Ashgill Series, Ordovician, Wales

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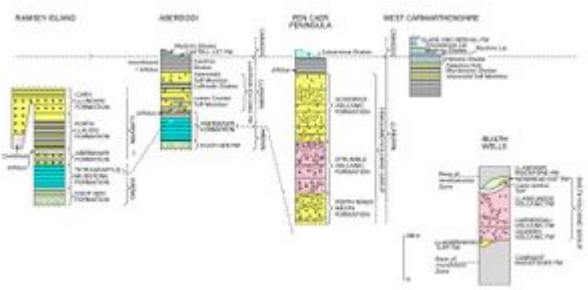

Generalised vertical sections of the Ordovician strata of north Pembrokeshire, west Carmarthenshire and Builth Wells (adapted from several sources). P916156.

Following the Nod Glas anoxic event in late Caradoc times, there was a gradual change of deposition into grey mud and silt, commonly calcareous, in Ashgill times. The change was related to a general shallowing of the basin in response to the maximum extent of the glaciation, which had developed on the Gondwana continent. In places, coarser shoreface and submarine fan deposits accumulated. However, graptolitic mudstone of latest Ashgill *persculptus* Biozone age marked the initiation of the transgression that continued into the Llandovery.

In north-east Snowdonia, in the vicinity of Conwy, blue-grey mudstone and siltstone with thin, flaggy, cross-bedded sandstone bands have yielded a shelly fauna of Rawtheyan age, indicating a significant hiatus between these beds and the underlying Cadnant Shales. The break is thought to reflect submarine erosion and non-deposition since the basal Ashgill facies, representing a relatively deep offshore environment, overlies the anoxic mudstone with no interverning shallow marine deposits. The mudstone is overlain by thickly bedded, channelled calcarenites (Conwy Castle Grit) laid down on a submarine fan; this episode of sedimentation was probably stimulated by the glacioeustatic fall in sea level. The calcarenites contain rugose corals and allochthonous elements of the Hirnantian fauna.

To the south, the Ashgill outcrop defines the Derwen Anticline and trends south-westwards to Tywyn. It persists into the Bala district and fringes the Berwyn Dome. The calcareous grey silty mudstone and subordinate shelly sandstone overlie Caradoc strata. At Bala, impersistent layers and concretions of fine-grained, pale-grey, muddy bioclastic limestone contain a rich shelly fauna of Rawtheyan age, and Pusgillian strata are also reported. The uppermost dark blue silty mudstone (Foel y Ddinas Mudstone Formation) includes the Hirnant Limestone Member with its distinctive brachiopod fauna, defining the Hirnantian, the highest stage of the Ashgill and the top of the Ordovician. This fauna contains a mixture of genera seen in the older strata as well as newly evolved forms, and represents a fundamental reorganisation of benthic community structure during one of the major episodes of mass extinction in Earth history.

In the vicinity of Corris and the Dysynni valley, the basal succession of mainly massive, pale grey, bioturbated silty mudstone (Broad Vein Formation) has been extensively worked for slate, and

interbedded in the upper part is rusty-weathering graptolitic mudstone (Red Vein) of the *anceps* Biozone. A sparse shelly fauna includes the deep-water *Novaspis*-cyclopygid Association of Rawtheyan age. The formation grades up into sparsely fossiliferous, dark grey, hemipelagic mudstone (Narrow Vein Formation). In the inliers of west mid Wales, equivalent strata (Nant y moch Formation) comprise a succession of thinly bedded, turbiditic sandstone/siltstone and grey mudstone couplets with a few graptolites that indicate the *anceps* Biozone. The highest beds are massive, poorly cleaved, silty mudstone with isolated grains and pebbles, and bedded turbiditic quartzose sandstone (Garneddwen Formation), which display lateral variations in thickness, bedding disaggregation, loading and slump folding. The development of the formation was synchronous with the glacio-eustatic regression when sediment input from the shelf increased; equivalent lithologies occur in the Plynlimon and Machynlleth inliers (Drosgol and Bryn Glas formations). To the east, in the Berwyn Dome, the basal unconformity is diminished, but lithologies are generally similar (Dolhir Formation). South-east of the Berwyn Dome, Ashgill strata are poorly represented, but pale brown, micaceous and calcareous mudstone (Trawscoed Mudstone Formation) forms a small exposure beneath the Powis Castle Conglomerate of Llandovery age.

To the south, Ashgill rocks crop out about the Tywi and Rhiwnant anticlines. A thick sequence of pale grey, blocky and bioturbated mudstone with thin sandstone laminae (Tridwr, Nantmel Mudstones and Cribarth formations), of Cautleyan to Rawtheyan age, conformably overlie Caradoc strata, and are overlain by laminated silty mudstone, fine- to coarse-grained sandstone and conglomerate (Yr Allt Formation) of Hirnantian age, deposited in a subtidal or intertidal setting. The change was caused by the onset of the glacio-eustatic regression. To the west, Ashgill rocks crop out around the southern closure of the Central Wales Syncline, towards the Cardiganshire coast, and the eustatic change occurs between the bioturbated blue-grey mudstone with rare cross-laminated sandstone of the Tresaith Formation and the coarser clastic facies of the Llangranog Formation with a rich assemblage of trace fossils. Between Llandeilo and Haverfordwest, thin argillaceous limestones occur within the Cautleyan Stage, and near Whitland, the Mydrim Shales (Caradoc) grade up into the Sholeshook Limestone (P916156). The contact with the overlying Slade and Redhill Mudstone Formation is marked by a thin impersistent conglomerate that is overlain by shallow-water, blue-grey mudstone and thin grey sandstone with trilobites of Rawtheyan age. The overlying sequence is dominantly argillaceous, with a rich Hirnantian fauna at the top.

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