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# Crag Gill

## Highlights

Crag Gill shows the best section through the Namurian on the Alston Block, and includes one of the highest known marine limestones in the Carboniferous of north-western Europe.

## Introduction

This stream [NZ 027 236] between Eggleston and Woodland, 8 km ESE of Middleton in Teesdale, County Durham, exposes Namurian rocks on the Alston Block, an area of reduced subsidence that separated the Stainmore and Northumberland troughs. Details of the geology can be found in Mills and Hull (1976).

## Description

The full sequence as exposed along Crag Gill is 49 m thick, but only the upper 25 m is Upper Carboniferous and thus dealt with here. The lowest Upper Carboniferous strata are 11 m of alternating mudstones and deltaic sandstones, together with one thin limestone. These are overlain by a 28 cm thick grey, impure limestone — the Whitehouse Limestone, for which this is the type locality.

The Whitehouse Limestone is overlain by 2 m of basinal mudstones with abundant marine fossils (see below). There then follows thick sandstones, which mark the base of the Millstone Grit on this part of the Alston Block. Two sandstones can be seen in this section, the lowest is only 3 m thick, and is relatively fine grained, the higher one, however, is much coarser and massive, and is known as the First Grit, which can be up to 22 m thick, although only 8 m are visible here.

The thin, unnamed limestone below the Whitehouse Limestone has yielded an abundant brachiopod fauna, together with the bivalves *Sanguinolites* sp. (Mills and Hull, 1976). This is not biostratigraphically diagnostic. However, the same bed in the nearby Woodland Borehole has yielded the ammonoid *Vallites henkei* (Schmidt) (Mills and Hull, 1969), indicating the *R. circumplicatilis* Zone (lower Kinderscoutian). As the underlying Grindstone Limestone is thought to be upper Arnsbergian, there seems to be a non-sequence somewhere in the intervening succession.

The Whitehouse Limestone here has yielded only a limited range of fossils, mainly crinoid debris and *Productus* sp., but in the Woodland Borehole *Reticuloceras stubblefieldi* Bisat and Hudson has been found, indicating the *R. nodosum* Zone (middle Kinderscoutian). At Crag Gill, this ammonoid species occurs in the mudstones immediately overlying the limestone. It occurs together with bryozoa (*Fenestella*, *Rhombopora*), echinoderms (*Archaeocidaris*), brachiopods (*Crurithyris*, *Productus*, *Rugosochonetes*), gastropods (*Coleolus*, *Euphemites*), bivalves (*Aviculopecten*, *Euchondria*, *Palaeoneilo*, *Paleyoldia*), cephalopods (*Catasroboceras*) and arthropods (*Dithyrocaris*). There are also fragments of zaphrentids which, although they have so far proved specifically unidentifiable, are of interest as one of the youngest occurrences of this coral-type.

## Interpretation

This is the best exposure of the upper Yoredale and lower Millstone Grit groups on the Alston Block. The Namurian sequence developed on the Alston Block is more condensed compared with those of the Stainmore and Northumberland troughs (Taylor *et al.*, 1971, pl. 7). Also, the Yoredale facies extends to rather higher stratigraphical levels, with the Whitehouse Limestone of middle Kinderscoutian age; in the trough successions, Yoredale limestones do not extend above the Arnsbergian.

A somewhat more complete succession has been reported from the nearby Woodland Borehole (Mills and Hull, 1969). For instance, the stratigraphical interval between the Grindstone and Whitehouse limestones is 38 m thick in the

borehole, but only 21 m along Crag Gill. However, whether this represents a non-sequence between the Arnsbergian and Kinderscoutian at Crag Gill, or is simply a function of the relatively poor exposure of this part of the succession here, is not totally clear.

Although it has not been subjected to a detailed taxonomic study, the Whitehouse Limestone fauna is important as being the youngest shelf-limestone assemblage known from the Carboniferous of north-western Europe. In fact, apart from the Zechstein deposits of the Upper Permian, it is the oldest marine limestone deposit in the entire Palaeozoic of north-western Europe. It thus holds considerable potential importance for understanding the decline in marine influence in the Late Carboniferous and Permian in this part of Laurasia/Pangea, which resulted from the geographical changes caused by the Variscan earth movements.

## **Conclusions**

Crag Gill is the best exposure of rocks of Namurian age (about 320 million years old) on the Alston Block in Northern England. The marine limestone is amongst the youngest known in the Carboniferous of north-western Europe.

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