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Another Look at the Cuxton Handaxe Assemblage

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The well-known Palaeolithic site at Cuxton, Kent (TQ 710 665) is situated on a remnant of Pleistocene terrace deposits of the Medway, which lies on a chalk spur at the junction of the main river and one of its former tributaries (Fig. 1). These deposits have been known as a source of Palaeolithic artefacts since at least 1889 (Payne 1893, cited in Tester 1965), and have been the subject of two controlled excavations, the first by P.J. Tester in 1962–3 (Tester 1965), and the second by John Cruse (on behalf of the Maidstone Area Archaeology Group) in 1984 (Cruse 1987).

The two excavations produced a total of 878 stratified artefacts, including 206 handaxes. Tester (1965, 38) described the handaxe assemblage as being dominated by 'roughly made, pointed hand-axes with thick, crust covered butts', although some ovates and cleavers were present. This impression was confirmed by Roe (1968) in his metrical analysis of 160 handaxes from Tester's excavations, which showed a tendency towards elongated pointed forms (56.9%). He duly placed it in his Pointed Tradition, Group I (with cleavers). The character of the Cuxton handaxe assemblage is therefore well established, but recently it has gained new importance in relation to a debate concerning the significance of variation in handaxe form.

Classically, inter-assemblage differences in handaxe shape are taken as a marker of different cultural groups, relative age, or both. However, over the past ten years several workers have argued that these shape differences, in particular the gross contrasts between Roe's pointed and ovate handaxe traditions, reflect differences in the raw materials used in their manufacture (Ashton & McNabb 1994; White 1998). In these models, well-made ovate handaxes with all-round edges are argued to have been generally produced on large nodules or flakes, on which the worker was more or less free to impose any form they wished, whereas pointed handaxes were generally produced from smaller and more elongated cobbles, on which the choices of the knapper were greatly curtailed. Under these circumstances, knappers tended to follow the 'path of least resistance', trimming a long, sharp tapering tip and leaving the butt unworked, a knapping strategy that generally produced more pointed forms. White's extension of the original model further argued that assemblage characteristics could be related to the type of lithic material available at a site, with ovate assemblages tending to cluster around sources of large primary chalk flint, but pointed assemblages occurring most often on sources of smaller, more elongated gravel flint.

While Cuxton did not feature in White's original work (because at the time it was believed that the material was derived into a much later, probably Devensian, gravel; Bridgland in Cruse 1987, revised in Bridgland 1996), Wenban-Smith (in Wenban-Smith *et al.* 2000) has recently cited it as contradicting the raw material models, noting that while the Cuxton handaxe assemblage is clearly point dominated, it has been made on a source of local chalk flint. However, thus far this claim remains unsubstantiated. It is therefore timely to take another look at the Cuxton handaxe assemblage.

GEOLOGICAL AND ARCHAEOLOGICAL BACKGROUND

Cuxton lies on the west bank of the River Medway, in a gap cut by the river through the North Downs. The underlying solid geology is Middle Chalk containing isolated flints and occasional bands of flint, with flint-rich Upper Chalk cropping-out less than a mile (2km) to the west (Dines *et al.* 1954). The site itself lies in a small remnant of Medway terrace gravel, situated on a Chalk spur between the Medway and a tributary valley once occupied by a north-west flowing stream.

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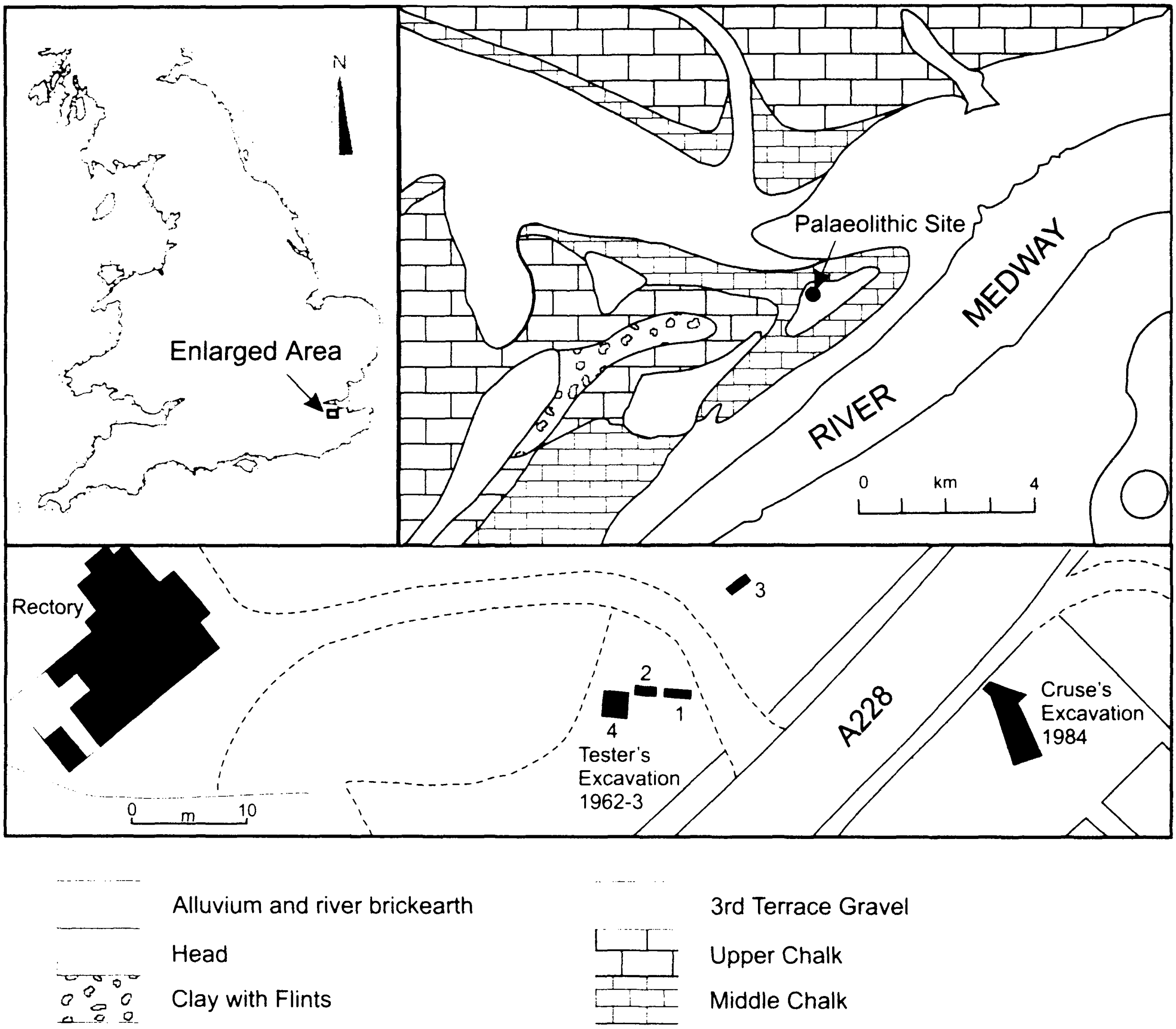
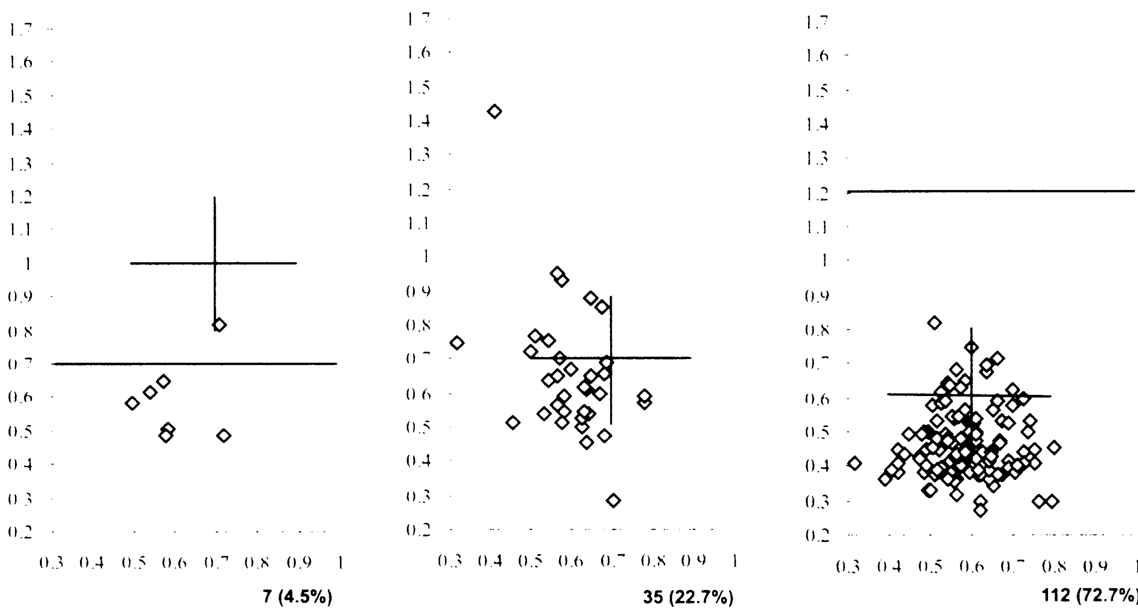


Fig 1.
Map showing location, geology and position of various excavations at the Cuxton site (redrawn and modified after Tester 1965; Cruse 1987).

Tester's excavations revealed a very thin Pleistocene sequence at the site: 0.5 m of sand and gravel lying on chalk and chalk breccia, overlain by 0.6 m of loam and capped by chalk rubble. Cruse's excavations exposed a deeper sequence of over 3 m of fluvial sand and gravel, again lying on brecciated chalk; apparently Tester's trenches had exposed only the top feather edge of the terrace sequence. The terrace deposits have a surface height of ~18.5 m OD but unfortunately the site lies in a part of the valley where correlation with terrace deposits in the Upper and Lower Medway is difficult, and where altitude is a poor guide. Dines *et al.* (1954) placed Cuxton on the second terrace, but Bridgland (1996) who examined several possible projections of the Medway terraces concluded that Cuxton actually lies on Terrace No. 3, which he suggested may correlate with either the Lynch Hill/Corbets Tey or Taplow/Mucking Formations of the Thames (OIS 10/9/8 or 8/7/6, respectively). As the Cuxton sequence represents a degraded and landscaped remnant (cf. Tester 1965, 33), the former age is preferred (D.R. Bridgland, pers. comm.).

A) Cuxton Sample



B) Key to Tripartite Shape Diagrams (after Roe 1968)

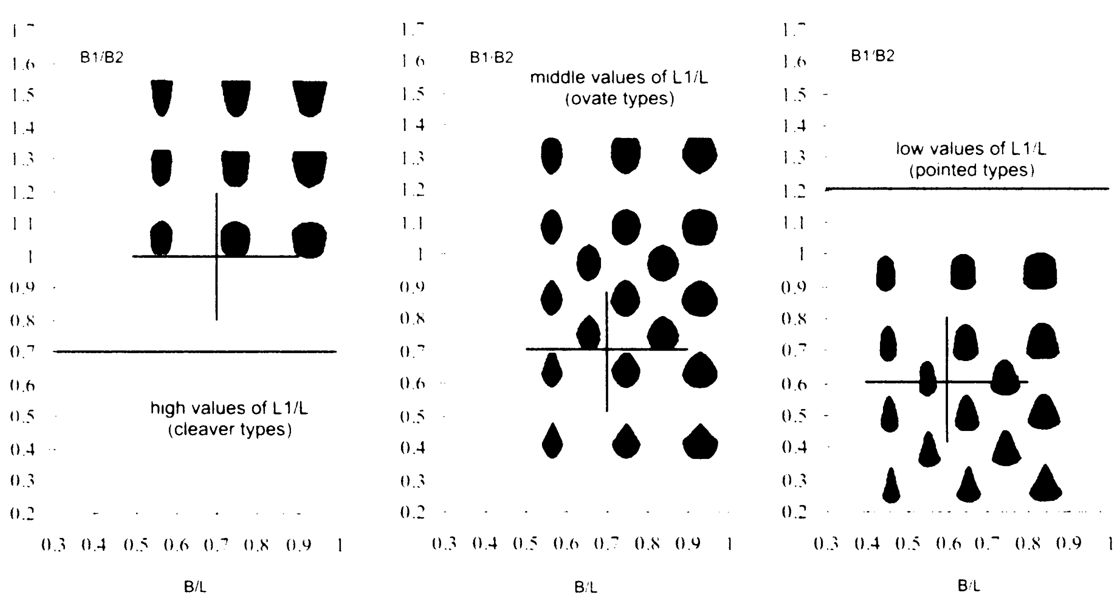


Fig 2.
Tripartite diagrams for the present Cuxton handaxe sample.

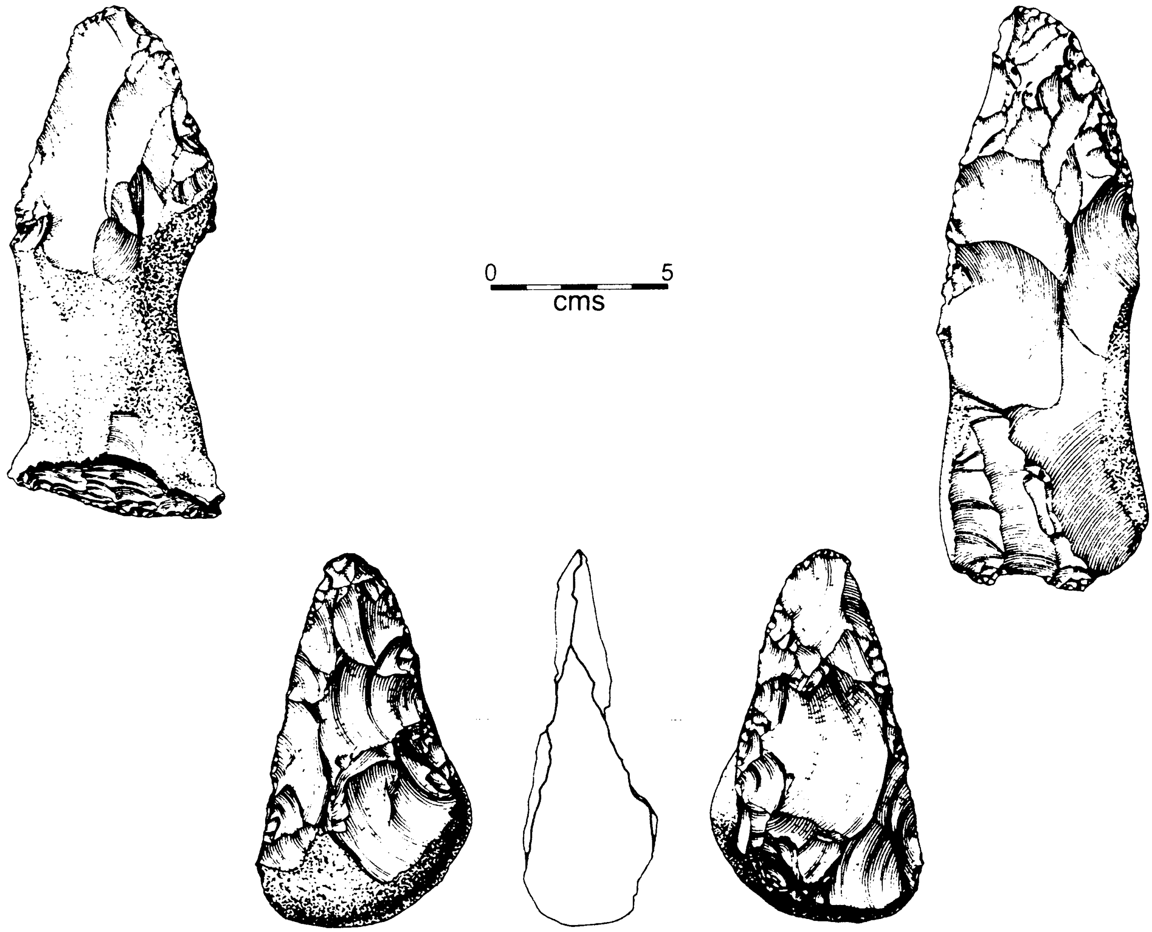


Fig 3.
Some examples of handaxes from Cuxton showing how the shape of the flint nodule has influenced how it was worked and, consequently, its final form. After Tester (1965) (top) and Cruse (1987) (bottom); reproduced by courtesy of the Kent Archaeological Society.

Tester's excavations in the highest part of the outcrop produced 657 artefacts, including 199 handaxes, mostly from the gravel and mostly in fresh condition, although some pieces were recovered from the loam and a few were noted to be in rolled condition. Only a single, handaxe-yielding (Acheulean) assemblage is represented. Cruse's excavations in a deeper-channel extension of the sequence identified two separate artefact groups: a non-handaxe assemblage (n=118) from the lower gravel and a handaxe assemblage (n=102) from the upper gravel, separated by a depositional hiatus (Callow in Cruse 1987). The latter is probably the lateral equivalent of Tester's gravel (see Cruse 1987, fig. 2.3)

TECHNOLOGY AND TYPOLOGY OF THE CUXTON HANDAXES

The present sample comprises 154 complete handaxes, six from the Cruse excavation and 148 from the Tester excavation (trenches 1, 3, & 4). All are currently housed in the British Museum. They were analysed using the methods employed by Roe (1964; 1968) and White (1996; 1998). Regardless of the occasional typological anomaly one encounters when using Roe's method, it has the advantage that being metrically defined there is no *a priori* link between shape and technological features, meaning that one may justifiably look for meaningful correlations between form and technique.

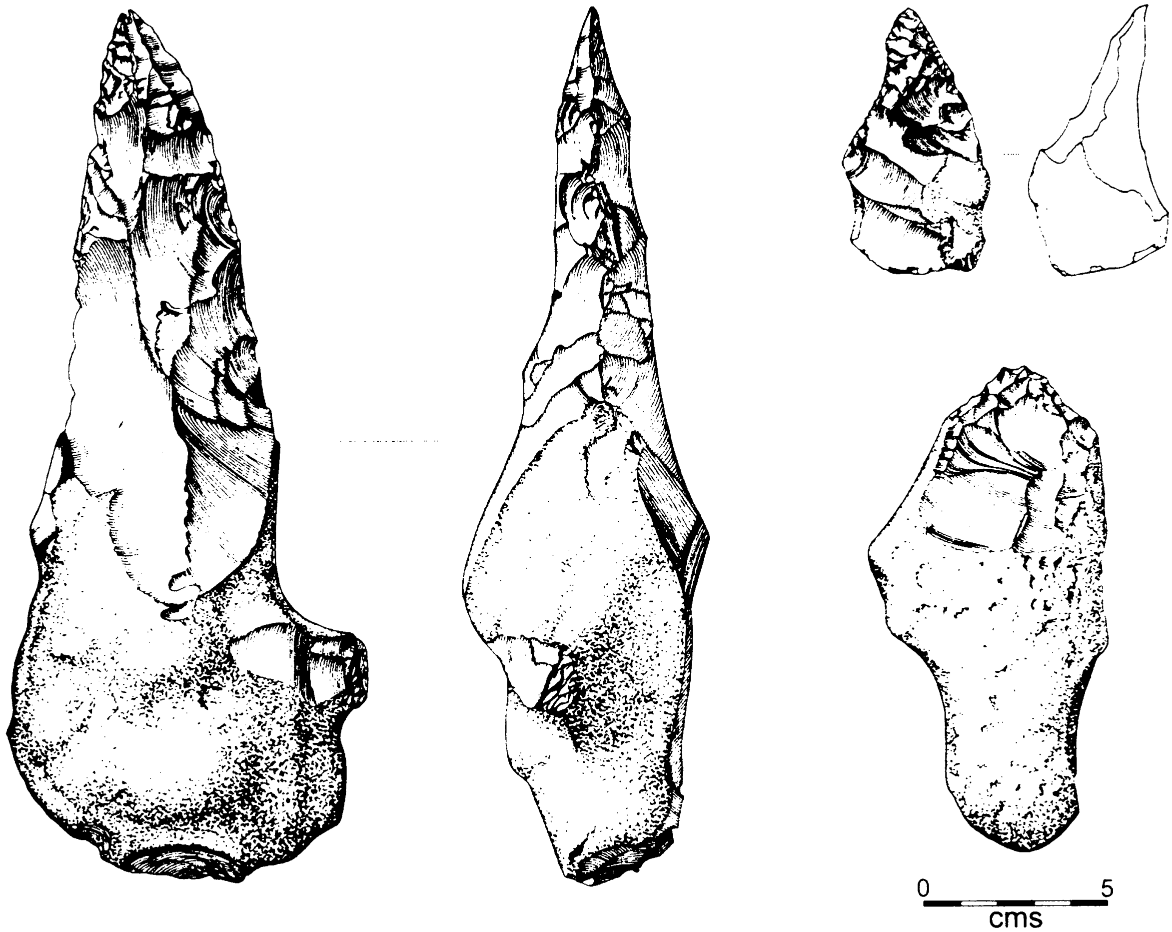


Fig 4.
Some examples of handaxes from Cuxton showing how the shape of the flint nodule has influenced how it was worked and, consequently, it's final form. After Tester (1965); reproduced by courtesy of the Kent Archaeological Society).

The present handaxe sample consists of 112 (72.7%) points, 35 (22.7%) ovates, and 7 (4.5%) cleavers (metrically defined). These totals differ somewhat from Roe's original assessment, but this can be explained by the different samples employed and the inevitable inter-analyst variation, especially in the tricky L1 (butt length) measurement (some of which results from taking measurements directly from the artefacts [ADS] rather than outline drawings). Regardless, the picture of an assemblage dominated by pointed handaxe remains unchanged. Figure 2 provides a tripartite diagram for the present sample, while Table 1 provides summary statistics for selected metrical and technological attributes.

Figure 2 clearly shows that, within the basic division of points, ovates, and cleavers, the Cuxton handaxes exhibit a wide variety of shapes. This is typical of all Lower Palaeolithic sites, leading many to conclude that handaxe shape reflects a continuum of variation around a basic concept (Dibble 1989; Ashton & McNabb 1994), which varies according to such factors as raw materials, reduction intensity, idiosyncrasy, experience, and skill. This continuous variation is taken as good evidence that handaxe forms are *not* reflections of rigid mental templates shared by all members of a group, but were the outcomes of a single flexible strategy applied differentially by individuals to a heterogeneous world.

TABLE 1. SUMMARY METRICAL AND TECHNOLOGICAL DATA FOR SELECTED ATTRIBUTES

	mean length (mm)	mean width (mm)	mean thickness (mm)	mean refinement (th/B)	mean profile shape (T1/T2)	mean cortex %	%showing all round edge	%fully worked butts	%fresh raw material	%handaxes where shape is influenced by nodule form
Whole assemblage (n=154)	120±34	69±15	41±10	0.60±0.13	0.41±0.14	23	5	37	78	44
points (n=112)	199±36	67±14	40±10	0.60±0.12	0.40±0.13	23	5	36	75	44
ovates (n=35)	126±31	73±16	44±10	0.61±0.15	0.42±0.18	23	5	35	77	34
cleavers	113±17	67±11	39±9	0.57±0.08	0.44±0.16	36	0	42	85	71

However, the diagram also shows that, regardless of shape, the Cuxton handaxes are generally elongated (the ratio of length/width), with a mean metrical elongation of 0.588. While point dominated assemblages are usually more elongated than ovate dominated assemblages (see Roe 1968), of the 22 assemblages studied by White (1996; 1998), only Fordwich (0.535), also in Kent, and Furze Platt, Berkshire (0.535) had greater mean elongation. In short, the Cuxton handaxes have a strong bias towards long and narrow forms. The Cuxton handaxes also show extreme values for several other related attributes. In terms of metrical refinement (an index expressing thickness divided by width), the present sample showed an average of 0.60 (ie, thickness was 60% of the width), showing a bias towards relatively thick handaxes. In both White's and Roe's work only Fordwich showed poorer metrical refinement. Similarly, Cuxton shows the most extreme values for cross-sectional uniformity (calculated by dividing the tip thickness [T1] by the butt thickness [T2]), the value of 0.41 showing handaxes with very thick butts and very thin tips. Together these data indicate that the Cuxton handaxes are generally long, narrow, and thick with a strongly wedge-shaped cross-section, but that they show a diverse range of final shapes.

These metrical characteristics are accompanied by a suite of technological features. Only 37% have fully worked butts, with the remaining 63% showing fully cortical or only partly worked butts. Concomitantly, most handaxes have only a partial cutting edge, often restricted to the tip and adjacent lateral margins, and only 5% possess an all-round cutting edge. As one might expect given these observations, the Cuxton handaxes also show high levels of residual cortex; in fact, the mean of 23% is greater than in any of the assemblages studied by White, with only Fordwich (16%) coming close. These are all hallmarks of limited reduction intensity.

The residual cortex also provides two critical pieces of information. First it is clear from the preservational state of the cortex that much of the raw material came from a primary flint source, the ratio of fresh to worn cortex (78:22) indicating the nodules were probably procured directly from the local chalk or from a gravel source eroding fresh nodules from the Chalk. Only 19% of the handaxes show any signs of pre-manufacture flaws or breaks in the flint, suggesting that this raw material was also of good quality. However, the high cortex retention also makes it possible in a large number of cases to reconstruct the approximate shape and dimensions of the original nodule (cf. Ashton & McNabb 1994). At Cuxton, this is possible for 44% of the handaxes (50% in Ashton and McNabb's examination), again more than in any other British handaxe assemblage. Often, these pieces show that they were made on long, thick and narrow nodules, some of which appear to be 'burrow or pipe flints' (ie, formed in burrows of Cretaceous marine animals). Of the pieces for which original nodule form was evident, 73% were points. Some of the nodules were indisputably very large in terms of length, leaving Cuxton with several very long handaxes (up to 251 mm), but they were also narrow and thick (practically cylindrical in some cases), a combination that has clearly influenced the choices made by the knapper in working the nodule.

We therefore conclude that the character of the handaxes is largely a reflection of the character of the raw materials, which, while highly variable, contained a significant number of very elongated nodules. What these data also show is that even though it may have come directly from the Chalk, the Cuxton flint knappers were faced with a source of raw material that imposed certain constraints on their actions and they acted accordingly. When working such nodule forms, the easiest way successfully to produce a handaxe seems to have been to knap the tip and upper margins and leave the butt unworked; in Ashton and McNabb's terms, the path of least resistance. In choosing this route they produced handaxes with high cortex retention, low scar counts, low refinement values, a tapered cross-section, partial cutting edges, and, because one end is subjected to preferential lateral reduction, a maximum width that falls towards the butt end, usually resulting in a pointed shape. Several examples of this type of handaxe, which clearly show the limitations imposed by the raw materials on human actions can be seen in Figures 3 and 4. White (1996; 1998) has previously referred to this phenomenon as 'raw material conditioning', although this has somewhat negative connotations and is perhaps too strong a term for what boils down to a series of technical decisions made by hominids in response to the size and shape of the raw materials in hand. One might counter argue that nodules were selected to conform to a cultural template, although if this were the case we would not expect to see the wide shape variation evident in this and most other assemblages.

Another notable point is that the different shape classes at Cuxton show similar character states (Table 1). In other words, while there is the occasional well-worked and metrically refined ovate handaxe (and some similar points), on average the pointed and ovate handaxes do not significantly differ in any of the studied attributes, a feature common to many sites (cf. White 1998). This suggests that in most cases the materials used for both handaxe classes elicited a similar suite of technological responses, with the differences in shape reflecting a combination of the actual nodule shape, the way the knapper chose to work it, individual preference and skill. Furthermore, although roughly the same planform shape, most ovates from Cuxton are metrically and technologically different from the well-worked examples known from sites such as Boxgrove (E. Sussex), Elveden and High Lodge (both Suffolk), all sites where sources of large fresh nodular flint was employed. It therefore seems that at Cuxton the production of any type of decent and preferably large handaxe from the types of nodule available there, rather than a single type of handaxe, was the paramount consideration; although of course it does not necessarily follow that this was the case for all sites or all handaxes. The cleavers, interestingly, show some deviation from this pattern, which may reflect a real functional difference.

DISCUSSION

The Cuxton handaxes are clearly dominated by thick, lightly reduced points with cortical butts and partial cutting edges, yet they are made on a source of fresh raw materials. On the face of it this clearly contradicts the predictions of White's model, which would generally expect such assemblages to be formed on gravel flint. However, the technological and metrical character of the assemblage also shows that the shape of the handaxes has been strongly influenced by the original shape of these nodules, which is entirely in keeping with the predictions of White and Ashton and McNabb. In some respects the assemblage at Cuxton is similar to that at Fordwich, and interestingly both have high frequencies of burrow flint. Fordwich is famous, however, for high numbers of very crude hard-hammer handaxes, while Cuxton shows finer possibly soft hammer work; perhaps an indicator of their different ages, or perhaps hammer type reflects local technical habits, with greater cultural information residing in technique rather than shape. The point, though, is that the Cuxton raw material has exercised a significant influence over the technical choices made by the flint knappers, and therefore the nature of the assemblage, even if Cuxton is clearly an exception to White's model in terms of its raw material source. Yet, as White (1998, 25) explicitly states:

'... exceptions will be found. For example, fresh flint sometimes occurs as elongated, narrow burrow flint ... which would not support ovates ... although such exceptions would not conform to the simple predictions [of the model, they do support] the overall principle ... that geological context has a tremendous effect on archaic human technology and typology' (White 1998, 25).

This describes Cuxton perfectly. What it also shows is that while the state of the cortex can be a useful device for determining raw material provenance (although only on fresh artefact assemblages where the chances of post-depositional alteration can be eliminated), which allows broad generalisations to be made about its knapping potential on a gross scale, it can sometimes be a red herring. Any assessment of raw materials must be based on both direct study or good descriptions of the proposed sources as well as a study of the artefacts. Furthermore, any assessment should be based on whole assemblages and a single beautiful ovate on gravel flint or crude point on a fresh nodule do not serve to disprove the contentions of the raw material models. As White (1998) clearly explains, hominid decisions and their subsequent technological actions were in part influenced by the shape and nature of the nodule in hand, not its cortex.

One other example will serve to reinforce this point: the recently published site of Red Barns, Porchester, Hampshire (Wenban-Smith *et al.* 2000). This is another site where a small (comprising seven complete handaxes and eleven broken ones) but nevertheless point-dominated assemblage (Gamble & Apsimon 1986), has been made on a source of fresh flint. However, this flint was riddled with frost fractures and consequently of questionable knapping quality: 75% of the total assemblage shows the effects of pre-manufacture frost action, and of the eighteen handaxe attempts found in the main horizon, eleven (61%) failed due to the poor quality of the material. So, although the flint might have been large and its shape neutral, it was not of sufficient quality to allow knapping to progress in a completely unhindered fashion or full 'rhythms of making' to be completed. In fact, everything described about the Red Barns handaxes suggests that hominids did not just ignore the poor quality of the material (ibid, 243) but adjusted their knapping strategy to meet its challenges, and that this *has* affected the nature of the assemblage.

We are not saying that the hominids at Red Barns (or Cuxton, or elsewhere) did not deliberately produce the forms found there, but that the shapes and technological character of the types they did choose to make reflects a response to the nature and quality of the flints they had at hand, not a rigid template. In an attempt to avoid breakage by knapping beyond the limits of the poor quality flint at Red Barns, hominids chose a range of suitable blanks and, judging by the published illustrations (Gamble & Apsimon 1986, Wenban-Smith *et al.* 2000) enacted only minimal shaping followed by delicate finishing along the margins, mostly at the tip end. Thus, the Red Barns assemblage shows an overall technological consistency, but this is not necessarily accompanied by typological uniformity; once again shape diversity within technological uniformity is the overriding pattern.

It is also of interest that the excavators saw the material at Red Barns as rejects left at the manufacturing location (Gamble & ApSimon 1986). The recent report confirmed this, showing that more handaxes were made in the excavated area than were found there and that some had therefore been removed. It is thus quite conceivable that better made ovate handaxes could have originally been present at Red Barns but were selectively removed, leaving a signature dominated by partly worked more pointed forms. Indeed, Pope (2002) has identified a similar practice at Boxgrove, leading him to suggest that assemblage composition is not only related to raw materials but also to discard and transport behaviour. According to Pope, handaxes in general were less likely to be discarded at one-off activity sites than at established, frequently used locales, and furthermore, the selective removal of better-made (generally ovate) handaxes lead to them being under-represented at sites with poor raw materials.

CONCLUSION

Models simplify reality. The test of the raw material model is how far it explains the fossilised acts and decisions of hominid agents in specific, concrete situations. When the model is applied to Cuxton we find that it does contradict the clearly over-simplified prediction regarding raw material sources, but that they conform to the more important principle that nodule form influenced human technological choices and practices. Now, there is clearly more to handaxes than just raw materials, as Pope's work and the recent explorations of social technologies have begun to show us (eg, Gamble 1998; 1999; Kohn & Mithen 1999). However, ecological variables such as raw materials, while not actually determining human actions, certainly imposed a set of boundaries within which hominids could reasonably act and which left a very real mark on assemblage level variation in the landscape.

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