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# Dinas Brân

[SJ 2230 4311]

## Introduction

Dinas Brân is a steep-sided, conical hill 1 km north-east of Llangollen in northern Wales. The hill-top site consists of Ludlow strata in the vicinity of the remains of the ancient stronghold of Castell Dinas Brân (Figure 5.68); the Carboniferous scarp of Creigiau Eglwyseg lies to the north-east. This GCR site contains the type section of the fossiliferous Dinas Brân Beds.

Llangollen lies more or less on the principal, east–west axis of its eponymous synclorium, north of the contiguous Berwyn Anticline (see (Figure 5.70)). Just to the south of Llangollen is the extensive, east-west trending, Llangollen fault. In essence the latter separates the simple flexured southern part of the synclorium from the complexly folded northern part and, as a consequence of its northerly downthrow, introduces the youngest (Ludlow Series) beds of the local Lower Palaeozoic as outcrop on Dinas Brân.

The local Silurian stratigraphy, including the rocks of Dinas Brân, was first documented by Bowman (1841a, b) and was most recently reviewed by Cocks *et al.* (1971, 1992), Warren *et al.* (1984) and the British Geological Survey (Haim and Davies, 1991: 1:50 000 Wrexham Sheet 121). However, there has been hardly any published primary work on this sequence since Wills and Smith's (1922) account of the Lower Palaeozoic of the Llangollen area. In his unpublished thesis Bell (1990; (Figure 5.68), (Figure 5.69)) included new sedimentological observations on what he variously termed the Dinas Brân Beds or the Dinas Brân Group and Dimberline *et al.* (1990) recognized late Wenlock–early Ludlow hemipelagite facies in the area. Swanson and Dorning (1977) described the palynomorphs of the Dinas Brân Beds. Earlier authors who mention Dinas Brân, particularly its fauna, include Sedgwick (1843a, b), Marr (1880b), Salter and Etheridge (1881), Lake (1895) and Wills (1920a, b). Sedgwick (1843b) featured the locality not only on a geological sketch cross-section but also on his geological map — one of the earliest of northern Wales — which accompanies his paper.

## Description

The southerly dipping Dinas Brân Beds occur on the crown of the hill and its southern slopes (Wills, 1920a, fig. 1). They are unclesaved, thin-to medium-bedded, fossiliferous calcareous siltstones and subordinate fine micaceous sandstones, with a minimum total thickness of 250 m (Bell, 1990). The siltstones, in units 30–40 cm thick, are heavily bioturbated but preserve occasional parallel and low angle cross-lamination.

The sandstone beds are lenticular, 4–11 cm thick and have planar bases and symmetrically rippled tops. They contain low angle cross-laminated, sand-draped symmetrical ripples and minor erosional surfaces. The diverse fauna consists chiefly of brachiopods, especially *Dayia navicula*, together with gastropods, bivalves, trilobites, corals, crinoids, phyllocarids and orthoconic nautiloids (e.g. Sedgwick, 1843a, b; Marr, 1880b; Lake, 1895; Wills and Smith, 1922). *Skolithus* type burrows are common at many horizons (Bell, 1990).

The Dinas Brân Beds are probably the youngest Silurian rocks in north Wales. Modern studies confirm that Dinas Brân hill is formed entirely of Ludlow rocks, as proposed by Bowman in his pioneer work (1841a, b). Cocks *et al.* (1971, 1992) thought that the Dinas Brân Beds are of Ludfordian age. Based on graptolite evidence and on lithological comparison with the succession in Denbigh to the west, Warren *et al.* (1984) proposed that the boundary of these beds with the underlying Vivod Group lies at no younger horizon than the base of the *Saetograptus leintwardinensis* Biozone (early Ludfordian Stage) and that it may be as early as the base of the underlying *Saetograptus incipiens* Biozone (late Gorstian Stage). Swanson and Dorning (1977) identified Lower Whitcliffe Formation (Ludfordian) acritarchs and chitinozoans from the Dinas Brân Beds.

## Interpretation

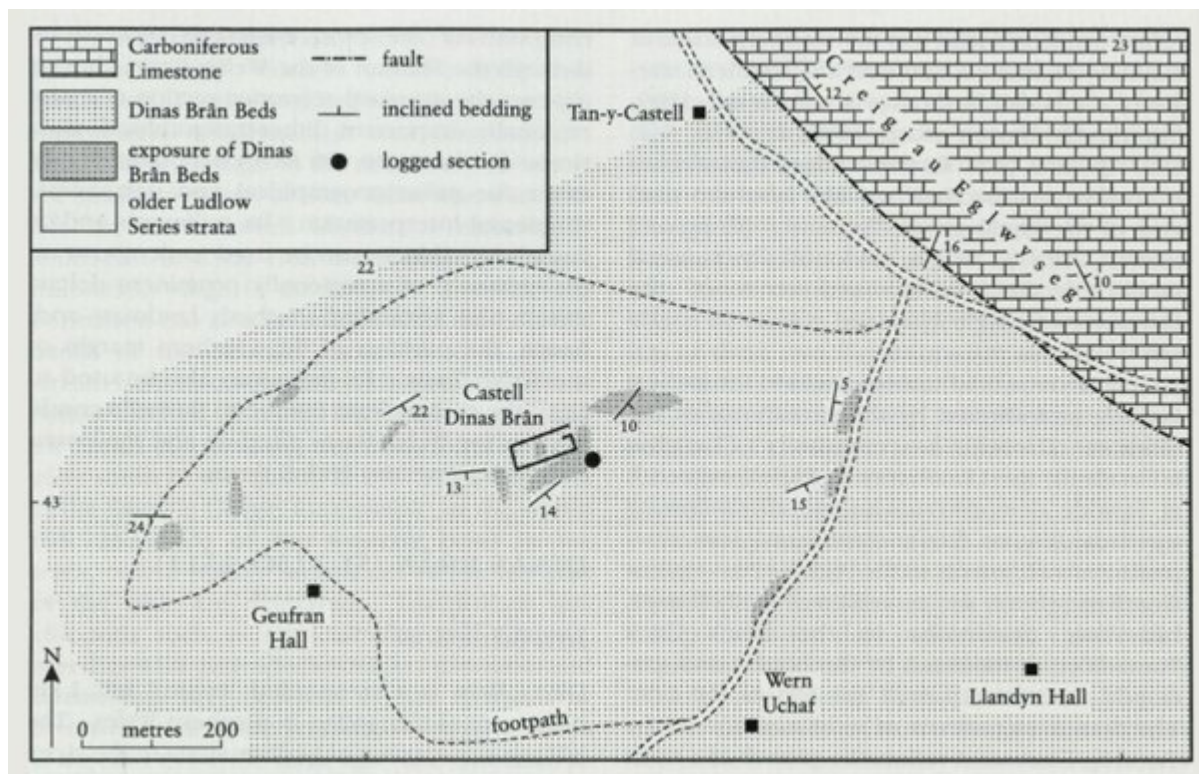
Throughout much of Silurian times the Llangollen area was situated in a relatively deep-water environment that was principally receiving turbidites and associated sediments in the northern part of the Welsh Basin (see Siveter *et al.*, 1989, figs 8–10; Dimberline *et al.*, 1990, fig. 1). During the Wenlock and early Ludlow the Llangollen area received sediments supplied from the south along the NNE–SSW aligned Montgomery Trough (Cummins, 1957). In mid-and late Ludlow times the Llangollen area was dominated by sediments from the west along the Denbigh Trough (Cummins, 1959a, b). The Dinas Brân Beds were, however, deposited above storm wave base, resulting in the suite of sedimentary structures (see above) in the sandstone beds (Bell, 1990). Siltstone units were strongly bioturbated between storm events.

Dinas Brân, Tyn-y-Ffordd and Clogau Quarry are the only GCR sites of Ludlow age in northern Wales. The latter two localities have a truly basinal rather than basin margin or shelf setting. For much of the Silurian the Dinas Brân vicinity shared a similar setting. However, the fact that the Dinas Brân Beds are characterized by shelly faunas and wave-formed structures reflects a shallowing of this part of the Welsh Basin in late Ludlow times.

## Conclusions

This is a classic locality, which features in some of the earliest literature of the geology of Wales. It is also the type section for a locally developed, fossiliferous lithostratigraphical unit, the Dinas Brân Beds, which represents the youngest Silurian in northern Wales. The unit is characterized by a relatively shallow-water, shelly fauna, which is unusual for Silurian strata in this part of the Welsh Basin.

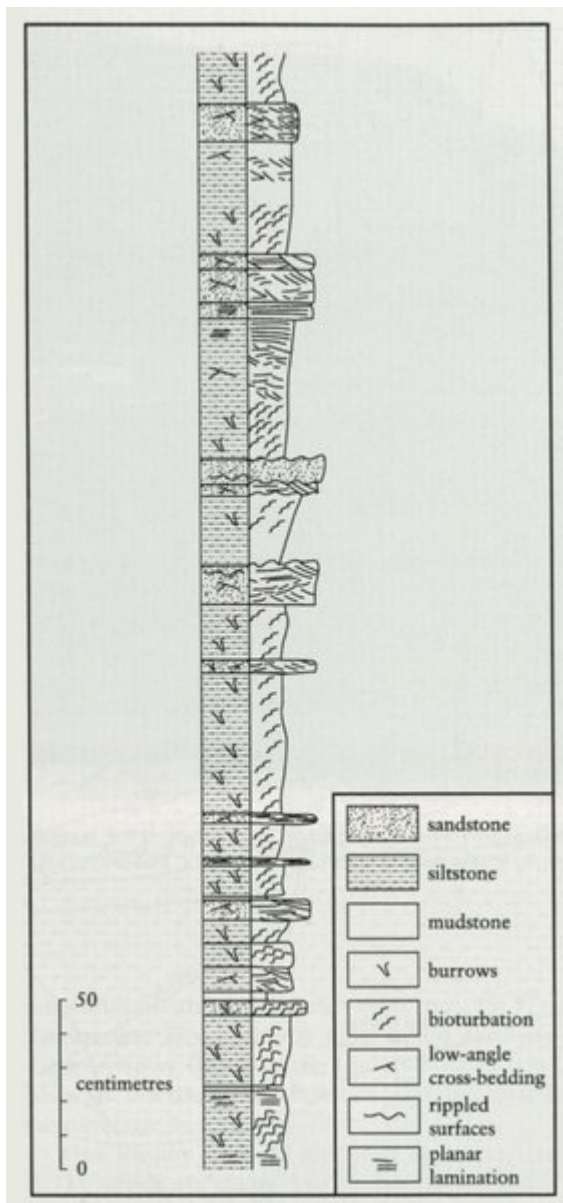
## References



(Figure 5.68) Distribution of the Dinas Brân Beds at Dinas Brân, near Llangollen (after Bell, 1990; with minor additions from Haim and Davies, 1991). For details of logged section see Figure 5.69.



(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 5.69) Log of the Dinas Brân Beds in the eastern moat of Castell Dinas Brân (see Figure 5.68), near Llangollen (after Bell, 1990): low-angle cross-bedded sandstones interbedded with bioturbated siltstones.