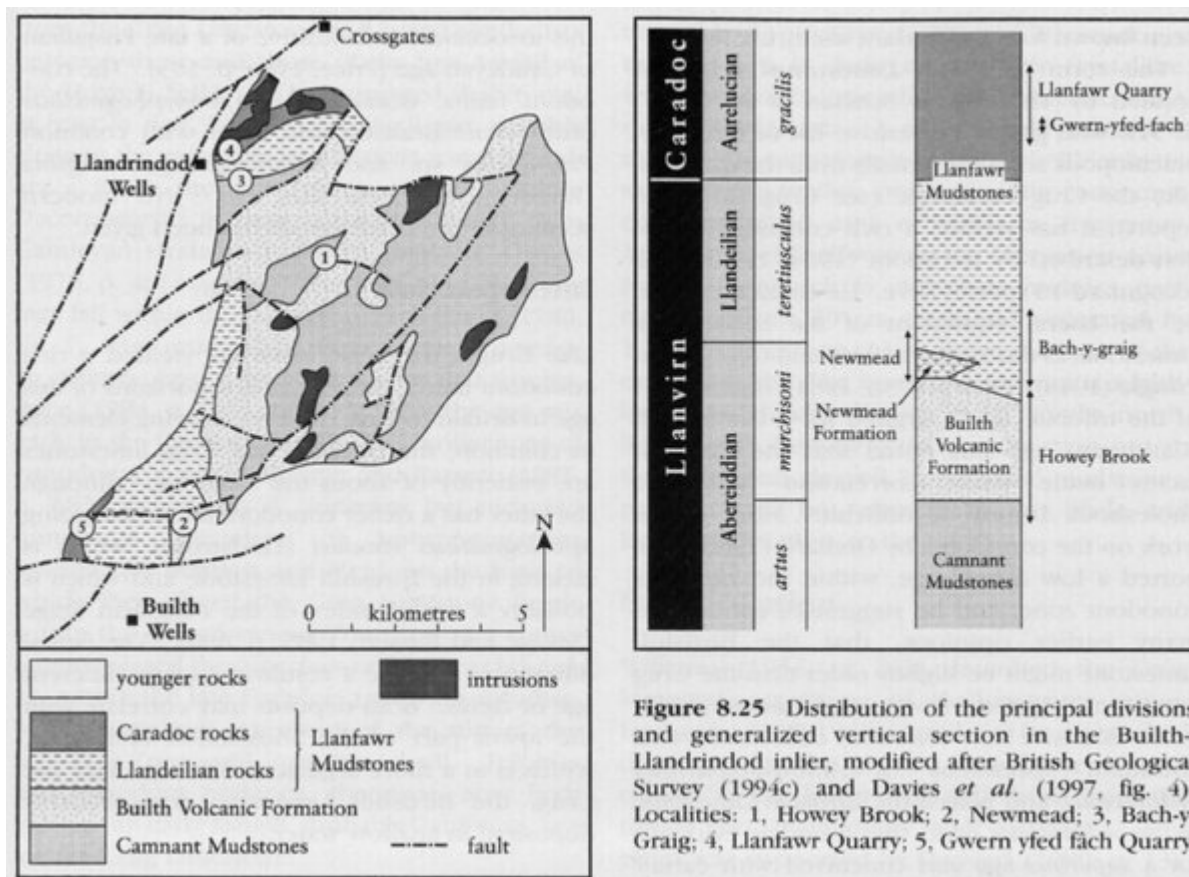
References



(Figure 8.1) Distribution of Ordovician (Arenig to Ashgill) rocks in south-west Wales, after British Geological Survey (1994c). Locations of GCR localities as follows: 1, Ogof Hên and Road Uchaf; 2, Pwlluog; 3, Abereiddi Bay; 4, Abergwaun; 5, Sholeshook; 6, Robeston Wathen; 7, Bryn-banc; 8, Llanfallteg; 9, Pontyfenni; 10, Mylet Road; 11, Meidrim; 12, Dan-lan-y-castell; 13, Glan Pibwr; 14, Allt Pen-y-coed; 15, Cwm yr Abbey; 16, Birdshill; 17, Crag; 18, Dynevor Park; 19, Ffairfach; 20, Talar Wen. Also 21, Treffgarne Bridge (Upper Cambrian, see Chapter 4).



(Figure 8.2) Correlation of the principal Arenig to Ashgill successions in south-west Wales, showing the stratigraphical ranges of individual GCR sites. Note that the upper Caradoc stages are not separately distinguished in this figure.



(Figure 8.25) Distribution of the principal divisions and generalized vertical section in the Builth-Llandrindod inlier, modified after British Geological Survey (1994c) and Davies *et al.* (1997, fig. 4). Localities: 1, Howey Brook; 2, Newmead; 3, Bach-y-Graig; 4, Llanfawr Quarry; 5, Gwern yfed fâch Quarry.