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# Danygraig, Gwent

[ST 234 908]

## Introduction

The Danygraig GCR site is a disused quarry and landfill site [ST 234 908], immediately west of Risca. It exposes a section in the Rudry Formation (George *et al.*, 1976) of probable late Chadian–Arundian age, which may provide a critical link between sections in the Vale of Glamorgan and Gower to others in the Abergavenny–Penderyn region. The main section contains a variety of very shallow-water limestones and clays that were deposited on storm-influenced intertidal flats, in shallow lagoons and as soils. The formation appears to be an equivalent of the Cheltenham Limestone Member of the Llanelly Formation, a unit cropping out from Gilwern to near Penderyn to the north and north-west (see Llanelly Quarry, Clydach Halt Lime Works, Cwar yr Ystrad and Hendre, Baltic Quarry, Odynau Tyler Bont and Blaen Onneu Quarry GCR site reports, this chapter). However, the section at Danygraig is at least three times thicker than its possible northern equivalent. The original, extensive section was discussed by George (1956a) and the only recent work has been that on the dolomites from the quarry by Hird *et al.* (1987).

## Description

Two sections are available in the Rudry Formation. The southern exposures comprise thickly bedded to massively bedded dolomites and may be of Chadian age. Those in the western part of the site are probable Llanelly Formation equivalents, and are therefore likely to be Arundian in age. The latter crops out in two sections. The smaller of the two sections is located close to the site entrance. This section reveals the higher part of the succession, which comprises approximately 10 m of medium- to thin-bedded limestones and dolomites, with shale and clay partings. The lower part of the Llanelly Formation equivalent, higher up the slope, is a larger, continuous section (Figure 9.34) exposing 28 m of mainly medium- to thick-bedded limestones and dolomites, with a variety of clays. Many of the carbonates exhibit prominent fine wavy lamination. Hird *et al.* (1987) note microbial laminites with fine bioclastic units and intraformational breccias, fenestral fabrics and pseudomorphs after gypsum. They also presented detailed mineralogical and geochemical data on the associated dolomites. The present outcrop does not contain any obvious contacts with other units, nor any of the distinctive palaeokarst horizons associated with the Llanelly Formation in its main outcrop area. Also absent from this site is the distinctive fluvial lithofacies of the Llanelly Formation with its thick calcrete palaeosols that form the basal and top members of the formation in its type area.

## Interpretation

The western section closely resembles the Cheltenham Limestone Member of the Arundian Llanelly Formation except in two respects. Firstly, typical thickness values for this member range from 1.75 m to 8.5 m, not 28 m as at this site. Secondly, laminated rocks are not a common lithology in the Cheltenham Limestone Member, making up only 12.5% by thickness (Wright, 1981a). There are also significant differences with the Caswell Bay Mudstone of the Vale of Glamorgan and Gower, which, although commonly well laminated (Riding and Wright, 1981; Waters and Lawrence, 1987) does not exhibit common clay beds, and is also not as thick as the unit at Danygraig. There are, however, similarities with the Arundian Clifton Down Mudstone of the Chipping Sodbury–Tytherington area (Weedon, 1987).

The Danygraig succession was deposited in very shallow waters and a significant proportion was formed in a variety of intertidal settings. The preservation of fine lamination with thin bioclastic layers is typical of lower intertidal, storm-influenced settings. The presence of brecciation and gypsum pseudomorphs probably relates to upper intertidal to supratidal conditions. Hird *et al.* (1987) interpreted the finely crystalline dolomites in this section to be of peritidal origin. The clay beds, by analogy with the more studied Cheltenham Limestone Member, may represent thin palaeosols, but this assertion requires further investigation.

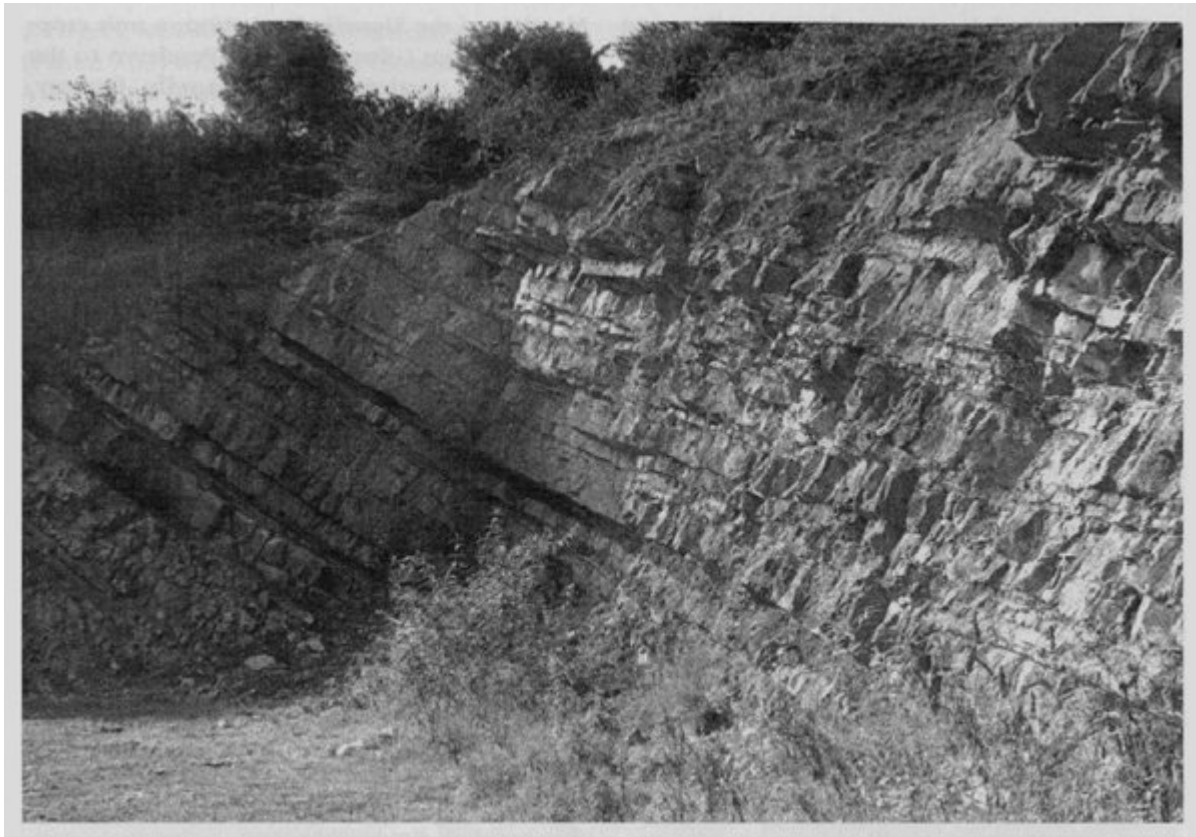
A clue to the origin of the Danygraig section might come from a sequence stratigraphical approach. In this context, the Caswell Bay Mudstone may represent a transgressive unit developed during the early Arundian sea-level rise, whereas the Cheltenham Limestone Member has the characteristics of a mainly highstand systems tract (Wright, 1996). It is possible that the Danygraig section represents an intermediate setting. To the south, down ramp, the combined effects of real sea-level rise and subsidence led to the drowning of the peritidal systems of the Caswell Bay Mudstone and to the development of a relatively thick set of offshore bioclastic limestones, the High Tor Limestone. In the more northern areas, where the rate of accommodation space creation was reduced, partly as a result of low subsidence rates, only a thin, broadly regressive peritidal unit formed (Llanelly Formation), associated with prominent palaeosol development. At the intermediate setting represented by Danygraig, the rate of accommodation space creation was in balance with sediment production, allowing the peritidal deposits to stack and not to be drowned and transgressed, as in the case of the Caswell Bay Mudstone. This might also explain the apparent lack of well-developed palaeosols in the Danygraig section.

The dolomitized sections to the south probably equate to the Chadian Gully Oolite or Gilwern Oolite, assuming that these outcrops are in sequence and that no fault exists between them and the peritidal limestones to the west.

## Conclusions

This site contains peritidal carbonates, of probable Arundian age. It is unique in that it may represent an important link between well-documented sections in South Wales, to the south-west and north. The site is therefore a key site for future sedimentological and stratigraphical research and pivotal to the understanding of late Chadian–Arundian palaeogeography in the South Wales area.

## [References](#)



*(Figure 9.35) Interbedded limestones and shales of the Courceyan Lower Limestone Shale Group at the Stenders Quarry GCR site in the Forest of Dean. (Photo: P.J. Cossey.)*