Osgodby Point, North Yorkshire

[TA 065 854]

K.N. Page

Introduction

Osgodby Point, perhaps better known as 'Osgodby Nab', is a small headland on the coast, *c.* 4 km south of Scarborough. It separates Cayton Bay to the south from Cornelian Bay to the north. The tip of the headland is formed of upfaulted Cloughton Formation of Bajocian age but Callovian rocks, comprising the Cornbrash, Cayton Clay and Osgodby formations, are exposed on both its sides (at *c*. [TA 064 853] and *c.* [TA 064 855]. Further exposures are visible, depending on the state of the beach, on the foreshore opposite the former Cayton Bay waterworks [TA 067 846]. Osgodby Point has long been recognized as an important Callovian site and is now the type locality of the Osgodby Formation (Wright, 1978). The site also includes an internationally important Callovian–Oxfordian stage boundary sequence (Callomon, 1990).

Description

The Callovian sections around Osgodby Point were fully described by Wright (1968, 1977), and the Lower Callovian part reassessed by Page (1988, 1989). The succession is broadly similar to that farther south in Cayton Bay (see Gristhorpe Bay, Yons Nab and Red Cliff-Cunstone Nab GCR site report, this volume) but there are differences in detail between the two sites.

The Cornbrash Formation is normally seen only in boulder-covered foreshore exposures (*c.* [TA 065 853]) on the south side of Osgodby Point. The succession is as follows.

	Thickness (m)
Cornbrash Formation	
α_3: Limestone, sandy, bioclastic with pebbles of berthierine oolite derived from underlying bed; abundant Lopha marshii o. Sowerby); Macrocephalites ex gr. kamptus (S.S. Buckman)	0.08
α_1: Limestone, red-weathering, berthierine oolite; common bivalves; rare *Macrocephalites*	0.79

Poor exposures of the overlying Cayton Clay Formation are present on either side of Osgodby Point. On the south side, traces can often be seen between boulders above the Cornbrash Formation outcrop recorded above. The basal silty shelly horizon (Bed α_4 of Wright, 1977) is well developed with abundant *Meleagrinella braamburensis* (Phillips), *Lopha marshii* Sowerby) and *Nanogyra nana* (J. Sowerby). Higher levels contain occasional, small, brownish-grey phosphatic nodules, and several (mainly fragmentary) *Macrocephalites polyptychus* (Spath) have been recovered. The formation is also occasionally seen in a disturbed condition on the north side of the point at *c*. [TA 063 856] close to the cliff-landslip base where exposures are remarkable for yielding, as well as *Macrocephalites* ex gr. *kamptus* (S.S. Buckman), many fragmentary crustacean (*?Glyphaea*) remains in typical small phosphatic nodules.

In 1996, the overlying Redcliff Rock Member (*c.* 9.6 m thick) of the Osgodby Formation was seen best on the south side of Osgodby Point at *c.* [TA 064 853], where units β_1–β_3 of Wright (1968) are well developed. The berthierine ooidal sandstone of β_2 yields the ammonites *Kepplerites* (*Gowericeras*) sp. and *Proplanulites* cf. *ferruginosus* S.S. Buckman.

The Langdale Member (3.8 m thick) is seen overlying the Redcliff Rock Member in the exposure on the south side of Osgodby Point (see above), and again at *c*. [TA 064 855] on the north side. It comprises a fine- to medium-grained

sandstone with clay wisps and bivalves (*Chlamys* and *Modiolus*) (γ_1 of Wright, 1968) overlain by a flaggy-weathering siltstone with very occasional small bivalves and scattered belemnites (γ_2 of Wright, 1968). *Erymnoceras* has been recorded in γ_2 by J.K. Wright (pers. comm., 1996).

The Hackness Rock Member (*c.* 0.75 m thick) is seen particularly well only on the north side of Osgodby Point, above the Langdale Member. Here it is dominated by a hard, bluish-grey, sandy, berthierine oolite with sporadic ammonites, belemnites and bivalves (Bed 8 of Wright, 1968) overlain by 0.1 m of soft, greenish-grey sand with green berthierine ooids (Bed 9 of Wright, 1968). The base of the member is erosional. The member is overlain by a grey, sandy shale (Bed 10 of Wright, 1968) with scattered berthierine ooids and a line of calcareous nodules *c.* 0.08 m above the base.

On the foreshore opposite the former waterworks [TA 067 846] in Cayton Bay (Wright, 1968, 1983), the Hackness Rock Member comprises *c.* 0.6 m of hard, berthierine ooidal sandstone with *Kosmoceras* and *Binatisphinctes* (Bed 1 of Wright, 1968) overlain by 0.6 m of berthierine oolite and ooidal sandstone with *Quenstedtoceras, Peltoceras* (*Peltomorphites*) and *Hecticoceras.* The basal 0.45 m of the overlying Oxford Clay Formation (Bed 5 of Wright, 1968) is a black chamositic silt with calcareous nodules, *Quenstedtoceras paucicostatum* (Lange) and a possible late form of *Longaeviceras* (Wright, 1983, pl. 18, fig. 8).

Interpretation

The presence of *Macrocephalites* in α_1 of the Cornbrash Formation indicates, as elsewhere in the area, the Terebratus Subzone of the Lower Callovian Herveyi Zone; subdivision α_2 is completely absent here. The *Macrocephalites* ex gr. *kamptus* recorded in α_3 is presumed to indicate the *kamptus* α Biohorizon of the Kamptus Subzone (Lower Callovian Herveyi Zone); the *polyptychus* Biohorizon of that subzone is indicated in the Cayton Clay Formation by the presence of its index species (Page, 1988).

Within the Osgodby Formation, *Erymnoceras* in γ_2 of the Langdale Member indicates the Middle Callovian Coronatum Zone but no age-diagnostic fossil has been reported from γ_1. The basal *c.* 0.15 m of the Hackness Rock Member has yielded the ammonites *Kosmoceras* (*Lobokosmokeras*) sp. and rare *Binatisphinctes bamulatus* (S.S. Buckman), *Pachyceras* cf. *crassum Douvillé* and *Peltoceras* (*P.*) *athleta* (Phillips) (Wright, 1968). These are indicative of the upper Phaeinum or lower Proniae subzones of the (Upper Callovian) Athleta Zone. A little higher, but still within Bed 8 of Wright (1968), the ammonite *Quenstedtoceras* ex gr. *lamberti* (J. Sowerby) occurs with the bivalve *Chlamys* and the belemnite *Lagonibelus beaumontiana* (d'Orbigny), and indicates the Lamberti Zone and Subzone (Wright, 1968; K.N. Page, unpublished). Bed 8 therefore appears to include a significant non-sequence as no evidence of the upper Proniae, Spinosum and Henrici subzones is known. The Lamberti Zone and Subzone is also indicated in the overlying Bed 9 by the presence of *Peltoceras* and *Quenstedoceras.*

In the foreshore exposure opposite the former waterworks, the ammonites recorded in the Hackness Rock Member indicate the Athleta Zone overlain by the Lamberti Zone and Subzone. *Quenstedtoceras paucicostatum* here is a terminal Callovian indicator (*paucicostatum* Biohorizon of Marchand, 1979). Although not specifically recorded, the basal Oxfordian Scarburgense Subzone would be expected immediately above this fauna.

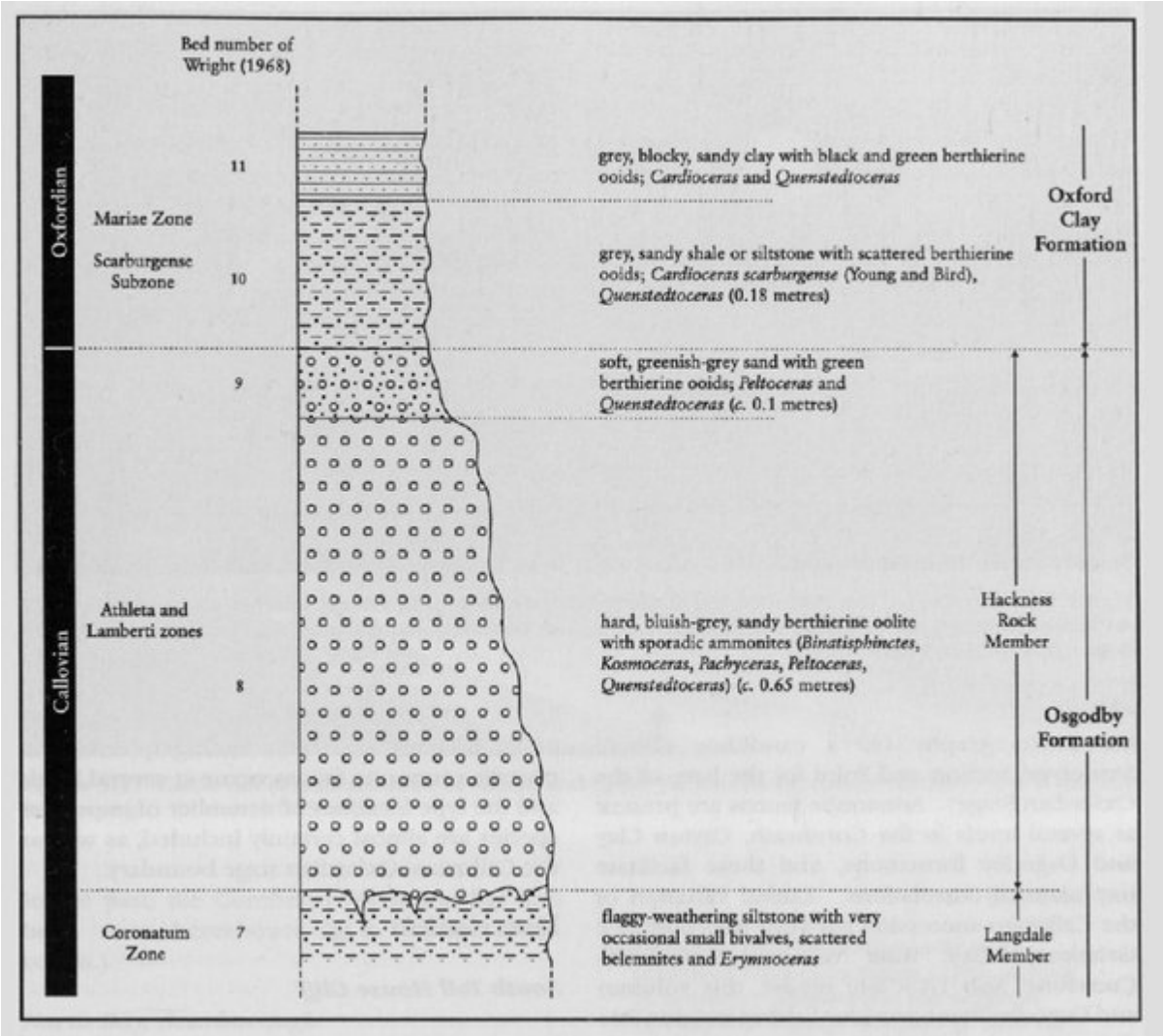
On the north side of Osgodby Point, well-preserved *Cardioceras scarburgense* (Young and Bird) are recorded just below the line of calcareous nodules in Bed 10 (figured by Wright, 1983, pl. 18, figs 5–7). This fauna is one of the best-preserved Lower Oxfordian (Mariae Zone, Scarburgense Subzone) faunas in the district. The base of Bed 10 was proposed by Callomon (1990) as the definition of the base of a formalized Scarburgense Subzone, and the site was thereby established as a candidate GSSP (Global Stratotype Section and Point; Salvador, 1994) for the base of the Oxfordian Stage ((Figure 5.15) and (Figure 5.16)). The section certainly forms a valuable reference for a *scarburgense* Biohorizon in the type area of the subzonal index species. According to Callomon (1990), its advantages lie in the fact that it is permanently exposed and accessible, and that the boundary at the base of Bed 10 is readily recognizable. Its disadvantage is that the Scarburgense Subzone is here strongly condensed (total thickness *c.* 0.5 m) compared with 10 m or more elsewhere in Britain. However, the absence of a recognizable terminal Callovian *paucicostatum* Biohorizon (see above) may suggest that a slight stratigraphical gap exists at the proposed boundary, and other sections in the area are more complete (e.g. at Cunstone Nab and on the shore opposite Cayton Bay waterworks; see Gristhorpe Bay, Yons

Nab and Red Cliff–Cunstone Nab GCR site report, this volume). Even more complete sequences are known in Dorset (see Ham Cliff GCR site report, this volume) and in Provence, France (Fortwengler and Marchand, 1994). Although this means that Osgodby Point will not be established as a GSSP, the significance of the site in formulating the GSSP proposals cannot be underestimated.

Conclusions

Osgodby Point (more traditionally known as 'Osgodby Nab') is an important stratigraphical reference site for both lithostratigraphy (as the type locality of the Osgodby Formation) and chronostratigraphy (as a candidate Global Stratotype Section and Point for the base of the Oxfordian Stage). Ammonite faunas are present at several levels in the Cornbrash, Cayton Clay and Osgodby formations, and these facilitate international correlations. Lateral variation of the Callovian succession between Red Cliff (see Gristhorpe Bay, Yons Nab and Red Cliff-Cunstone Nab GCR site report, this volume) and Osgodby Point provides further insights into the structural evolution and depositional history of the Cleveland Basin.

References



(Figure 5.15) Graphic section of Callovian–Oxfordian boundary sequence on the north side of Osgodby Point. (After Wright, 1969, fig. C4.))

(Figure 5.16) Members of the Oxfordian and Kimmeridgian working groups of the International Subcommission on Jurassic Stratigraphy sampling the Callovian–Oxfordian boundary sequence on the north side of Osgodby Point. (Photo: K.N. Page.))