
Lynch Cove

[SY 648 780]–[SY 648 775]

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Introduction

The low cliff and foreshore exposures on the southern shores of Lynch Cove, 400 m to 900 m south-west of Lynch Farm [SY 648 780]–[SY 648 775]; (Figure 2.22)) include an important occurrence of the Red Nodule Bed. This is a horizon of sideritic nodules within the Costicardia Subzone of the Weymouth Member of the Oxford Clay. The section was first described by Blake and Hudleston (1877), and later by Woodward (1895). Arkell (1939b) listed ammonites collected from Lynch Cove. Later, Arkell monographed ammonites from the site (Arkell, 1935–1948), and provided the first full description (Arkell, 1947a).

Description

Southwards along the Fleet shore, there is present in the low cliffs a variably complete section through the Bowleaze Clay subdivision of the Weymouth Member of the Oxford Clay. The Bowleaze Clay is overlain by the Nothe Grit, which is capped by a thin representative of the Preston Grit. The beds dip very gently southwards, and this gentle dip, combined with frequent slumps obscuring the solid rock, precludes compilation of a measured section here.

Two metres of grey mudstone belonging to the Bowleaze Clay, and containing numerous *Gryphaea dilatata* J. Sowerby and *Lopha gregarea* (J. Sowerby) with occasional well-preserved *Myophorella hudlestoni* (Lycett), are exposed in the low cliff at [SY 647 777]. The succession here is capped by the Red Nodule Bed, 0.3 m of clay containing two bands of red-weathering, sideritic nodules that infill or enclose *Cardioceras* (*Vertebriceras*) sp., *C.* (*Cardioceras*) aff. *costicardia* Buckman, '*Cerithium*' sp. and *Modiolus* sp.. The nodules weather out to form a readily recognizable rusty-coloured platform on the intertidal flat.

The junction with the overlying Nothe Grit is not seen. However, further southwards, the Nothe Grit is well exposed. It comprises a heavily bioturbated, very fine-grained sandstone with frequent calcareous concretions. The fauna is abundant, with numerous *Liostraea* sp. and *Nanogyra nana* (J. Sowerby), and also *Pleuromya* sp., *Myophorella hudlestoni*, *Cardioceras* (*Cardioceras*) *ashtonense* Arkell and *Goliathiceras* sp..

At the southern end of the exposure, close to the land owned by the Ministry of Defence, 0.45 m of Preston Grit is present overlying the Nothe Grit. It consists of a fine- to medium-grained, shelly sandstone with occasional *C.* (*Vertebriceras*) sp..

Interpretation

The fauna of the Red Nodule Bed is the best representative remaining in England of the fauna of the Costicardia Subzone now that the type locality at Studley Brickyard near Oxford is no longer available. At Lynch Cove the Red Nodule Bed is easily accessible in low cliffs beside the beach, and yields frequent Costicardia Subzone ammonites.

The bivalve fauna of the Bowleaze Clay at Lynch Cove is also of considerable interest. It includes the typical surface-dwelling *Gryphaea* and *Lopha*, and also the shallow-burrowing *Myophorella*. Conditions within the bottom sediment were clearly not anoxic. The bivalve fauna of the Red Nodule Bed thus comprises an assemblage indicating an extensive infaunal palaeoecological community, the *Modiolus bipartitus* *Pleuromya alduini* association (Fürsich, 1977). Multitudes of red casts of *Modiolus bipartitus* J. Sowerby, *Thracia depressa* (J. de C. Sowerby) and *Pleuromya alduini* (Brongniart) occur on the beach in addition to *Lopha* and *Gryphaea* (Arkell, 1947a). Such a fauna indicates that initially this was a period of colonization of the sea floor by a wide variety of organisms. The preservation of these in siderite

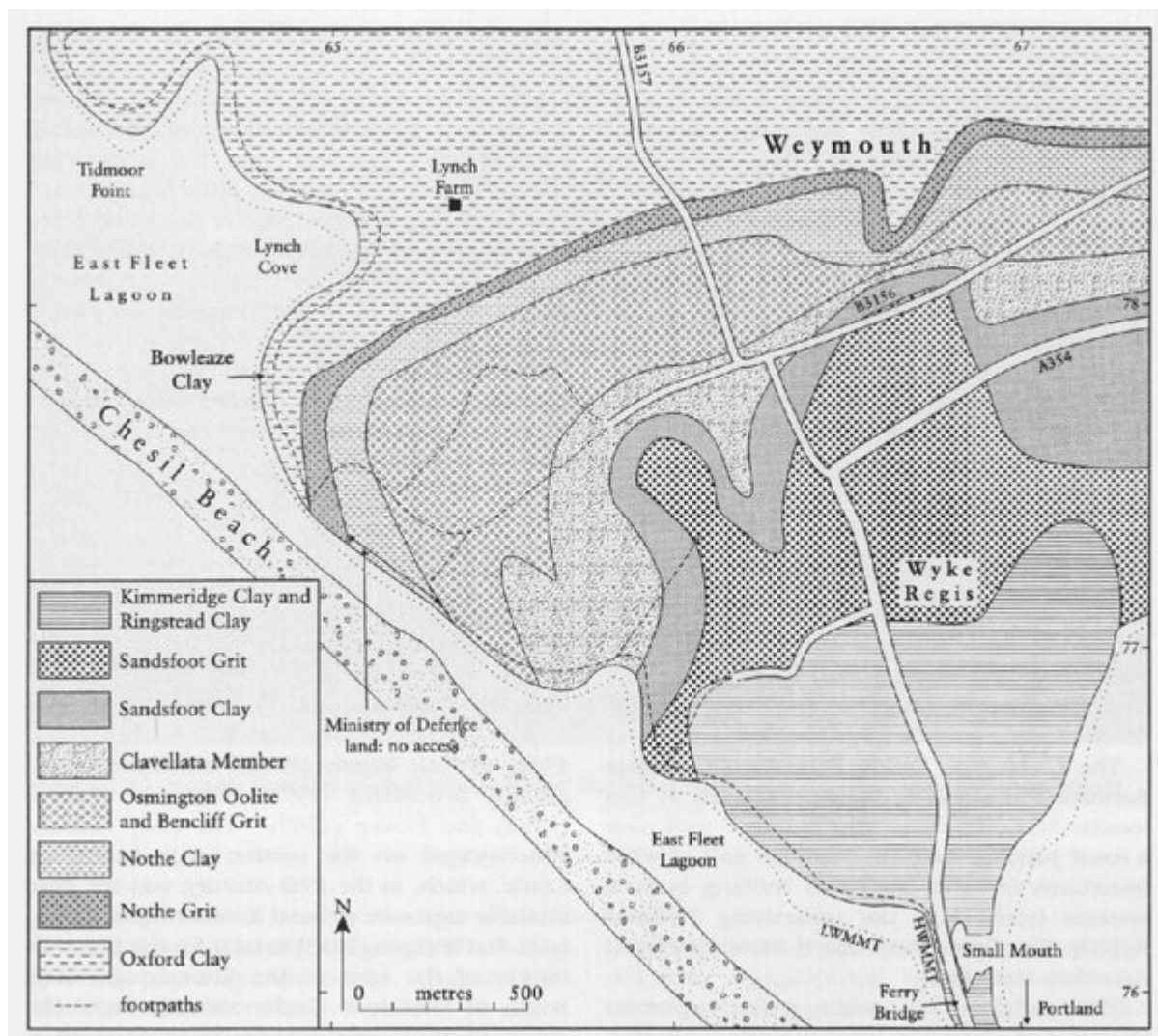
must have occurred during a period of restricted marine circulation. Fresh sea water containing sulphate was not brought down to the depths, and the bottom waters became depleted in sulphate. In these conditions, iron carbonate is precipitated as nodules in the topmost few centimetres of the sediment in preference to iron sulphide (pyrite) which is normally precipitated in clays laid down at moderate depth.

The Nothe Grit at Lynch Cove yields an ammonite fauna indicative of the Cordatum Subzone, the highest subzone of the Cordatum Zone. The fauna is well preserved in calcareous concretions, along with numerous bivalves indicating a wide variety of habitats, from the deep-burrowing *Pleuromya*, through shallow-burrowing forms such as *Myophorella*, to numerous cemented, surface-dwelling forms such as *Liostrea* and *Nanogyra*. The Nothe Grit thus demonstrates the characteristic fauna of an offshore marine sand laid down under comparatively gentle, non-turbulent conditions. This can be contrasted with the fragmental nature of the fauna of the overlying Preston Grit, laid down under shallower, more turbulent conditions.

Conclusions

Arkell's systematic collection of ammonites and bivalves from the Red Nodule Bed at this site (Arkell, 1939b, 1947a), together with his similar collection from the unit at the Osmington site (this volume), demonstrates that this is a highly significant exposure, one of only three in England yielding ammonites of the Costicardia Subzone. In addition, this is one of the few localities in southern England where the well-preserved ammonite fauna found in the overlying Nothe Grit can be collected.

References



(Figure 2.22) Geological map for the Small Mouth, East Fleet and Lynch Cove GCR sites.