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# Stout's Cottage Quarry, Devon

[ST 048 192]

## Introduction

The Stout's Cottage Quarry GCR site is a deep, elongated depression resulting from former quarrying on the edge of Waterslade Copse [ST 048 192], 3 km north-west of Weddeigh, east Devon. Now much overgrown, it nevertheless provides crucial evidence for the age and origin of the Upper Westleigh Limestone. The limestones are believed to have formed in shallow water and were transported to this area by turbidity currents during late Viséan times. Webby and Thomas (1965) first described the lithologies and macrofossils from this site, and conodonts have been used subsequently (Matthews and Thomas, 1974) to corroborate their Asbian–Brigantian age.

## Description

The Stout's Cottage section is developed in the steeply dipping southern limb of a minor anticline. The small exposure reveals about 10 m of typical Upper Westleigh Limestone but the faunas are unusually diverse and abundant. Distinct and massive calcarenites 20–60 cm thick dominate the succession, the coarser beds containing oolites and crinoid debris. Each bed is sharp-based and laterally continuous, but poorly sorted. Intervening fine-grained limestones are thinner (15–20 cm) and show evidence of weakly developed graded bedding. Webby and Thomas (1965) recorded one thick horizon that contained a variety of casts, one of which was part of a colonial coral identified as *Lithostrotion arachnoideum* (now *L. araneum*).

The interbedded shales are grey, but commonly weather pink due to iron staining. They are locally siliceous and yield numerous crushed ammonoids including *Michiganites* cf. *besteri* and *Goniatites*, which are indicative of late Asbian times (Prentice and Thomas, 1965; Riley, 1993). Benthic faunas have not yet been recorded from this site and the only other macrofossils known are *Posidonia becheri*, indeterminate orthocones and abundant comminuted plant debris (Webby and Thomas, 1965).

A limestone situated 7 m above the occurrence of *M. cf. besteri* produced an impoverished conodont assemblage that includes *Gnathodus bilineatus*, *G. commutatus commutatus*, *G. c. homopunctatus*, *Pseudopolygnathus triangulus pinnatus* and *Ps. cf. dentilineatus* (Matthews and Thomas, 1974). This suggests a Brigantian age, which accords well with the underlying ammonoid and bivalve data, although the presence of *Ps. triangulus pinnatus* and *Ps. cf. dentilineatus* also indicate reworking of older, Tournaisian conodonts (N. Riley, pers. com., 2002).

## Interpretation

The succession exposed here can be compared with that at West Whipcott Quarry and the evidence provided by the reworked shelf debris, such as coral fragments and oolites, in the limestones confirms a shallow-water origin. Thomas (1982) considered the coarse limestone beds of the Upper Westleigh Limestone succession to be proximal turbidites, characterized by thick detrital limestones containing reworked, shallow-water faunas. In contrast, the interbedded shales possess fossil assemblages that comprise pelagic and benthic taxa showing little sign of transportation. Thus the shales imply deposition below wave-base and represent background sedimentation into which the turbidites were intercalated.

The thick, sharp-based, massive calcarenites at Stout's Cottage Quarry are comparable with the Viséan Kohlenkalk in the West German Rheinisches Schiefergebirge (Franke *et al.*, 1975). In particular, the well-bedded, bioclastic limestone facies is characterized by beds of variable (0.5–2.5 m) thickness that often lack internal structures and have few shale partings. The German facies attains a maximum thickness of about 100 m and it thins to 10 m on the flank of a submarine high. Franke *et al.* (1975) interpreted these rocks as proximal turbidites derived from an adjacent carbonate platform.

At a regional scale, Franke *et al.* (1978) note that the association of black shales, cherts and limestone turbidites form condensed pelagic sequences throughout much of the Rhenohercynian Zone. This phase of diminished subsidence and sedimentation, the so-called 'stagnation phase' or 'bathyal lull', probably took place in water depths that ranged from several hundred metres up into the photic zone. Franke *et al.* (1978) distinguish this upper bathyal setting from abyssal depths (> 2000 m) because there is no evidence that a Rhenohercynian ocean existed.

## **Conclusions**

Stout's Cottage Quarry is an important site because it yields a variety of fossils that indicate a late Viséan age and further constrain the age of the Upper Westleigh Limestone succession. Detrital limestones containing shallow-water debris are thought to result from powerful submarine currents that transport slurries of partially consolidated sediment into low areas on the seabed. They add considerably to the overall thickness of Viséan strata in the area.

## **[References](#)**