NEW INVESTIGATIONS AT SLINDON BOTTOM PALAEOLITHIC SITE, WEST SUSSEX: AN INTERIM REPORT

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INTRODUCTION

In December 2001 fieldwork was undertaken at Slindon Bottom in order to map the Pleistocene geology at the site and to evaluate the potential for further archaeological work. The geological survey formed a crucial part of the on-going Raised Beach Mapping Project funded by English Heritage and run by the Boxgrove Projects, UCL. Slindon Bottom is a key site in these investigations due to the rich nature of archaeological finds documented in the valley during the 20th century. The site is also important from a geological perspective as the conformable Slindon Formation, recorded immediately to the west of the valley at Everyman’s Pit (Wymer 1999), had not been previously identified within the valley or at any locality to the east of it. The initial phase of fieldwork involved the investigation through bore-holing of the eastern flank of the valley and the re-exposure of key parts of the beach section recorded in the west side of the valley. Further exposures were also made in the vicinity of excavations undertaken by Woodcock in the 1970s, so that the geological sequences he recorded could be related to the main western exposures (Woodcock 1981). This is a brief, preliminary report on this fieldwork. Further investigations are planned at the site during the course of 2002 and this work will be published in due course alongside the results of the wider mapping project (Roberts and Pope in prep).

LOCATION, TOPOGRAPHY AND GEOLOGY

Slindon Bottom is located within a Chalk dry valley that runs north-south about 4km to the east of the Boxgrove site (Fig. 1). To the north of the site, two relatively short dry valleys are confluent at the approximate junction between the solid Cretaceous outcrop and the northernmost edge of the Pleistocene deposits of the Coastal Plain. Beyond this confluence, Slindon Bottom becomes a single, deeply incised valley that cuts through and exposes head and marine deposits of the Slindon Formation in its side for a distance of about 1km. Boreholes at Little Heath and inspection of sections in Everyman’s Pit (Wymer 1999), both to the west of the site, confirm that conformable, well preserved deposits of the Slindon Formation are preserved on this side of the valley. The deposits seen exposed at Everyman’s Pit include all the major sedimentary units known to contain artifacts at Amey’s Earham Pit. These include the Slindon Sands (marine), Slindon Silts (lagoonal/estuarine), Unit 4 (terrestrial) and Unit 5a (fen/carr) deposits (Roberts and Parfitt 1999).

Prior to the current phase of fieldwork, the nearest exposures of the formation to the east of Slindon Bottom were recorded at Penfolds Pit, some 4km away (Woodcock 1981; Jeffery 1957). Here an atypical, unconformable sequence comprising Slindon Sands overlain by head deposits was encountered. Therefore Slindon Bottom appeared to represent a boundary between parts of the Upper Coastal Plain preserving an intact conformable sequence of...
Figure 1: Location Map showing the position of Slindon Bottom in relation to other local Pleistocene sites and the position of exposures, boreholes and trenches referred to in the text.
the Slindon Formation and an eastern, marginal area where solifluction and decalcification have severely truncated and altered the original depositional sequence. The aims of this first phase of fieldwork were to provide a broad geological model for the valley, determine if any part of the Slindon Silts survived in the valley side and to re-examine the context of previously recovered artifacts.

**PREVIOUS RESEARCH**

Prior to the discovery of the exceptionally preserved archaeological horizons at Boxgrove, Slindon Bottom represented the best-documented and most prolific Palaeolithic raised beach site in the country. Formal investigations began at the locality in 1912, when Curwen monitored gravel extraction at Slindon Bottom. This work involved the reopening of the Slindon Park Pit, on the west side of the valley (Fig. 1), in order to provide stone for building works at Slindon House. The pit extended for some 76m N-S along the western edge of the valley. Fowler reported that the northern part of the pit was exploited for gravel, while the most southerly bay was used for the extraction of 'lug-sand' (Fowler 1929). Curwen noted that the section showed 1m of head gravel overlying 2.5m of 'lug' sand at the south of the section, while to the north 4m of rounded flint cobbles overlay a thin layer of sand which itself rested on a chalk platform (Curwen 1925).

Overlying the marine sands and raised beach were brickearth seams and head gravel. Curwen published only two of the artefacts found during these works, a small abraded ovate biface 117mm long and a fresh but patinated core. Fowler visited the site in 1929, finding an unrolled, finely made sub-cordate biface at the foot of the gravel section. During subsequent visits to the pit Fowler found another nine implements including six bifaces. While none of these finds were found in-situ, Fowler believed that they came from the overlying brickearth and head deposits and not from the body of the beach itself. All of Fowlers artefacts were unrolled and were either stained red or had reddish matrix identical to the of the head deposits adhering to their surface.

Calkin was the first to carry out a systematic programme of excavation at Slindon Bottom. Through the early 1930s Calkin recorded those sections of the Slindon Park Pit still accessible and managed to recover artefacts from both the body and surface of the raised beach and from the overlying head deposits (Calkin 1934). Exposures in the side of the pit showed 1-4m of raised beach resting on a chalk platform and overlain by up to 3.5m of head gravel. Calkin recovered at least 37 artefacts from the deposits and these included both rolled and unabraded tools, all were patinated and many exhibited manganese staining. A number of pieces from the surface of the beach were recovered in relatively fresh condition. Calkin suggested that at least some of this material was in primary context, largely undisturbed and related to occupation of the beach subsequent to a retreat in sea-level. This level he described as the ‘Late Acheulean floor’. Calkin drew upon the evidence of conjoining artifacts, differential patination of the upper face of flints, the lack of preferred orientation for artifacts, the clear undisturbed junction between the beach and overlying head and the presence of scatters of burnt flint to support his claims for primary context.

Woodcock reinvestigated the site in the 1970s with the aim of testing Calkin’s interpretation of the site. Specifically, Woodcock questioned Calkin’s equation of the Slindon deposits with the Swanscombe Middle Gravels and his claims for the presence of Levallois elements within the assemblage. In addition Woodcock intended to determine the precise stratigraphic position of major artifact horizons, especially in relation to the beach and to overlying head deposits (Woodcock 1981, 205). Unfortunately, inspection of the site suggested that the
original section of Slindon Park Pit recorded by Calkin and from which his artifacts were recovered, was too close to the road to be reinvestigated. Preliminary cleaning had exposed areas apparently under-cut and then repacked with cinderblock and rubble. Because of this, Woodcock sited two trenches immediately to the north-east of Slindon Park Pit further into the valley itself. Both these pits (Trenches A and B) showed remarkably similar stratigraphic sequences comprising a number of horizons of dark reddish brown decalcified brickearth sometimes forming a matrix in beds of angular flint gravel. Woodcock recovered 388 artifacts from his trenches, and these included 14 handaxes, 16 cores and 320 pieces of debitage. On the basis of condition the assemblage was divided into two groups: those which were unpatinated and included the majority of unrolled pieces and those with a white or grey-white patina, many of the latter were at least slightly abraded.

Woodcock interpreted the site on the premise, shared by Calkin, that the current topography of Slindon Bottom “owes much to its Pleistocene origins and has changed comparatively little since that time” (Woodcock 1981, 207). Thus the modern valley floor, with sloping beach gravels on each flank, was seen as equating directly with a small marine inlet or flooded dry valley during a Pleistocene high sea level event (Woodcock 1981). Woodcock’s model suggested that the level of the valley floor would have been broadly maintained throughout the climatic fluctuations of the later Pleistocene and Holocene and thus, artifact assemblages from the surface of the raised beach could represent a palimpsest of re-occupations throughout this period. Specifically, Woodcock forwarded a model of site formation that envisaged discrete artifact horizons documented at Amey’s Earsham Pit and Everyman’s Pit to the west, being conflated into the single apparent occupation ‘floor’ on the surface of the beach at Slindon.

GEOLOGICAL RESULTS OF CURRENT INVESTIGATIONS

When the latest phase of fieldwork commenced in December 2001, a large stretch of the Slindon Park Pit had been colonised by scrub. The National Trust, which owns the land and was kind enough to give permission to investigate the site, allowed limited clearance of the scrub vegetation in order that a machine could be brought into the pit. The original sections were found to be buried under only a thin talus and the cinder packing previously documented at the base of the section turned out to be lobes of manganese stained gravel filling solution pipes. Thus, it was possible to re-expose the western section of Slindon Park Pit, close to two of Calkin’s original recorded exposures.

The first geological test pit, GTP1, was cut at the southern end of Slindon Park Pit, in a low-lying bay-excavation recorded by Fowler (1929) as a sand pit. It was cut close to Calkin’s recorded exposure D (Fig. 1), which showed 2m of head gravel overlying 3m of sand onto a chalk platform. The section confirmed this sequence (see Fig. 2). Below 1.1m of gravely topsoil, 2.2m of angular flint gravel in a brown decalcified silty-clay matrix was recorded. This gravel rested unconformably upon laminated silty sands with a thickness of 2.7m, which in turn overlay the chalk platform. The sands themselves were visibly decalcified at the junction with the overlying gravel, the gravel filling a solution void within the body of the sands.

A second test pit, GTP2, was cut some 30m to the north of GTP1, between Calkin’s recorded exposures C and B. The cutting recorded 1.8m of decalcified Head Gravel overlying a thin (0.2m) bed of decalcified brickearth (Fig. 2). Preserved in localised patches below the brickearth were blocks of un
Figure 2: Provisional W-E transect across Slindon Bottom, showing strip logs for key exposures and boreholes within the valley. Refer to map in Figure 1 for specific location of each borehole or exposure. Transect length: 552m.

decalciﬁed chalk-pellet gravel which overlay 0.25 m of blue-grey silts. These silts would appear to be the remains of the Unit 4 Slindon Silts, not previously documented in the valley. Unfortunately the silts were entirely decalciﬁed (John Whittaker pers com.) and so any possibility of characterising the unit beyond being part of the lagoonal/estuarine phase of deposition is remote. Below these silts and under a thin trace of pale silty-sand, lay 2m of loosely packed flint beach cobbles. Sections were also cleaned by hand adjacent to Woodcock’s Trench B. The stratigraphic sequences here accorded well with Woodcock’s records (Woodcock 1981), showing beds of decalciﬁed head overlying the surface of the beach at a height of 37.5m O.D.

ARCHAEOLOGY: LATEST FINDS AND A NEW MODEL FOR ASSEMBLAGE FORMATION.

A total of 36 artefacts were found during the course of the geological investigations at Slindon Park Pit. The only piece to found in-situ was a single, patinated soft-hammer ﬂake in fresh condition, which was recovered from a small patch of ﬁne Unit 4 silts in GTP2. The main body of the Unit 4 silts at Amey’s Earham Pit preserves some of the best examples of intact knapping scatters due to the rapid but low-energy depositional processes involved in its formation (Roberts and Parfitt 1999). The ﬁnding of this single artefact signals that similar areas of high-
resolution archaeology may be preserved within the valley sides. Eight artifacts were found within talus banked against the sides of the pit. These were all patinated white and were slightly abraded. It was impossible to determine from which deposits these finds originated but their condition is consistent with Palaeolithic material previously recovered from head deposits overlying the beach (Fowler 1929).

Twenty-seven pieces were recovered during the hand-cleaning of sections close to Woodcocks Trench B excavations. The position of these artefact was recorded both three dimensionally and in relation to Woodcock's original stratigraphic scheme. The condition of the artefacts recovered from these sections varied from unpatinated, mint condition pieces to those exhibiting abrasion and white patination. In general the fresher material predominated towards the top of the sequence within the gravelly head subsoil, although fresh artefacts were found both close to the surface of the beach and within brickearth seams directly overlying it. Unfortunately, all the fresh artefacts were undiagnostic, predominantly hard-hammer flakes and it was impossible to establish the likely age of these pieces on technological or typological grounds. However, the general character of the more heavily patinated material: large hard-hammer flakes, rough-out fragments and a single biface, is generally consistent with the composition of material from the beach section at Amey's Earham Pit. A number of small pieces of debitage (<10mm) were recovered from within Brickearth seams suggesting that some of the fine-grained deposits of the covering head may preserve compositionally intact assemblages. In general, however, there was a virtual absence of small flake fragments confirming Woodcock's conclusion (1981) that the assemblages from deposits close to Trench B had been the post-depositionally winnowed.

The biface was typical of those previous found at the site. The tool was of average size, 148mm in length and exhibited soft hammer finishing around much of its circumference (Fig. 3). The tool conforms metrically to an ovate form (Roe 1968b), Wymer type K i/e (Wymer 1968). The piece has been patinated to a creamy white colour across the surface that lay upper-most as excavated. The lower surface still shows large areas of the blue-grey flint with only the edges of the flake scars beginning to patinate to a white colour. In general the piece is abraded, the tool's edges and flake ridges being worn and chattered. The piece is not however abraded enough to suggest extensive rolling within an open foreshore environment.

Figure 3: Biface recovered from the surface of the raised beach in the vicinity of Woodcock's Trench B. Image shows the patinated and abraded upper surface of the artifact.
The author finds it hard to equate the relatively minor degree of abrasion on the artifacts and the presence of small debitage with the effects of marine wave action, the explanation forwarded by Calkin and Woodcock for the condition of artifacts at the site (Calkin 1934; Woodcock 1981). It is also unlikely that wave action would allow an artifact to remain on the surface of a beach with only one side exposed for a long period of time; artifacts recovered from the body of the beach at Amey’s Earham Pit exhibit uniform patination and extensive abrasion. Thus, some other explanation must be sought for to explain the formation of the geological sequence at Slindon Bottom and to explain the condition of artifacts found resting on the beach.

Fluvial processes associated with the formation of the dry valley itself may provide a more adequate mechanism to explain both the relative absence of smaller material and the degree and differential location of abrasion/patination on artefacts. The following, alternative model of site formation is therefore proposed as a working hypothesis to be tested by future fieldwork.

It is suggested that the dry valley precursor of Slindon Bottom would not have reached Pleistocene sea level to form an inlet as previously thought. Instead the valley would have been truncated by cliff recession and would have been exposed high above the Goodwood-Slindon beach as many dry valleys are in modern day downland coastlines. Thus it is likely that the full sequence of the Slindon Formation would have developed at the site, directly comparable with the stratigraphy recorded at Amey’s Earham Pit (Roberts and Parfitt 1999), Everyman’s Pit (Wymer 1999), the Valdoe, Trumley Copse and other newly identified localities (Roberts and Pope in prep). The thin, decalcified patches of the Slindon Silts identified in this investigation on either side of the valley may, therefore, be all that remains of a once-complete succession of lagoonal and terrestrial deposits at the site. These deposits have been shown in this and previous investigations to preserve apparently in-situ artifacts (Fowler 1929; Wymer 1996) and it is suggested that artifact assemblages were originally preserved at Slindon Bottom both within the Slindon Formation and within the rubble talus slopes close to the cliff.

Throughout wetter periods of the Pleistocene and especially during post-glacial thaws, the precursor valley would have become active and would have incised through the overlying head deposits covering the Slindon Formation and would have eventually cut down through deposits preserving artifact assemblages. The proposed model suggests that at this point assemblages preserved in primary context within silts, chalk rubble and brickearth overlying the beach were re-exposed, winnowed and finally redeposited as a lag on the truncated surface of the beach. Where the valley cut through the Slindon Formation, small cliffs or bluffs of fine-grained silts, marine sand and beach deposits would have been formed. These natural exposures would then have continued to introduce artifacts into head deposits of the valley floor throughout the later Pleistocene to the present day as erosion continued (Fig. 2). The mixture of Palaeolithic and late Prehistoric artifacts within the topsoil and sub-soil of the valley floor (Woodcock 1981), is therefore seen as resulting from on-going valley side stabilisation throughout the Holocene.

CONCLUDING REMARKS

The model proposed above is provisional and is based only on a limited geoarchaeological investigation of the valley. In order to test its validity, the exact relationship between remnants of the Slindon Formation and artifact bearing horizons within the valley itself has to be established. Further investigation also needs to be undertaken to model accurately the timing and physical mechanisms of dry valley formation. This work will help to establish if artifacts recovered from the surface of the beach could
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reflect a generally intact but winnowed occupation floor or, more pessimistically, resorted material eroded from the Slindon Formation during periods when the Slindon Bottom valley was fluvially active.

The current work has shown that the sides of the valley still preserve parts of the intact Slindon Formation and artifacts can be recovered in-situ from these silts. It is possible that some of the fresher material found by Calkin and Fowler from above the beach may have been recovered in-situ from these remnants of the Slindon Formation. Further investigation is required to determine both the extent of these surviving deposits and their relationship to the artifact bearing head deposits in the valley bottom. In addition, the Raised Beach Mapping Project will now begin to sample other dry valleys fringing the West Sussex Coastal Plain where there is likelihood that the valley bottoms incise parts of the Slindon Formation. Identifying such valleys may provide archaeological localities similar to Slindon Bottom in the future.

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