

THE CHARMOUTH 16A BOREHOLE, DORSET, U.K.: PALYNOLOGY OF THE PENARTH GROUP AND THE BASAL LIAS GROUP (UPPER TRIASSIC – LOWER JURASSIC)



G. WARRINGTON

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Palynomorphs from a succession proved in a cored borehole at Charmouth, in the Dorset and East Devon Coast World Heritage Site, amplify the incomplete palynological documentation of the Penarth Group and basal Lias Group previously available from coastal exposures and a borehole in east Devon. Units examined are the upper Westbury Formation, the Lilstock Formation, including beds (the Cotham Member) that are typically poorly exposed, and the Blue Lias, to a level in the Hettangian Stage. Miospore associations increase in diversity upwards through the upper Westbury Formation and the Cotham Member, into the basal Langport Member; associations from higher beds, particularly in the Blue Lias Formation, are less diverse. A change from dinoflagellate cyst-dominated to acritarch-dominated organic-walled microplankton associations occurs above the basal Langport Member.

*Honorary Visiting Fellow, Department of Geology, University of Leicester,
Leicester, LE1 7RH, U.K. (E-mail: gw47@le.ac.uk).*

INTRODUCTION

The Charmouth 16A borehole (British Geological Survey registered number SY39SE/5) was one of a series of boreholes drilled in 1973 in connection with a study, by the former Institute of Geological Sciences Engineering Geology Unit, of coastal landslipping in the Lyme Regis - Charmouth area (Institute of Geological Sciences, 1974, p. 3). The borehole site [SY 36560 93077] is in the Dorset and East Devon Coast World Heritage Site, at an elevation of 3.39 m above OD.

Drilling was supervised by M. G. Culshaw, who also logged core at the site. The core was subsequently examined by Dr A. Whittaker. Depths used in this account are based on an unpublished log (Whittaker, 1974) in which the terminal depth of the borehole is 3.04 m less than that published (Institute of Geological Sciences, 1974). Coring, with a nominal core diameter of 92.1 mm (Culshaw, 1973), commenced at 54.47 m, and the borehole was terminated at 88.84 m (Whittaker, 1974). The succession cored is summarised in Table 1

Higher beds in the Lias Group were cored in the adjacent Charmouth 16 borehole [SY 36533 93090] which was terminated in the Blue Lias at a depth of 58.88 m (Institute of Geological

Sciences, 1974); this section overlaps the top of that cored in borehole 16A by about 4.4 m.

The Charmouth 16A borehole ('Borehole 16A') was terminated 2.72 m below the top of the Westbury Formation, which is 9.88 m thick in the Lyme Regis (1901) Borehole [SY 336 930], c.3 km to the west (Warrington and Scrivener, 1980). In contrast, Richardson (1906) recorded only 5.13 m at outcrop in the Culverhole - Charton Bay coast sections, c.6 km west of Lyme Regis [c.SY 270 894 - SY 300 900]. Hart (1982) and Gallois (2003) illustrated c.5.65 m and c.7.5 m respectively from those sections, and Edwards and Gallois (2004) recorded 6 to 8 m in the Sidmouth district. The suggestion (Callomon and Cope, 1995) that the formation comprises 'up to 15 m of marine black shales' in this area, is clearly erroneous.

The Cotham Member is 2.64 m thick in Borehole 16A, compared with 1.88 m in the Lyme Regis borehole (Warrington and Scrivener, 1980). Richardson (1906) recorded 1.75 m in the Culverhole - Charton Bay section; Hart (1982), Mayall (1983) and Gallois (2003) illustrated 1.83, 1.6 and c.2 m respectively for those sections, and Callomon and Cope (1995) recorded 'about 1.5 m'. Edwards and Gallois (2004) recorded up to 1.5 m in the Sidmouth district.

Formation/Member	Depth to base (m)	Thickness (m)
Lower Lias		
Blue Lias Formation	74.64	(20.17 m cored)
Penarth Group		
Lilstock Formation	86.12	11.48
<i>Langport Member</i>	83.48	8.84
<i>Cotham Member</i>	86.12	2.64
Westbury Formation	(seen to TD: 88.84)	(2.72 m seen)

Table 1. Summary of the lithostratigraphic units examined in this study.