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# Crackington Coast

## Highlights

Crackington Coast provides the most complete section through the Crackington Formation, ranging in age from Chokierian to Langsettian.

## Introduction

This stretch of coast lies between Rusey Beach and Widemouth Sands, near Crackington Haven, north Cornwall [SX 123 936]–[SS 198 019]. It shows a highly contorted succession through the Crackington Formation, between the Rusey Fault Zone to the south and the Widemouth South Fault to the north (Figure 3.3). The geology is described by Freshney *et al.* (1972).

## Description

### Lithostratigraphy

Structural disturbance has made it impossible to establish a stratigraphical log for the sequence here, or to determine its full thickness. The strata are mainly alternating sandstones and shales, the arenaceous sediments becoming more dominant towards the top of the succession. Many of the sandstones have sole marks, flutes, lodes and flames, typical of turbidites (Figure 3.4) and (Figure 3.5). Palaeocurrents established by Mackintosh (1964) suggest a westerly or north-westerly flow.

These strata were first named the Crackington Measures by Ashwin (1958). Edmonds (1974) later used the name to include both the original Crackington Measures and the Boscastle Measures, found south of the Rusey Fault Zone. However, Selwood *et al.* (1985) showed that the strata south of the fault were Lower Carboniferous, as well as being of completely different facies, and so restricted the Crackington Formation to the strata north of the fault.

### Biostratigraphy

The only stratigraphically diagnostic fossils found here are ammonoids. They are rare and usually poorly preserved, but sufficient have been found to identify several zones (Freshney *et al.*, 1972).

The Chokierian is represented by assemblages of both the *Isohomoceras subglobosum* and *Homoceras beyrichianum* zones, found between Rusey Cliff and Crackington Haven. Freshney *et al.* give few species identifications, however, beyond *I. cf. subglobosum* (Bisat) found on the south side of Crackington Haven.

The presence of Alportian fossil assemblages is questionable. Freshney *et al.* mention localities near Crackington Haven yielding *Homoceratoides?* and *Homoceras* of the *H. undulatum* Subzone, associated with bivalves *Dunbarella* sp. However, the fossils are badly distorted and their identifications are far from certain.

There is apparently rather better palaeontological evidence available for the Kinderscoutian, at several localities between Crackington Haven and Millook Haven. Freshney *et al.* mention assemblages belonging to the *Reticuloceras circumplicatile*, *R. nodosum* and possibly the *R. reticulatum* zones. However, the composition of these assemblages is not documented.

Basal Marsdenian fossils were reported from near Canceleave Strand, in the form of abraded goniatites of the *Bilinguites gracilis* Zone (although Freshney *et al.* again fail to give identifications). At Foxhole Point, *Verneuilites sigma* (Wright) and *Bilinguites cf. superbilinguis* Bisat have been reported. This suggests the *V. sigma* Subzone (*B. superbilinguis* Zone) at the very top of the Marsdenian.

Biostratigraphical evidence of the Yeadonian has yet to be found in this section. The Langsettian, in contrast, has been proved at two levels. Near Wanson Mouth, *Gastrioceras* cf. *coronatum* Foord and Crick, *G.* cf. *listeri* (Sowerby) and *Dunbarella* sp. have been found at several points and indicate a level equivalent to the Gull Rock Shale near Clovelly, and the Listed Marine Band of coalfields to the north. Ammonoids have also been reported from a higher stratigraphical level near Wanson Mouth. They have been totally recrystallized as calcite and are thus unidentifiable, but Freshney *et al.* argue that they are very similar to ammonoids found in the Sandy Mouth Shale of the Bude Formation.

## Interpretation

This site may be provisionally regarded as the stratotype for the Crackington Formation. It is far from an ideal choice, due to tectonic disturbance of the sequence. However, the interval was first named here (Ashwin, 1958) and it is the only known section through most of the formation with reasonable biostratigraphical control. Although Ashwin originally identified only the strata at Crackington as the Crackington Formation, following Edmonds (1974) it is now used for a variety of mainly Namurian deposits previously called the Limekiln Beds, Instow Beds, Westward Ho! Formation, Welcombe Formation and Appledore Formation (Ashwin, 1958; Prentice, 1960a; De Raaf *et al.*; 1965; Money, 1966).

The Crackington Formation, as currently defined, is widely distributed over north Devon and north Cornwall, and there are a number of other extensive coastal exposures, such as Clovelly (see below), Embury Beach near Hartland Point (Freshney *et al.*, 1979), and the Westward Ho! coast section (Edmonds *et al.*, 1979). However, these only show the upper part of the formation (Marsdenian to Langsettian). There are also a number of inland sites, such as Bonhay Road Cutting and Bickleigh Wood Quarry (see below), but these have relatively limited sequences. Only at Crackington Coast is the full Chokierian to Langsettian succession of the Crackington Formation demonstrated.

The evidence from Crackington suggests that the Culm Trough was filled during the Namurian by progressively more proximal turbiditic sediments. The broadly westerly palaeocurrents indicate that the turbidites flowed along the axis of the trough, although elsewhere, easterly orientated palaeocurrents have also been recognized (Edmonds *et al.*, 1968). Thomas (1988) argued that the turbidites were probably generated by slumping of sediments on the shelf margin. He also suggested that the flows were not constricted laterally, although Melvin (1986) has argued that they may have occurred within broad, shallow channels.

The Ugbrooke Sandstone Formation in south Devon is probably a lateral equivalent of the lower Crackington Formation. Typically, it consists of coarse, often feldspathic sandstones and conglomerates, interbedded with dark shales (Selwood *et al.*, 1984). At places, however, the Ugbrooke sandstones are rather similar to the Crackington Formation, and near Tavistock, McCourt (1975) was only able to distinguish them by the chemical composition of the shales.

The Rusey Fault Zone, at the southern limit of the site, is an important geological boundary in south-west England, separating rocks of different age, facies, structural style and metamorphic grade (Selwood *et al.*, 1985). According to the model of Selwood *et al.*, it marks where a complex suite of allochthonous nappes to the south underthrust a more or less autochthonous flysch basin. In contrast, Turner (1986) has argued that the strata to the south represent a compartmentalized basin, in which sedimentation and structural evolution were controlled by movements along vertical basement faults, and that the Rusey Fault Zone was not a persistent line of underthrusting. Whichever model is accepted, however, the Rusey Fault Zone is important for understanding the geological evolution of the Culm Trough.

## Conclusions

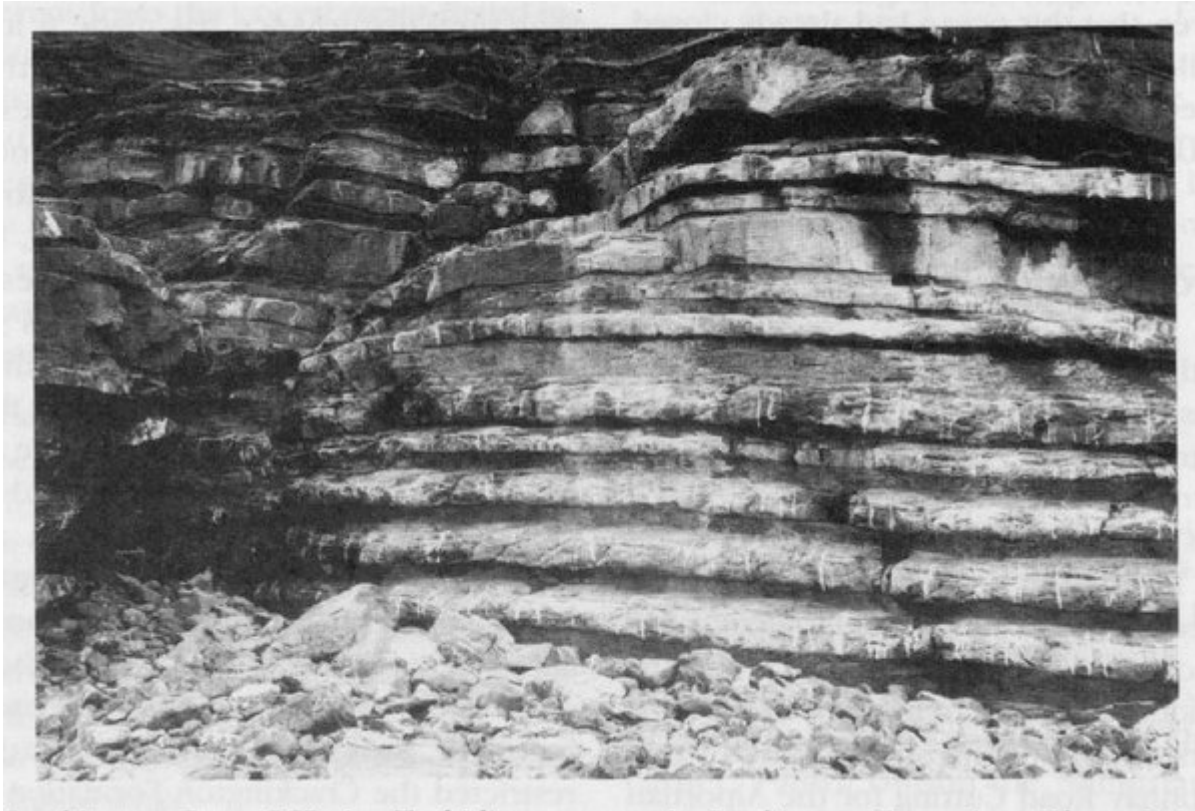
Crackington Coast is the best place to study the Crackington Formation, an interval of rocks found widely in Cornwall and North Devon, ranging in age from about 322 to 315 million years old (part of the Namurian Epoch). They are thought to represent alternating layers of muds and sands deposited in deep marine water. The muds are typical deep-water deposits and include numerous marine animal fossils that have proved useful in establishing correlations with other areas. The sandstones, on the other hand, were probably originally river-delta deposits, transported into the deeper water by underwater currents known as turbidity currents, probably triggered by earthquake shocks. Evidence from here suggests that these sands progressively filled-up the marine basin, and by the end of the Namurian the area became

essentially coastal in character.

## References



(Figure 3.3) Crackington Coast GCR site. Typical convoluted sequence of Crackington Formation. (Photo: R.A. Cottle.)



(Figure 3.4) Crackington Coast GCR site. Turbidite sequence in Crackington Formation. (Photo: R.A. Cottle.)



*(Figure 3.5) Crackington Coast GCR site, south side of Crackington Haven. Sole markings in Crackington Formation.  
(Photo: R.A. Cottle.)*