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# Havern Beck, Saltergate, North Yorkshire

[SE 847 947]

K.N. Page

## Introduction

Sections in the small steep-sided valley of Havern Beck, near Saltergate, North Yorkshire, expose the thickest (3.56 m) Cornbrash Formation known in the Cleveland Basin. The formation is seen particularly well in a waterfall section (Figure 5.21). The site has been reported by Fox-Strangways *et al.* (1885), Fox-Strangways (1892), Douglas and Arkell (1932), Wright (1968, 1977, 1978), Page (1988) and Riding and Wright (1989).

## Description

The following notes, including bed notation, are based mainly on Wright (1968, 1977, 1978) and Riding and Wright (1989).

	Thickness (m)
<b>Osgodby Formation</b>	
<b>Langdale Member</b>	
$\gamma_1$ : Sandstone	seen to 3.8
<b>Redcliff Rock Member</b>	
$\beta_2$ : Sandstone with berthierine ooids	2
$\beta_1$ : Sandstone, massive and flaggy; <i>Macrocephalites</i> cf. <i>polyptychus</i> (Spath) found loose	c. 17
<b>Cayton Clay Formation</b>	
Clay, shaly, bituminous; small bivalves (only traces seen)	c. 2.4
<b>Cornbrash Formation</b>	
$\alpha_3$ : Limestone, sandy, bioclastic; mudstone■ filled burrows; <i>Entolium</i> , <i>Lopha marshii</i> (J. Sowerby), <i>Oxytoma</i>	seen to 0.75
$\alpha_2$ : Limestone, sandy, sideritic; burrows weathering red; bivalves (including <i>Entolium</i> , <i>Liostrea</i> , <i>Meleagrinnella</i> , <i>Modiolus</i> , <i>Oxytoma</i> , <i>Pinna</i> ) and the brachiopod <i>Microthyridina</i> cf. <i>lagenalis</i> Douglas and Arkell <i>non</i> Schlotheim	0.54
$\alpha_1$ : Limestone, sandy, hard, grey with bivalves (including <i>Entolium</i> ) and serpulids	1.94
Sandstone, fine-grained, shaly; <i>Entolium</i>	0.16
Ironstone, silty, sideritic; <i>Meleagrinnella</i> , <i>Modiolus</i>	0.17
Shale, grey; calcareous and sandy in upper part; brachiopod fragments	c. 0.9
<b>Scalby Formation</b>	
Siltstone, grey, sandy, burrowed	

## Interpretation

Unlike the Cornbrash Formation of the Yorkshire coastal sections (see Gristhorpe Bay, Yons Nab and Red Cliff–Cunstone Nab GCR site report, this volume), marine beds ( $\alpha_0$ ) occur below  $\alpha_1$ ;  $\alpha_2$  is missing (Figure 5.22).  $\alpha_0$  rests on a bored erosion-surface at the top of the Scalby Formation into which clay-filled burrows extend 0.05–0.10 m (Riding

and Wright, 1989). The presence of thick Cornbrash Formation was not appreciated by Douglas and Arkell (1932) who grouped the beds of  $\alpha_0$ , which is present only in this area, with the non-marine Scalby Formation (then called the 'Upper Estuarine Series'). However, Wright (1977) demonstrated their marine character and confirmed that inclusion in the Cornbrash Formation was appropriate; he suggested that, below the main regional marine transgression represented by  $\alpha_1$ , at least some of  $\alpha_0$  passed laterally into non-marine sandstones of the Scalby Formation. He concluded that the presence of this lower marine unit at Havern Beck was due to an earlier marine transgression into a depression in the surface of the Scalby Formation delta in the Langdale–Newton Dale area. Palynological evidence indicates that the Scalby Formation is Bathonian in age (Riding and Wright, 1989); the Cornbrash–Scalby formational boundary is therefore the Bathonian–Callovian stage boundary. The virtual absence of other age-diagnostic fossils at Havern Beck is more problematic, and it can only be assumed that  $\alpha_1$  and  $\alpha_3$  here are contemporaneous with supposed equivalent levels in the Scarborough district, to the east.

The presence of an ammonite comparable with *Macrocephalites* cf. *polyptychus* in the Redcliff Rock Member (possibly  $\beta_{1b}$ ; see (Figure 5.24), Fairy Call Beck GCR site report, this volume) is also problematic since this species is elsewhere typical of the underlying Cayton Clay Formation; its presence here suggests that the lowest part of the Redcliff Rock Member may well still belong to the Kamptus Subzone (Lower Callovian Herveyi Zone), i.e. be older than near Scarborough, unless erosion and redeposition is invoked. No age-diagnostic fossils have been recorded from  $\beta_2$  here.

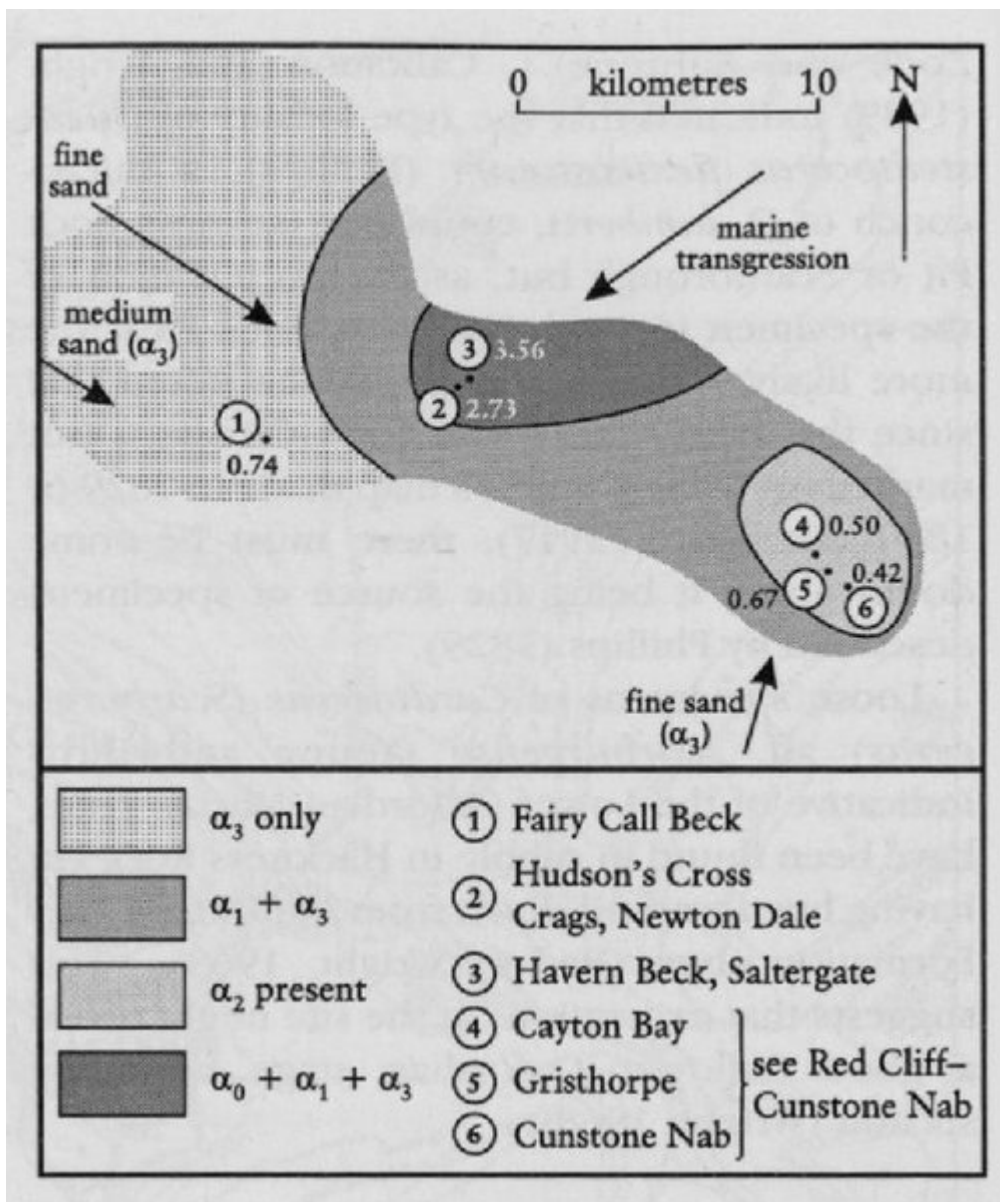
## Conclusions

The GCR site at Havern Beck exposes the thickest Cornbrash Formation in northern England. The sequence includes a basal marine unit apparently of equivalent age to non-marine deposits of the Scalby Formation elsewhere in the Cleveland Basin and provides clues as to the direction of the Early Callovian marine transgression in the region.

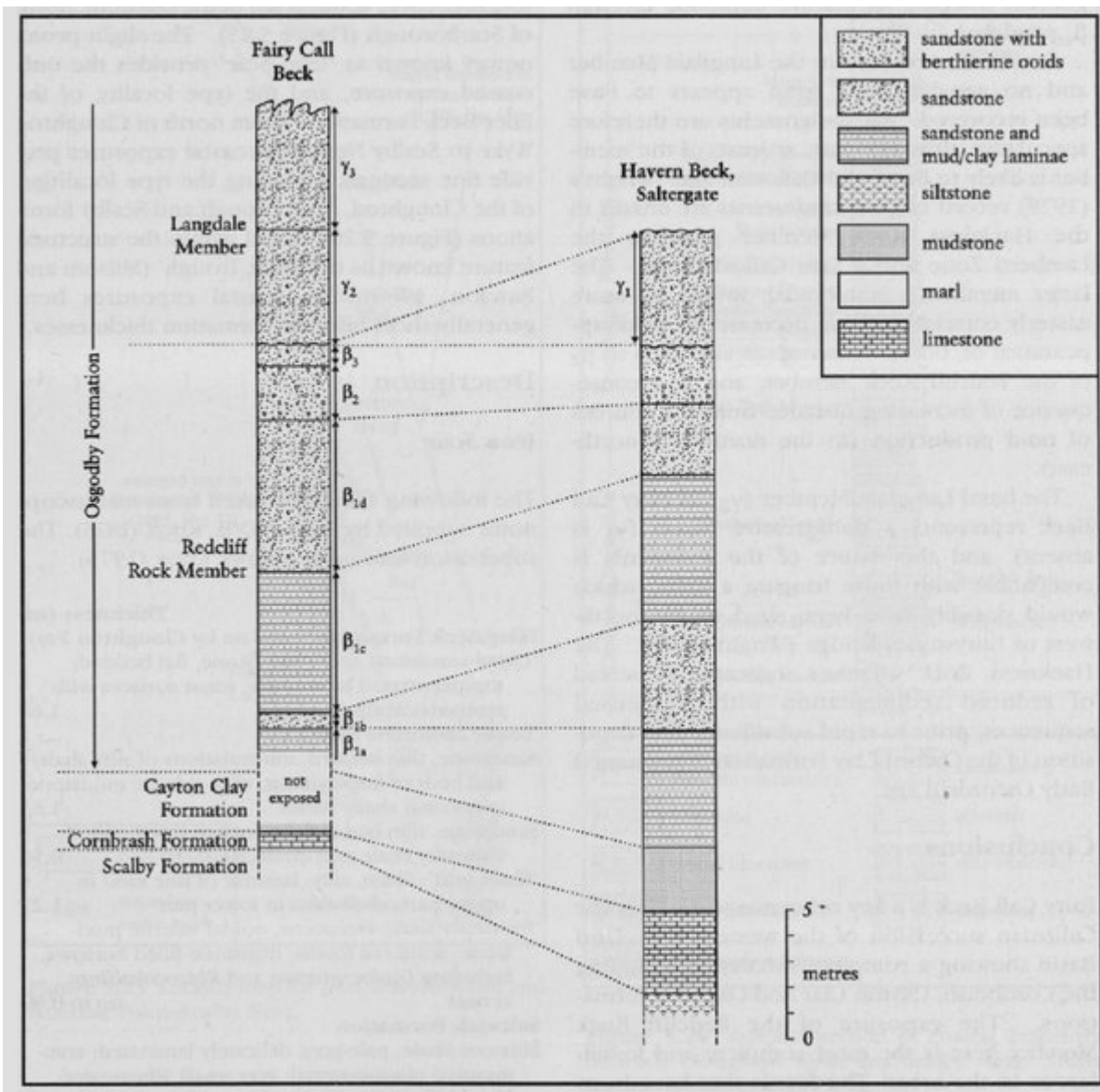
## References



(Figure 5.21) Havern Beck, Saltergate. The Cornbrash Formation is well exposed behind the waterfall. (Photo: K.N. Page.)



(Figure 5.22) Simplified distribution map of the subdivisions of the Cornbrash Formation in the Cleveland Basin showing thicknesses (in metres) at the GCR sites. (After Wright, 1977, fig. 3.)



(Figure 5.24) Correlation between the sections at Fairy Call Beck and Havern Beck. (After Wright, 1978, fig. 2.)