
Lligwy Bay, Isle of Anglesey, Gwynedd

[SH 499 871]–[SH 502 872]

Introduction

The Lligwy Bay GCR site consists of the southeast side of Lligwy Bay, from Carreg Ddafad [SH 499 871] ENE for about 500 m to the northwest side of the headland of Trwyn Gribin [SH 502 872], 1 km north-west of Moelfre, Anglesey. The locality is famous for its exposures of the impressive Lligwy Bay Conglomerate and of the Lligwy Bay Disturbance, features that are both unique to the Dinantian succession in Anglesey and critical to reconstructions of Lower Carboniferous palaeogeography in north-west Wales. Details of the site geology were originally presented by Greenly (1919), while more substantive and relatively modern accounts are provided by Cope (1975) and Davies (1982).

Description

The Lligwy Bay Conglomerate is exposed in the southernmost part of the bay, around Carreg Ddafad. It comprises about 2 m of poorly sorted rock with rounded boulders, many of which Greenly (1919) showed were derived from the Ordovician rocks of Parys Mountain. Rather more angular fragments of locally derived dolomitized Carboniferous Limestone, typically up to 60 cm across, but occasionally up to nearly 1.5 m, also occur. Greenly (1919) regarded this unit as the upper part of the Lligwy Sandstone Formation and thus part of the lowest unit of the Dinantian succession on Anglesey, and postulated an S_2 (Holkerian) age for its development.

Since Greenly's work, natural movement of the beach sand in Lligwy Bay has revealed that the conglomerate rests on a highly irregular limestone surface (Cope, 1975). Cope recorded a D_1 (Asbian) fauna from these limestones, demonstrating that the conglomerate lies within the Asbian Stage and not at the base of the succession. Davies (1982) put the conglomerate in his Lligwy Bay Sandstone as distinct from the basal Lligwy Sandstone Formation, although he noted that it is probable that the two units merge inland. Davies (1982) placed the limestones beneath the conglomerate in his Careg-Onen Limestone Formation.

Eastwards from Carreg Ddafad, the Lligwy Bay Disturbance of Greenly (1919) is seen in the cliffs. The structure has also been described by Chalinor and Bates (1973), Bates and Davies (1981) and Davies (1982). At the western end of the feature, limestones with a steep dip to the north-east rest on near-horizontal sandstones. Continuing seawards, more-or-less vertical, thinly bedded, rubbly limestones are followed by a chaotic mass of limestone blocks with a red muddy matrix and bands of fine yellow sandstone (Figure 8.5). Although the lateral contacts of the disturbed beds with undisturbed strata are not seen, Davies (1982) noted that the overall succession in the disturbed zone is similar to that of higher strata, belonging to the Flagstaff Limestone Formation, seen on the coast to the south-east.

Beyond the disturbed zone, a normal bedded succession can be seen in the cliffs. Sandstones and shales are overlain by bioclastic and oolitic limestones and represent the first exposed cycle of the Flagstaff Limestone Formation (Bates and Davies, 1981; Davies, 1982).

Interpretation

Cope (1975) interpreted the Lligwy Bay Conglomerate as a beach deposit, with the irregular limestone surface beneath being the remains of sea stacks and collapsed sea stacks. Bates and Davies (1981) and Davies (1982) regarded a fluvial origin as more likely, with the limestone surface beneath being intensely karstified. The Lligwy Bay Disturbance is also probably a karst-related feature, resulting from the collapse of a vadose cave system (Bates and Davies, 1981; Davies, 1982). It is tempting to relate this solution and collapse to one of the episodes of emergence higher in the Dinantian succession, but this is not proven and there remains the possibility that the collapse was much later, perhaps of Triassic or Tertiary age (Davies, 1982).

Conclusions

Lligwy Bay is an important site for showing two unique features, the conglomerate and the disturbance. The age of the conglomerate and its relationships to the underlying limestone are now clear, but further work is needed to try to establish whether the collapse that led to the development of the Lligwy Bay Disturbance is related to intra-Dinantian emergence or whether it is a later phenomenon.

[References](#)



(Figure 8.5) Conglomerate at the eastern end of the Lligwy Bay Disturbance showing a chaotic array of limestone blocks set in a red shale matrix. The rucksack, for scale (left of centre), is approximately 50 cm in length. (Photo: P.J. Cossey.)