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# Cwm Llŵch

## Highlights

This site shows the finest glacial cirque and associated moraine in South Wales. The best of the Brecon Beacons cirques; it shows in addition to the final Devensian late-glacial moraine, possible evidence of pre-Younger Dryas ice occupying the cirque.

## Introduction

Cwm Llŵch in the Brecon Beacons [SO 002 220] is the finest example of a cirque and associated moraine in South Wales. The cirque is one of several on the Devonian (Old Red Sandstone) escarpment, and contains a semi-circular moraine of probable Younger Dryas age. The site has long attracted scientific interest being first described by Symonds in 1872. A description of the site was given by Reade (1894) and it has also been mentioned by Howard (1901), Richardson (1910), Robertson (1933), North (1955) and Thomas (1959). More recently, the significance and age of the morainic deposits at Cwm Llŵch has been discussed by Lewis (1966a, 1966b, 1970a, 1970b) and Ellis-Gruffydd (1972, 1977).

## Description

The valley head and cirque comprising Craig Cwm Llŵch, Corn Da and Pen-y-fan faces north-east, and contains a single broad arcuate moraine which encloses Llyn Cwm Llŵch. The highest part of the moraine stands some 60 ft (18m) above the general level of the lake and valley floor. The feature has well developed lateral margins that climb the flanks of the back wall terminating 150 ft (46m) and 100 ft (30m) above the valley floor to the west and southeast, respectively (Ellis-Gruffydd 1972). Superimposed on the moraine are relatively minor ridges which run sub-parallel to its overall arcuate form. Towards the south-east end of the moraine two ridges are particularly conspicuous, and these are separated by a peat-flat from which a dry valley runs eastwards. A second peat-flat separates the back wall from the innermost ridge. The sides of the moraine are generally steep (20°-30°) and a small exposure, near the present lake outlet, suggests a composition of angular blocks in a sandy-silt matrix (Ellis-Gruffydd 1972). Thomas (1959) and Lewis (1966a) suggested that the lake, some 6–7m deep (Howard 1901), did not occupy a rock basin. The lower slopes of the cirque back wall are scree-covered and the upper limit of the back wall is defined by an extensive plateau remnant in the Old Red Sandstone, and the twin highest peaks in the Brecon Beacons, Pen-y-fan (886m) and Corn Dû (873m). An area of hummocky terrain outside the moraine may represent older morainic material, in part soliflucted (Lewis 1970b).

## Interpretation

The moraine impounding Llyn Cwm Llŵch was first noted by Symonds in 1872 and subsequently described by Reade (1894). Lewis (1966a, 1966b), on the basis of morphological evidence, concluded that at many sites in the Brecon Beacons there was evidence for two phases of moraine and protalus rampart formation. Preliminary pollen evidence from peat deposits behind the 'fresh' inner moraine at Cwm Llŵch indicated a probable Younger Dryas age for this moraine (Lewis 1970b). An early Devensian late-glacial (Pollen Zone Ic) age was favoured by Lewis for the degraded morainic sediments outside the 'fresh' moraine by analogy with palynological results elsewhere in the region (Trotman 1963). Lewis also identified up to five distinct ridges which he considered marked successive retreat stages of the Cwm Llŵch glacier.

In contrast, Ellis-Gruffydd (1972, 1977) considered that, with the exception of Craig Cerrig-gleisiad, only one phase of moraine formation was represented in the Brecon Beacons. At other sites in the region, this period of moraine formation has since been relatively dated palynologically and by radiocarbon to the Younger Dryas (Walker 1980, 1982a, 1982b); it seems likely that the moraine at Cwm Llŵch also dates from this part of the Devensian late-glacial. Ellis-Gruffydd noted that the compound nature of the moraine at Cwm Llŵch probably reflected oscillations of the glacier margin, and that the

channel at the south-east end of the moraine marked the former position of a proglacial stream. He considered, however, that there was insufficient morphological and sedimentological evidence to invoke the existence of extensive pre-Younger Dryas moraines at the site.

## **Conclusions**

The sharply defined cirque and associated glacial moraine at Cwm Llŵch are the finest examples in South Wales. It seems probable that the moraine enclosing Llyn Cwm Llŵch dates from the time when glaciers last formed in the South Wales uplands, but the significance of apparently earlier degraded moraines has still to be resolved.

## **References**