

FIELD EXCURSION TO EXAMINE THE UPPER DEVONIAN/LOWER CARBONIFEROUS ROCKS AND THE QUATERNARY DEPOSITS OF THE NORTH DEVON COAST, 7TH JANUARY, 2017

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A group of 44, including members of the Society, local visitors and students from Exeter College, assembled in the car park of the Saunton Sands Hotel [SS 4572 3777] on an uninviting foggy and damp January morning. The purpose of the field trip was to examine the sedimentology and structure of rocks spanning the Devonian/Carboniferous boundary and to investigate the nature of the unconformably overlying Quaternary raised beach deposits on the interglacial shore platforms in the setting of the North Devon coast. The trip included visits to two principal locations: Saunton Cliffs (AM) and Baggy Point (PM).

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INTRODUCTION

The Devonian and early Carboniferous succession exposed on the coast of North Devon (Figure 1) comprises a thick sequence (~6,000m) of terrigenous, brackish and shallow marine deposits (Whittaker and Leveridge, 2011), that traditionally was thought to have been laid down on the southern margin of the Old Red Sandstone (ORS) continent in a basin supplied with sediment from a migrating northern boundary (Edmonds *et al.*, 1979). South Wales was envisaged to be an immediate source of fluvial sediment supply, and the sequence in North Devon represents a more proximal setting than the fully marine Devonian successions exposed in South Devon. The Variscan Orogeny, which culminated in latest Carboniferous to early Permian times, folded and faulted the Devonian and Lower Carboniferous strata of the area. Increasing knowledge of the stratigraphy and structure of the marine Devonian rocks in South-West England, garnered through a major long-term programme of detailed remapping conducted by the British Geological Survey (Leveridge and Hartley, 2006), has refined understanding of Devonian and Carboniferous environments in the region such that deposition is now seen as having taken place in a series of down-faulted half and full grabens that developed sequentially across the passive margin of the Old Red Sandstone continent (Leveridge and Shail, 2011). Furthermore, it is now thought unlikely that the sediments in the North Devon Basin were sourced from South Wales, but rather from a setting located well to the south-east and to the west of the Ardennes (Whittaker and Leveridge, 2011) because of major late Carboniferous strike-slip displacement of what is now the North Devon area along the Bristol Channel-Bray Fault System (Shail and Leveridge, 2009). The field excursion provided a chance to examine two formations at the top of the Devonian succession in the North Devon Basin. In the morning, the group studied the Pilton Mudstone Formation (formerly known as the Pilton Beds or

Pilton Shales), which is transitional in age across the Devonian/Carboniferous boundary (358.9 Ma). In the afternoon, the underlying Upper Devonian (Famennian stage) Baggy Sandstone Formation was inspected near to its rather arbitrary boundary with the overlying Pilton Mudstone Formation.

Unconformably overlying the Devonian and Lower Carboniferous rocks of the North Devon coast are Quaternary deposits that have attracted attention and controversy for more than 170 years (Harrison and Keen, 2005; Rolfe, 2015). These sediments sit on raised shore platforms cut into the Pilton Mudstone Formation that range in height from 0–6 m, through 5.5–7.6 m to 10.7–15.0m O.D. Although showing considerable lateral and vertical variations, these deposits have a generalized sequence from the base upwards of encrusting barnacles, erratic boulders, raised beach conglomerate, cemented sand ('sand-rock') and Head (a diamicton consisting of coarser angular particles set in a finer matrix); see Campbell and Gilbert (1998). The field excursion provided the opportunity to examine this sequence in detail and to interpret what it reveals about the changing palaeoenvironments during the Middle and Upper stages of the Pleistocene epoch (c. 774.0–11.7 ka).

THE CLIFFS AT SAUNTON SANDS [SS 4572 3765 – SS 4401 3787]

The Thematic Trail 'Saunton Cliffs' booklet (Keene and Cornford, 1995) was distributed as additional field notes which encourage interpreting the location via a self-study format. The group descended to the modern beach which is c. 500m wide at low tide, has a simple non-barred form, and is comprised mainly of fine sand that has a high calcium carbonate content (~30% CaCO₃) derived largely from finely broken shells (Keene and Cornford, 1995). The beach is subjected to a high mean