Tandinas Quarry, Isle of Anglesey, Gwynedd

[SH 584 820]–[SH 587 822]

Introduction

The Tandinas Quarry GCR site, located 2 km NNE of Llandona in eastern Anglesey, comprises the disused Tandinas Quarry [SH 584 820] and a sea-cliff section [SH 587 822] that extends for 500 m to the north-east of the quarry. It is the most complete section of early Asbian beds in Anglesey. The locality was chosen by Power (1977) as the type section for his proposed Tandinas Limestone Formation which broadly equates with the Careg-Onen Limestone Formation of Davies (1982) and the Lower Brown Limestone of the older nomenclature (Morton, 1870, 1878, 1901).

Description

Details of the section are provided by Power (1977) who recognized 14 sedimentary cycles in a 42 m sequence of the Tandinas Limestone Formation (Figure 8.6). Each cycle is between 1 m and 8 m in thickness, with cycles 1–7 recognizable in the cliffs to the north-east of the quarry and cycles 7–14 and the base of the overlying formation found in the quarry itself. Cycles in the upper part of the formation tend to be thicker than those at the base. Each cycle comprises two major lithologies. At the base there is a unit of thinly bedded, dark-weathering bioclastic limestones with thin shaly interbeds and partings. This unit has little visible macro-fauna with the exception of the brachiopod *Daviesiella llangollensis,* chaetetid sponges and gastropods. The second, or upper, unit consists of carbonate mudstones ('porcellanous limestones') with bird's-eye fenestrae and carbonaceous shales with little macrofauna visible apart from concentrations of gastropods in some limestones. Power (1977) regarded the irregular tops to the carbonate mudstones that cap cycles and mark cycle boundaries as erosional. The eroded carbonate mudstone of cycle 13 is overlain by a probable palaeosol clay.

The junction with the overlying formation is also visible in Tandinas Quarry 22.5 m above the main quarry floor (Figure 8.7). The top of the Tandinas Limestone Formation is marked by an unusually thick (7.7 m) development of white-weathering carbonate mudstones with fenestrae in the uppermost metre (Power, 1977). These are succeeded by more thickly bedded, pale-weathering bioclastic packstones and grainstones of the Penmon Limestone Formation (Power, 1977), which broadly equates with the Flagstaff Limestone Formation (Davies, 1982).

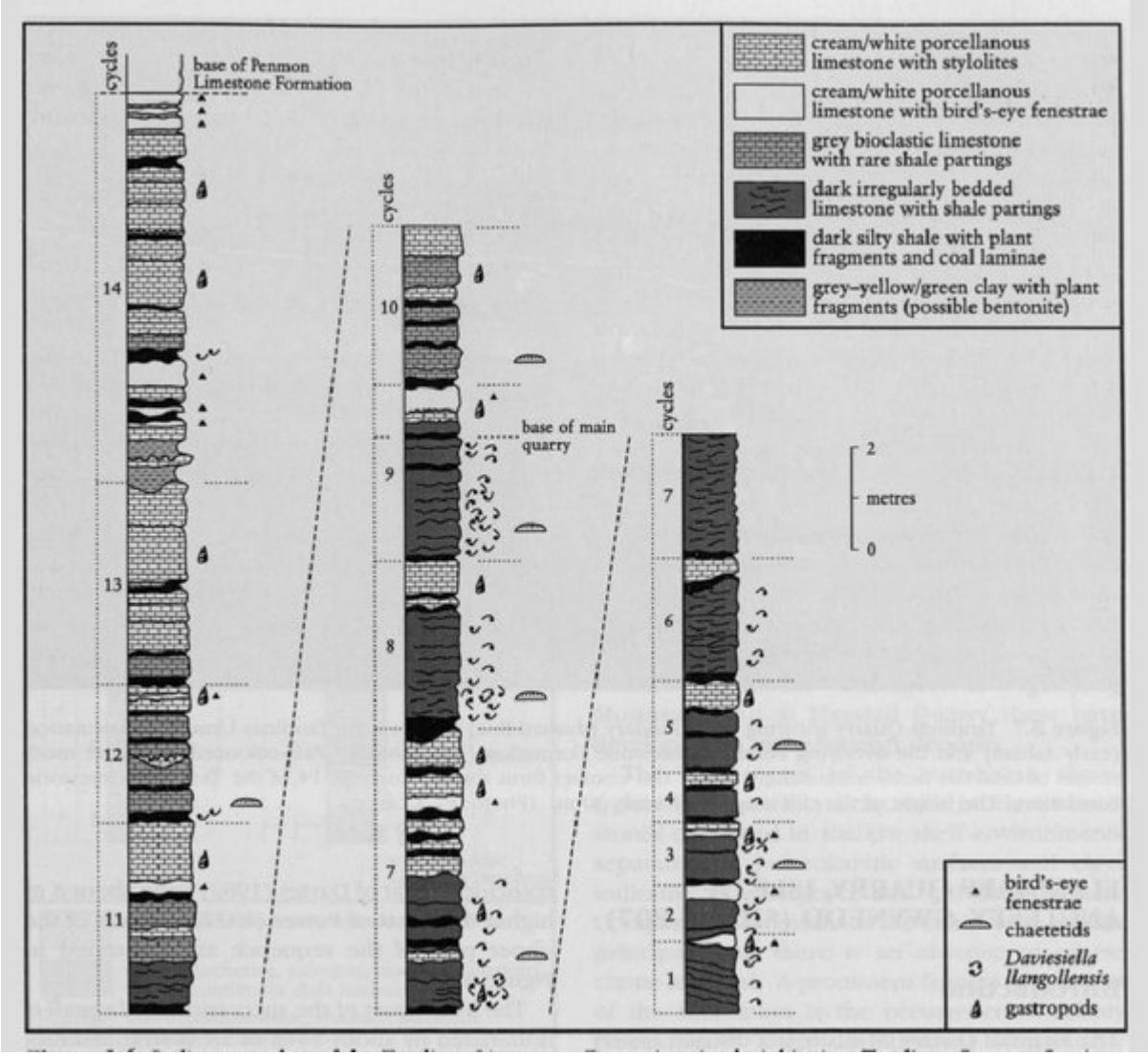
Interpretation

The early Asbian age for the Tandinas Limestone Formation is confirmed by the presence of *Daviesiella llangollensis.* The cycle style and thickness is comparable to that of the Ty-nant Limestone Formation at Eglwyseg Rocks, also of early Asbian age. Each cycle is interpreted as a small-scale shallowing-upwards succession, with the bioclastic limestones recording deposition in a shallow subtidal shelf or lagoon environment and the mudstones representing the shallowest, most sheltered parts of the lagoon. The presence of fenestrae, most typically in the white-weathering carbonate mudstones, indicates desiccation and deposition on tidal flats. The sparsity of the macrofauna suggests that salinities were different from normal sea water, confirming the interpretation that the environment was a restricted lagoon. The cyclicity reflected in the alternation of limestone rock types bears witness to a pattern of continuous sea-level change across Anglesey in late Dinantian times.

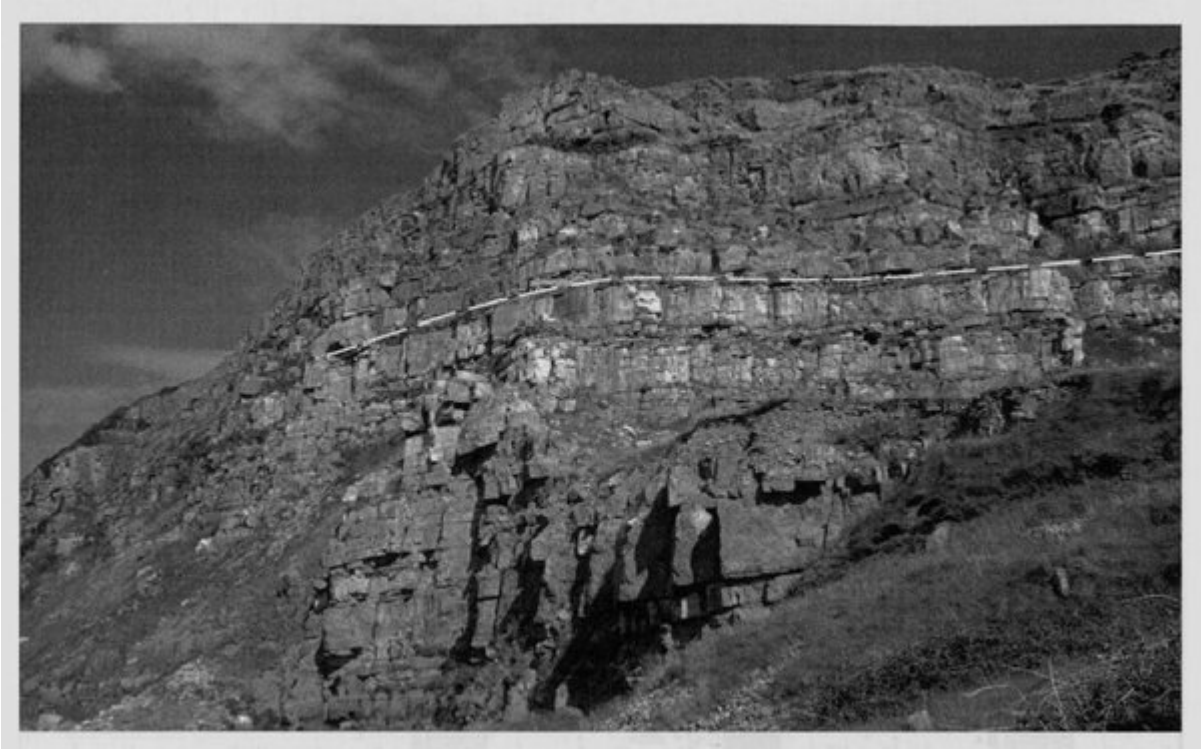
Conclusions

Tandinas Quarry is particularly important for demonstrating the development of small-scale cyclicity in early Asbian strata. Exposures here and at Flagstaff Quarry provide the best available and most continuous section of cyclic Asbian carbonates on Anglesey. Together these two complementary sites are of paramount importance in monitoring sea-level and palaeoenvironment changes across the North Wales Shelf during late Dinantian times.

References



(Figure 8.6) Sedimentary log of the Tandinas Limestone Formation (early Asbian) at Tandinas Quarry. Sections shown are for the main quarry (cycles 9 to 14), the adjacent sea cliffs (cycles 1 to 7 plus) and the transition zone (cycles 7 to 9) that links the quarry to the coastal exposures. After Power (1977).



(Figure 8.7) Tandinas Quarry showing the boundary (dashed line) between the Tandinas Limestone Formation (early Asbian) and the overlying Penmon Limestone Formation (late Asbian). Pale-coloured carbonate mudstones of tidal-flat facies immediately below this contact form the top to cycle 14 of the Tandinas Limestone Formation. The height of the cliff is approximately 30 m. (Photo: P.J. Cossey.)