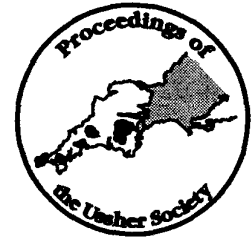


## THE LITHOSTRATIGRAPHY OF THE MID-UPPER JURASSIC OF NORTH DORSET; PRELIMINARY RESULTS FROM THREE NEW BOREHOLES

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### INTRODUCTION

The mid-Upper Jurassic succession of north Dorset is poorly exposed but has become better known as a result of recent British Geological Survey (BGS) mapping (Bristow, 1989; 1990; Freshney, 1990; Bristow *et al.*, 1994). As part of their investigations, the BGS drilled 5 boreholes; at East Stour [ST 8013 2297], Cannings Court (ST 7187 0734), Combe Throop [ST 7260 2350], Hazelbury Bryan [ST 7715 0810] and Knackers Hole [ST 7791 1188]. The boreholes at East Stour, Hazelbury Bryan and Cannings Court, while providing useful information on detailed facies changes, nevertheless penetrated the same part of the succession. In order to recover the *complete* succession from the Oxford Clay to the Kimmeridge Clay, three boreholes were drilled in Summer 1993, between East Stour and Buckhorn Weston.

The boreholes were drilled using a trailer-mounted B24 Mobile Surveyor Drilling Rig. Cores were recovered using a combination of a T2-56 mm diamond core barrel and a TT-56 mm triple barrel diamond core barrel. The latter system uses a plastic liner system, which caused extrusion problems despite its ability to contain the sediments. One of the boreholes yielded poor recovery in the top 6-7 m. This part of the hole was re-sampled using a hollow stem auger. Water loss was severe in most parts of the succession. Polymer additives were used, on occasions, in order to control the water problems. Recovery was, in general, very good throughout the project.

Prior to sampling, the cores were inspected, photographed and logged in detail. Sampling for foraminifera, calcareous nannofossils, holothurians, ostracods and organic-walled microfossils was then undertaken. While the cores were being sampled, all macrofossil debris/specimens were isolated for later identification.

The sites of the boreholes are indicated on Figure 1, together with the site of the BGS East Stour Borehole.

As indicated above, this investigation had two aims:-

- i. to document and confirm the regional stratigraphy;
- ii. the recovery of fresh material for micropalaeontological research.

### LITHOSTRATIGRAPHY

The original investigation of the north Dorset area was undertaken by Blake and Hudleston (1877). The subsequently published memoirs (Woodward, 1895; White, 1923) were based on that initial mapping. Advances in the understanding of the area were provided by Arkell (1933), Mottram (1956), Gutman (1970), and Wright (1981).

Wright (1981) provides a fairly comprehensive lithostratigraphy based on a succession of Formations and Members (see Figure 2). More recently, the BGS has re-mapped the area and produced a revision of the lithostratigraphy (Bristow, 1989a, b and 1990; Freshney, 1990; Bristow *et al.*, 1994; Bristow and Freshney, *pers. comm.*). The lithostratigraphy of the BGS has been adopted here with only minor modification (Figure 2).

The East Stour Borehole (Bristow, 1989a; Henderson *et al.*, 1992; Bristow *et al.*, 1994) recorded the succession between the Clavellata Beds and the Hazelbury Bryan Formation, but missed the transition upwards into the Kimmeridge Clay and downwards into the Oxford Clay. The current boreholes were drilled to prove these boundaries. As indicated in Figure 1, the Halletts Farm Borehole recorded the complete Clavellata Beds, together with the overlying Sandsfoot Formation. At the present time, we have been unable to ascertain if the overlying clays belong to the "Ringstead Waxy Clay" and/or the local equivalent of the Ampthill Clay (Bristow and Freshney, *pers. comm.*). At the base of this hole, the Sturminster Pisolite Member and the Cucklington Oolite Member were recorded; both of which are distinctive lithostratigraphic units. The Bowden Farm Borehole overlapped with that at Hallett's Farm and recorded the succession below the Sturminster Pisolite member. Like the East Stour Borehole, it terminated within the Hazelbury Bryan Formation. The Hartmoor Hill Borehole is more difficult to correlate with the other cores, as it began within the Hazelbury Bryan Formation. We have attempted a lithostratigraphic correlation using the sand/silt units within the Formation. This correlation appears to tie in with the East Stour Borehole (see Figure 1). While it was anticipated that the site of the Hartmoor Hill Borehole would allow recovery of the uppermost Oxford Clay, we are uncertain as to whether it was reached.

The cores recovered during the investigation will, when fully studied, yield useful information on the stratigraphy of the Upper Jurassic rocks in north Dorset.

### ACKNOWLEDGEMENTS

The authors wish to thank the landowners (Mr. D. J. Mills, Mr. H. Miller and Mr. W. R. Perrin) for their assistance during the drilling programme. Mr. R. Bowers, Mr. P. Davis, Mr. J. Abraham, Mr. G. Mott and Ms. M. Grimby (Technical Staff from the Department of Geological Sciences) are thanked for their hard work in the drilling operations. Mr. P. Castignetti, Mr. M. J. Carroll and Mr. D. Randall also helped on site and provided scientific back-up when needed. Dr. C. R. Bristow and Dr. E. C. Freshney (British Geological Survey, Exeter) gave advice on the location of the boreholes and have assisted in the initial interpretation of the cores. ASH and GMO acknowledge receipt of University of Plymouth Research Studentships. Mr. J. Abraham is thanked for producing the final diagrams.

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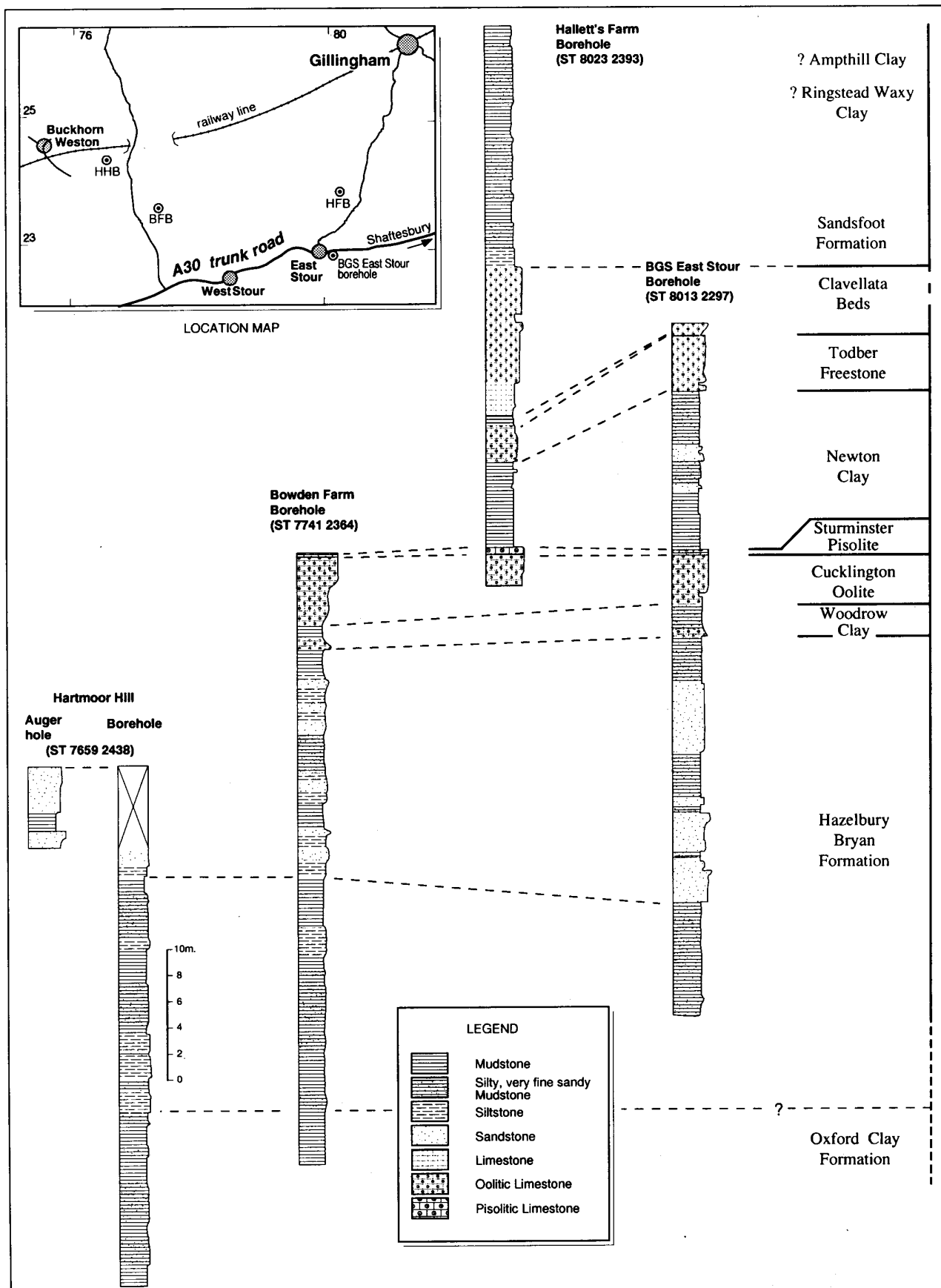


Figure 1. Preliminary correlation of the East Stour, Hallett's Farm, Bowden Farm and Hartmoor Hill boreholes. See inset map for borehole location.

WRIGHT (1981)		THIS ACCOUNT	
Kimmeridge Clay Formation		Kimmeridge Clay Formation	
Passage Bed Fm. (part)	Ringstead Clay Mbr.		Ringstead Clay Mbr.
Sandsfoot Formation	Sandsfoot Grit Mbr.	Sandsfoot Formation	Sandsfoot Grit Mbr.
	Sandsfoot Clay Mbr.		Sandsfoot Clay Mbr.
Trigonia clavellata Formation		Clavellata Beds	
Coral Rag Formation			
Osmington Formation	Todber Freestone Mbr.	Stour Formation	Todber Freestone Mbr.
	Sturminster Pisolite Mbr.		Newton Clay Mbr.
	Newton Oolite Mbr.		Sturminster Pisolite Mbr.
Stour Formation	Nothe Clay Mbr.		Hinton St. Mary Clay Mbr.
	Cucklington Oolite Mbr.		Cucklington Oolite Mbr.
	Woodrow Clay Mbr.		Woodrow Clay Mbr.
Lower Calcareous Grit Formation			Hazelbury Bryan Formation
Oxford Clay Formation		Oxford Clay Formation	

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Figure 2. Lithostratigraphy of the Corallian Group in north Dorset used by Wright (1981); and in this account, after Bristow (1989a, b and 1990) and Bristow et al. (1994)