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# Clogau Quarry

[SJ 1850 4630]

## Introduction

This large locality, termed Berwyn Quarry on some maps, is just south of the A542 road at the Horseshoe Pass on Maesyrychen Mountain, 6.5 km north-west of Llangollen, northern Wales (Figure 5.70). Formerly extensively worked for slate of probable Ludlow age, its large-scale operations ceased perhaps more than 100 years ago. Substantial tips of rock waste litter the site.

Brief mention of the locality is made by Wills (1920a, p. 8; 1920b). It is situated in the complexly folded northern limb of the east–west trending Llangollen Synclinorium, in ground mapped by Wills and Smith (1922). There has been little subsequent firsthand study of the area, although Cocks *et al.* (1971, 1992) have summarized the succession and age of the local Silurian, as have British Geological Survey officers when compiling the 1:50 000 Wrexham Sheet 121 (Hains and Davies, 1991). The only new observations on the quarry are in the unpublished thesis by Bell (1990, pp. 75–77). Dimberline *et al.* (1990) have noted that the Glyn-Dyfrdwy Group of the Llangollen area consists of interbedded turbidites and laminated hemipelagic facies.

This locality exposes the Slab Beds (Figure 5.71), which are claimed to be the middle stratigraphical unit of the Glyn-Dyfrdwy Group (Wills and Smith, 1922) and a horizon that is 'traceable throughout the synclinorium with fairly constant lithological characters'. Wills and Smith (1922) placed the Slab Beds stratigraphically above the Pentre-Dwfr Slates in their Glyn-Dyfrdwy Group. Bell (1990) observed that the Slab Beds are lithologically identical to the adjoining Pentre-Dwfr Slates, the distinction being a structural one, of the angle of cleavage to the bedding. On the map compiled by Hains and Davies (1991) the 'Slab Horizon' is placed at the top of the Nantglyn Flags Formation, a unit that they state includes the Glyn-Dyfrdwy Group.

## Description

The quarry lies in what appears to be tightly folded ground and its beds dip 70–75° to the north (Wills, 1920b; Wills and Smith, 1922). In 1919 it was estimated that (notwithstanding possible duplication due to folding) some 60–90 m of strata was exposed in the quarry (Wills, 1920b). The sediments of the Glyn-Dyfrdwy Group are a monotonous repetition of homogeneous silt–mud beds, between 1–40 mm thick, and laminated silt, in units 1–60 mm thick. The homogeneous silt–mud beds commonly have decalcified bases, usually graded and often with cross-lamination (Bell, 1990).

The Slab Beds have yielded the crinoid *Scyphocrinites pulcher*, the nautiloid *Orthoceras primaevum* and a graptolite fauna containing '*Monograptus nilssoni*' (see Wills and Smith, 1922). Confirmation of the presence of the *Neodiversograptus nilssoni* Biozone would give an unequivocal early Ludlow age. Cocks *et al.* (1971, 1992) show the entire Glyn-Dyfrdwy Group as late Wenlock correlatives, possibly extending into the early Ludlow Gorstian Stage. Warren *et al.* (1984), working on the nearby Denbigh sequence, correlated most of Glyn-Dyfrdwy Group, including the Slab Beds, with the basal Ludlow *nilssoni* Biozone. Haim and Davies (1991) state that, 'The 'slab horizon' (Wills and Smith, 1922) is the approximate equivalent of the Upper Nantglyn Flags of the Denbigh district', and indicate that the unit is of probable basal Ludlow age.

## Interpretation

Turbidites and associated deep-water deposits were the dominant sediments throughout much of the Silurian in this northern part of the Welsh Basin (Siveter *et al.*, 1989, figs 8–10; Bassett *et al.*, 1992, fig. S4a; Dimberline *et al.*, 1990, fig. 1). During the Wenlock and early Ludlow the Llangollen area received distal turbidite sediments supplied from the south through the NNE–SSW aligned Montgomery Trough (Cummins, 1957). Later in the Ludlow the predominant sediment

supply was from the west, along the east–west aligned Denbigh Trough (Cummins, 1959a, 1959b).

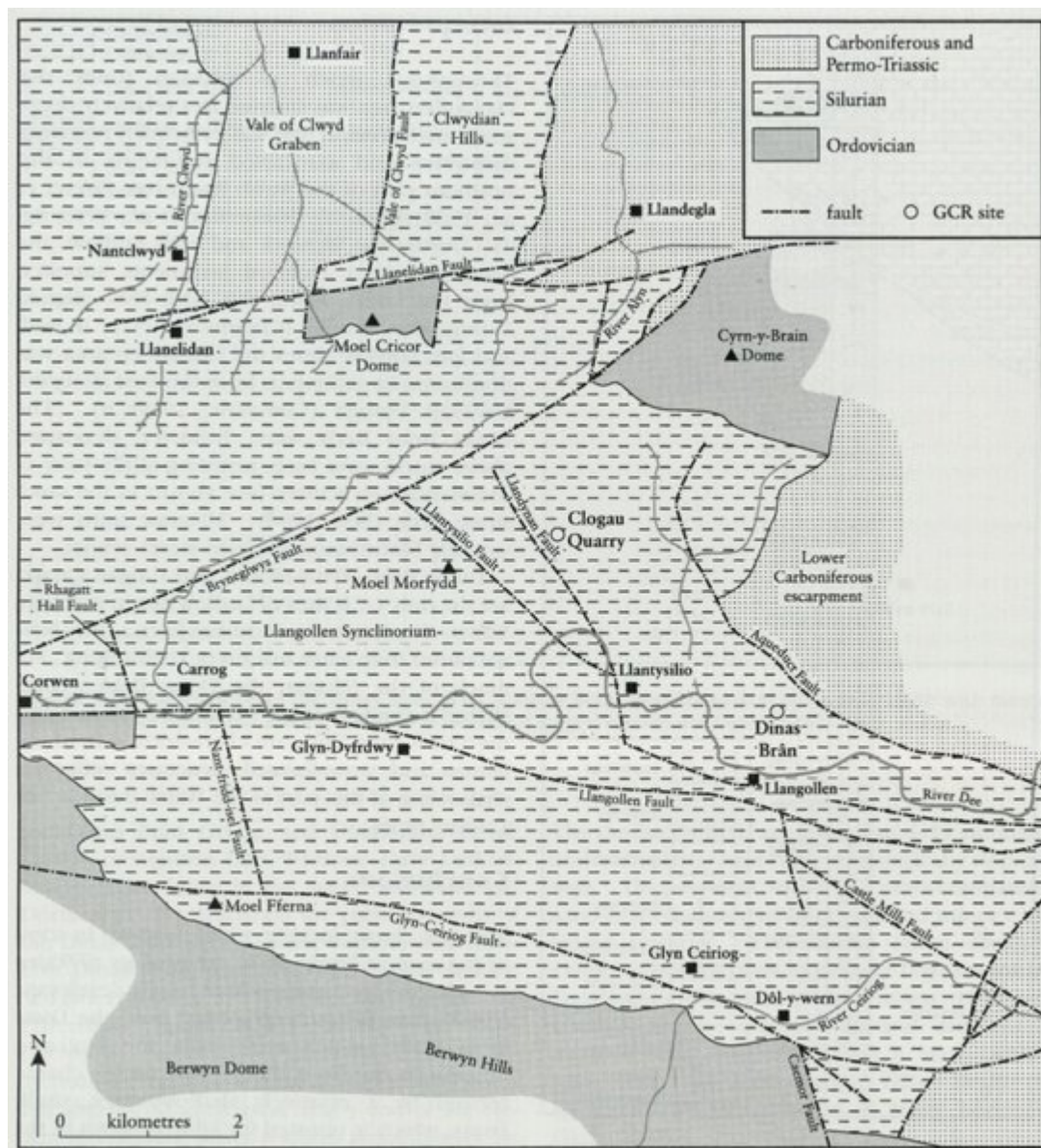
The homogeneous or graded silt–mud beds of the Glyn-Dyfrdwy Group at Clogau Quarry are interpreted as dilute turbidites (Bell, 1990). The intervening, well-displayed laminated silts are thought to be hemipelagites, formed by a fluctuating fall-out of organic carbon and terrigenous silt (Bell, 1990; Dimberline *et al.*, 1990). Such hemipelagites form an important component of basal Wenlock and early Ludlow sequences throughout the basins bordering the former Iapetus Ocean (Kemp, 1991).

Clogau Quarry Ty'n-y-Ffordd Quarry and Dinas Brân are the only GCR sites of exclusively Ludlow age in northern Wales. Both Clogau Quarry and Ty'n-y-Ffordd Quarry are also relatively rare within the GCR network in that they are of truly basinal rather than basin margin or shelf setting. The basinal Wenlock site of Ty Mawr, also contains some early Ludlow strata.

## Conclusions

This is a well-known site, important for determining the geology of the region. It displays extensive outcrop of a deep-water, basinal, graptolite-bearing lithostratigraphical unit of the Ludlow of the Welsh Basin.

## References



(Figure 5.70) Geological map in the vicinity of Llangollen, showing the location of the GCR sites Clogau Quarry and Dinas Brân (after Wills and Smith, 1922, with minor additions to the fault pattern from Hains and Davies, 1991).



*(Figure 5.71) Part of the Slab Beds, Glyn-Dyfrdwy Group, Ludlow Series, at Clogau Quarry, near Llangollen. (Photo: A3125, looking NNW, July 1925; courtesy of the British Geological Survey.)*