

stages of its history the production of bifaces, although little use seems to have been made of these here. By contrast Area V seems to have been used relatively briefly and is the most complex of all areas. Finishing of bifaces occurred here, as well as the final reduction of flake cores and the manufacture of flake tools; some items may have been introduced from other areas too. It therefore seems appropriate to interpret Area V as predominantly related to some activity other than manufacture, presumably involving the flakes, bifaces and tools found here.

Wenban-Smith and Ashton's study of the raw material available for use in the lag gravel at Barnham suggested that most of it could be used for biface production; this is not surprising as lag gravels produce large nodules which are best suited to such *chaines opératoires*. Disappointingly the authors ignore the seminal work of White (1995, 1996) on raw material effects on biface production, and the experimental work can be challenged due to the selective nature of the sample of raw material used for biface manufacture. Despite these minor criticisms, Barnham is crucial in that it takes us several steps further into understanding the human behavioural processes that created Lower Palaeolithic archaeology. It raises problems with the specifically cultural model of Lower Palaeolithic lithic variability in the UK as relating to two geochronologically separate traditions, given that both 'Acheulian' and 'Clactonian' *chaines opératoires* seem to be at least broadly contemporary along the river's banks. In addition, technological models suggesting that Clactonian assemblages represent simply the early stages of biface manufacture can be eliminated given the mix of such stages and technologies on the same raw material source in several areas here. Ashton's landscape model is a most plausible interpretation of the material. The key to this is the static lithic resource of the cobble band, around which other resources would fluctuate over time. It functioned as a primary manufacturing zone repeatedly over a

considerable length of time. This difference with lithic representation on other areas of the site - i.e. along/over the river's banks, can be explained as a 'fall off' from source effect. The manufacture of three or four bifaces in the locale might be interpreted in terms of changes in resource procurement patterns, e.g. that a source of better quality flint had become available by the time these were brought to the river. Ashton coins the term 'group focus' to describe this attractive area at which various activities were performed at several locations, an altogether more neutral term than Isaac's 'home base'. In all this is a superb volume which represents excellent value for money. It is a clear example of why Britain has a Palaeolithic and intellectual heritage to be very proud of.

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Boxgrove. A Middle Pleistocene hominid site at Eartham Quarry, Boxgrove, West Sussex. Roberts, M.B. and Parfitt, S.A. 1999. English Heritage Archaeological Report 17, London. ISBN 1 85074 670 2 £70.

Boxgrove needs no introductions; the flint and bone scatters that lie on relict landsurfaces above marine sediments in the shadow of an ancient Sussex cliff-line, are now of international reknown. This major volume covers the principal years of excavation from 1982-89, and additionally contains reports on the hominid fossil remains discovered in 1993. Outdoing the growing number of multidisciplinary reports from this period, the breadth of the book is immense with a

total of 34 contributors, providing specialist reports on subjects as diverse as dating with coccoliths, to the movement of microdebitage in semi-lagoonal environments. Inevitably the following comments will be selective, but hopefully convey the tone of the volume.

Following the introduction, Chapter 2 covers the geological contributions. The Pleistocene background is well set out by Roberts (Mark) with the geophysical

work of Lewis and Roberts (Clive) focussing in on the site with the location of the relict cliff-line. At this juncture one feels the real difference between big-picture geologists and those who prefer the minutae. Colcutt clearly belongs to the latter. Anyone interested by the activities of lugworms in marine sands will doubtless be fascinated, but I'm afraid I moved rapidly on 50 pages to the conclusions which show that the sea briefly came in and out twice, to be followed, yes, by evidence of humans. A bit of a low point this, but soon to be redeemed by studies on gravel of the raised beach (Bridgland), mineralogy (Catt) and micromorphology (Macphail). Bridgland supports the interesting idea that erratics found along the south coast (including Boxgrove) were brought in by seaweed rafts, rather than glaciation, while Catt and Macphail begin to pin down the human environments - a semi-tidal lagoon with some dry land, followed by partly-vegetated mudflats.

Chapters 3 and 4 deal with the palaeontology. Foraminifera and ostracoda (Whittaker), mollusca (Preece and Bates), fish (Parfitt and Irving), herps (Holman) and birds (Harrison and Stewart) all play a part, particularly as a reflection of the changing environment from marine to terrestrial. It is the mammals, however, that have the major role. The detailed study by Parfitt of 50 different species will be a standard aimed at, but rarely achieved, by others for many years to come. The range of species strongly suggests a slightly cooler, more continental climate, well illustrated by a map showing that 17 out of the 18 small mammals today overlap in eastern Poland/western Ukraine. A vast array of measurements are used on many of the bones and teeth to show the evolutionary differences between the Boxgrove specimens and those from other sites including the present day - from the size of birch mouse molars to the ankle bones of wild cat. These *are* minutae, but of immense importance to the ever-developing field of biostratigraphy. Of relevance are species such as the shrews *Sorex runtonensis*, *Sorex savini*, the cave bear *Ursus denigeri* and the rhino *Stephanorhinus hundsheimensis*. As is well known, these and other fauna suggest a late Cromerian (OIS 13) age for the site.

Although a range of chronometric dating techniques have been deployed (Chapter 5), they have failed so far to provide realistic absolute dates. However, amino acid ratios (Bowen and Sykes) and the coccolith assemblage (Gard) do support an OIS 11 age. Although the jury is still out, a good majority favour the mammal biostratigraphers.

On page 309 we reach Chapter 6, the archaeology, and its worth waiting for. Detailed descriptions are given of all the principal flint knapping areas in both Quarry 1 and 2 (Austin,

Roberts and Bergman). These sections illustrate again that the quality of preservation, excavation and recording reached the pinnacles of Palaeolithic endeavour. The analyses focus principally on taphonomy and technology. The former is treated thoroughly using distribution, refitting and microdebitage (Wilhemson) to assess the integrity of the assemblages. This varies from generalised, slightly disturbed scatters in Unit 4c probably produced over some time, to an undisturbed, single episode, discrete scatter in Unit 4b (both Quarry 1A).

Virtually all the flint knapping scatters relate to biface manufacture, and it is perhaps in the technological analysis that some question marks appear. The basic unit of study is the division into rough-out, thinning and finishing flakes based on the experiments of Newcomer, Bradley and Sampson among others. Unfortunately these terms are never clearly defined in this report, and seem to be applied inconsistently by different authors. As a reflection of this, Newcomer uses a hard quartz hammer for his roughing-out stage, though 96% of the roughing-out flakes described from unit 4c (Quarry 1B) are noted as soft hammer. The ability to distinguish stages in the flint knapping process is fundamental to the recognition of variation in site use. For example the assemblage from Unit 4b (Quarry 1A) is interpreted as a site for the thinning and finishing of bifaces, whereas that from Unit 4c (Quarry 2A) is assessed as knapping from the complete reduction sequence. This criticism is partly addressed through the experimental work on hammer mode by Wenban-Smith. He concludes that a soft hammer was used for the majority of knapping, although occasionally a flint hammer with thick cortex might have been used for some of the roughing-out. More work of this kind is required to assess whether there are distinct stages in biface manufacture and to help in their recognition.

The human activity is not just reflected by the flint, but also by the evidence of butchery. Parfitt and Roberts provide a good description of the cutmarks, scraping damage and impact fractures on a variety of species from deer to rhino. Those from GTP17 are particularly impressive with the single episode butchery, probably by several people, of a horse. The close association of flint and cut-marked bone is unrivalled as an example of an afternoon's activity. The puncture mark on the horse scapula is interpreted as evidence of hunting. Certainly the Boxgrove hominids were the first to the kill, as shown by the superimposition of gnawing marks on top of cutmarks.

This is a well produced volume, well illustrated and abounding with photographs. There seem to be few editing errors, although those that have been spotted are entertaining - a glaciated Mediterranean

(Fig. 1b) and a 8mm high beach section (Fig. 46). In the conclusions Roberts describes the report as being concerned with the descriptive background and framework building of the site. This it has certainly been achieved and more. In the next volume we are promised a 'detailed analysis of the activities of the Boxgrove hominids and their relationships with the

changing palaeogeography and palaeoenvironments'. This is certainly needed and on the basis of the high quality of this report eagerly awaited.

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