Chapter 20

Lithic artefacts: Phase 8, the overlying fluvial gravel

by Francis Wenban-Smith

INTRODUCTION

Phase 8 of the site sequence consisted of fluvial gravels that unconformably truncated the underlying sequence, variously overlying deposits of Phases 5, 6 and 7 in different parts of the site (Fig. 20.1a). The Phase 8 gravels extended across the whole excavated area of the site (see Chapter 4 for a full description) , with their base dipping from 27m OD at the southern end to 25.5m at Trench A and also slightly sloping down to the west along the length of the site.

The gravels were divided into three stratigraphic sub-phases, 8a-8c (Table 20.1). The basal Phase 8a was represented by context 40098, and was only seen at the base of Trench A (Fig. 20.1b), which was excavated more deeply than the main sections either side of the site. Overlying this, and unconformably truncating it, was the more extensive gravel bed of context 40047, identified as Phase 8b, which was visible in the central part of the main west-facing section 40015 (Fig. 20.1a). This bed was slightly sandy in places, and wedged out against the synclinal infill deposits of Phase 7, interdigitating with them in places. This bed was then overlain, and unconformably truncated, by the much more extensive main gravel beds of Phase 8c. These extended the full length of the site, and were variously allocated the different context numbers (40014, 40048, 40071 and 40102) in different parts of the site (see Chapter 4, Table 4.3). At the northern end of the site, there were small exposures of higher gravel/sand beds (contexts 40049 and 40050) that conformably overlay context 40048, dipping north; these two contexts were included within Phase 8c, but did not produce any artefacts.

PROVENANCE AND QUANTIFICATION

In total, 184 artefacts were recovered from the Phase 8 gravels (Table 20.1). Two flakes were found during preliminary field investigation of the site in December 2003, loose on an exposed sloping section of the gravel. It was thought likely that they originated from the gravel, but they were not found *in situ* within it, and despite a careful search of the extensive gravel exposures, no flint artefacts were found *in situ* in this phase of work. Therefore there was no expectation at the outset of the main excavation programme that the gravel would be an important source of artefactual material. However, it was nonetheless agreed that the gravel be subject to a systematic sampling programme, with a vertical series of samples of at least 100L taken through the gravels in Trenches A, B, C and D, and sieved on-site for lithic artefacts.

This process commenced in Trench A, and did not prove very productive in the upper levels of the gravel, although a few artefacts were found. However, a fresh condition pointed handaxe was recovered from the bottom sample in the lowest level of the gravel, context 40098 (Phase 8a). At the same time, machine-clearance and hand-cleaning of the main west-facing section in the southern part of the site was leading to recovery of other handaxes from the gravels. Therefore, since it was now

Table 20.1 Phase 8, artefacts from the fluvial gravel (excluding natural pieces): provenance, stratigraphic phasing and condition

Phase	*Context*	*Total artefacts (n)*	*Condition of artefacts* 1 - Mint	2 - Fresh	3 - Sl-mod abraded	4 - Very abraded	5 – Extr. abraded	*Notes*
8c	40014	2	-	-	1	1	-	
	40048	74	3	18	39	14	-	
	40102	47	10	14	14	9	-	Including one chip
	40071	17	-	6	8	3	-	Including two chips
8b	40047	21	1	7	11	2	-	Including one chip
8a	40098	23	-	14	8	1	-	Basal gravel bed at north end of site, in main W-facing section
Total		184	14	59	81	30	-	

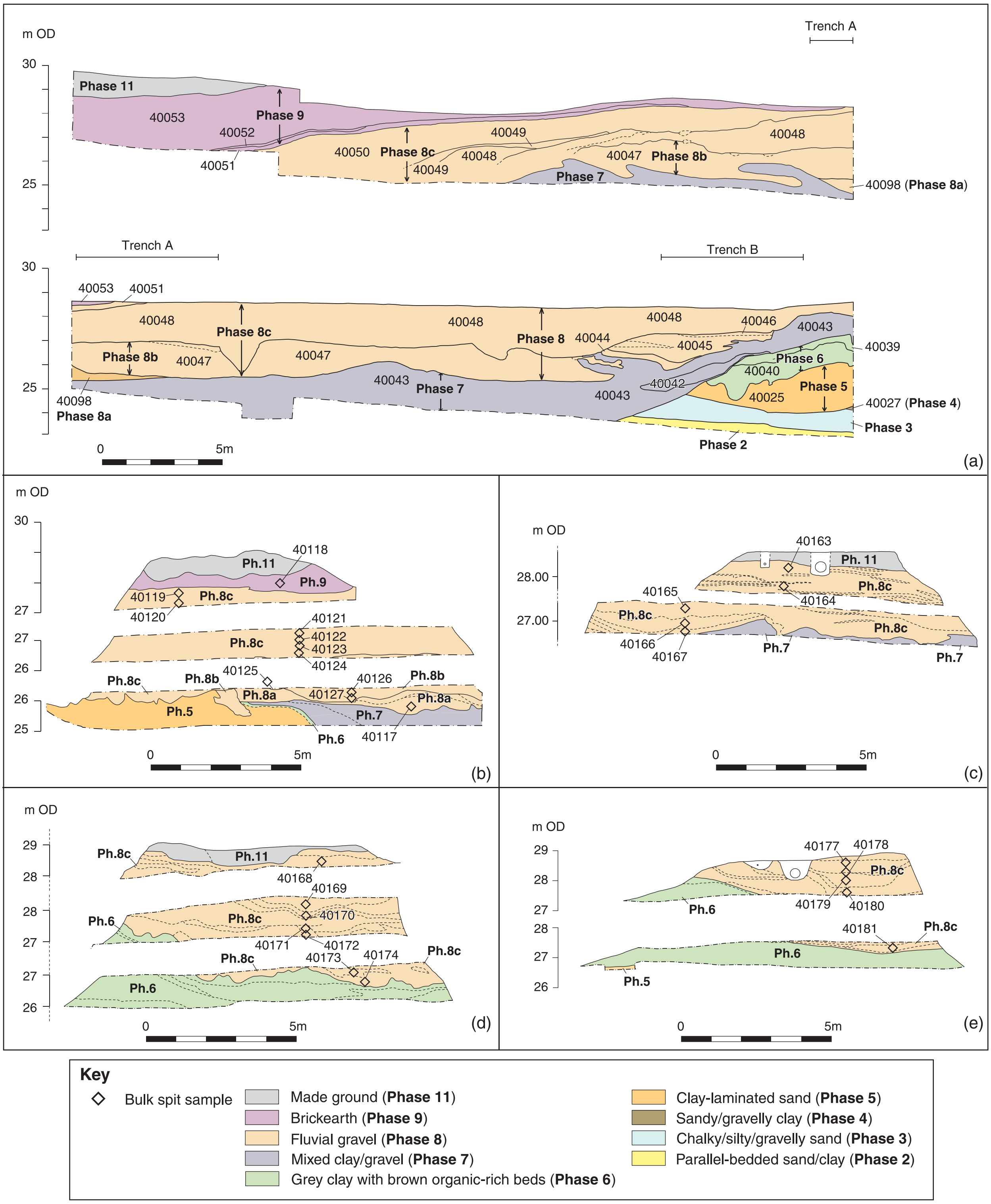

Figure 20.1 (a) Gravel phasing and stratigraphy at north end of west-facing Section 40015; (b) Trench A, stratigraphy and bulk spit sampling; (c) Trench B, stratigraphy and bulk spit sampling; (d) Trench C, stratigraphy and bulk spit sampling; (e) Trench D, stratigraphy and bulk spit sampling

clear that the gravels not only contained flint artefacts, but that they were in fact relatively rich in handaxes, spit sample sizes were increased from 100L to 250L for Trenches B, C and D. Full details of sample sizes and artefact recovery through Trenches A, B, C and D are given in the tabular summary (Table 20.2). The locations within the sequence of all the gravel samples are also showing in the summary trench section diagrams (Fig. 20.1b–e).

In total, 39 artefacts were recovered from the controlled sieve-sampling programme, derived from nearly 5300L of sieved gravel (Table 20.2). This part of the Phase 8 collection therefore represents a complete and unbiased sample of the lithic artefactual content of the gravel. The remainder of the artefact collection from Phase 8 was recovered either directly *in situ* during hand-cleaning of the various sections through the gravel, whether in Trenches A–D or from the main east-facing and west-facing sections of the site, or from monitoring of machine excavation through the gravel. Once it was realised that the gravel contained artefacts, it was removed in shallow machine spits, with both the machine driver and an archaeologist monitoring for discovery of flint artefacts. All artefacts found were recovered, with precise 3-D recording of their position when possible, although several were found in freshly excavated spoil of certain stratigraphic provenance but without their precise locations being known. This recovery process has probably resulted in a bias towards larger and more easily recognisable artefacts, particularly handaxes.

There were two main stages to the machine excavation of the gravel. The first stage was early in the excavation, when it was necessary to strip off the gravel to allow investigation of the underlying Phase 6 deposits. Approximately 95 artefacts were found in the gravel during this initial stage (including the 39 recovered from the systematic sieving program), when work was focused on the central and southern parts of the site; artefacts from this phase of work have find numbers in the sequence starting Δ.40000. The second stage took place after the main excavation was completed, as part of the watching brief on the bulk ground reduction north of Trench B. Approximately 90 artefacts were recovered during this stage, all from the gravels in the northern part of the site, which have find numbers in the sequence starting with Δ.50000.

ASSEMBLAGE INTEGRITY: CONDITION, STAINING AND PATINATION

The different Phases, 8a-8c, of the gravel were divided by unconformable junctions and the whole artefact collection was reliably provenanced to one of them. Consequently it was decided to maintain these stratigraphic subdivisions for initial analysis, and then to amalgamate the data at a later stage if desired. The summary table of lithic recovery (Table 20.1) also shows the breakdown of artefacts by condition for each context. There is some indication of a progression through the sequence of increasing abrasion, with about 60% of the (relatively small, admittedly) Phase 8a assemblage being in fresh condition, 38% of the (slightly smaller) Phase 8b assemblage being in mint or fresh condition, and 36% of the (relatively large) Phase 8c assemblage being in mint or fresh condition. The majority of artefacts were in slightly/moderately or very abraded condition, although none were in the category of extremely abraded.

The model adopted for site formation in relation to condition is that the condition of an artefact reflects firstly the environment and rapidity of its initial burial, and then the degree to which it is subsequently disturbed and reworked by new channelling within the braided gravel floodplain environment. Thus it is possible that the increasing prevalence of abrasion between Phase 8a and Phase 8b/8c reflects some reworking of material from Phase 8a, when truncated by development of the overlying Phase 8b and 8c. However, it is thought more likely that this mostly represents increased fluvial activity and reworking within Phase 8b and 8c. Therefore no distinction is made in subsequent analyses between parts of assemblages in differing condition, apart from in the discussion of handaxe typology (below) when there is a faint indication that twisted ovate/cordate forms are only found in fresh condition in Phase 8a, in contrast to more pointed forms which are found in fresh condition through Phases 8a–8c. Phase 8a (context 40098) was richest in sand/silt beds reflecting episodes of quieter deposition, which probably helped preservation of any artefacts that were abandoned in this environment. Likewise, the mint and fresh parts of the Phase 8c assemblage mostly came from

Table 20.2 Trenches A-D: artefact recovery from bulk spit-sampling of Phase 8 gravel

Phase	*Context*	*Trench A*		*Trench B*		*Trench C*		*Trench D*	
		Vol - lit	*Finds*	*Vol - L*	*Finds*	*Vol - L*	*Finds*	*Vol - L*	*Finds*
8c	40048, 40102	140	1 x irr w	250	3 x flks	250	None	250	2 x flks
		100	None	250	None	250	None	250	1 x h-axe, 3 x flk
		100?	None	250	None	250	1 x flk	250	None
		100	1 x irr w	250	2 x flks	250	2 x flks	250	1 x h-axe, 3 x flk
		100?	1 x flk	250	None	250	1 x flk	250	None
		100	1 x flk	-	-	250	3 x h-axes 1 x fl-tool 1 x flk	-	-
		100?	1 x flk	-	-	250	3 x flks	-	-
8b	40047	100	None	-	-	-	-	-	-
		100	1 x chip	-	-	-	-	-	-
8a	40098	100	1 x h-axe 5 x flks	-	-	-	-	-	-
Total		1040?	12	1250	5	1750	12	1250	10

irr w - irregular waste; flk - flake; h-axe - handaxe; fl-tool - flake-tool the southern part of the site, where there were more numerous sand/silt lenses reflecting quieter deposition, perhaps in an environment of exposed gravel bars on an abraded floodplain between quiet channels. The presence of a fair amount of material in absolutely mint condition, particularly in context 40102, indicates rapid burial and a minimum of disturbance. It is likely that this material is probably found where it was discarded, and therefore, although being found in a fluvial gravel environment mostly containing slightly disturbed material, it represents *in situ* evidence of hominin activity on the braided floodplain. The material in fresher condition is often unstained and unpatinated, but the majority of material is at least slightly stained, ranging from slightly yellowish, greyish or greenish, to orange-brown or strong ochre. A few pieces are also patinated to varying degrees, from partially mottled to completely blue-white, although usually with additional staining.

ANALYSIS

Introduction and technological overview

The quantities of artefacts attributed to different technological categories for each of Phases 8a–8c are tabulated, with both absolute counts and percentages (Table 20.3), although the latter are subject to dispro-portionate fluctuations due to their low absolute values for the smaller assemblages from Phase 8a and Phase

Table 20.3 Phases 8a-8c: technological categories, excluding chips and natural pieces

	5 - Percussor	*10 - Tested nodule*	*20 - Core*	*30 - Core-on-flake*	*40 - Core-tools*	*50 - Handaxe-on-flake*	*60s - Fl-tools*	*80 - Fl-flakes*	*90 - Flakes*	*100 - Irreg. waste*	*Sub-total (n)*
Phase 8c	-	4	4	-	23	2	8	-	76	20	137
%	-	2.9	2.9	-	16.8	1.5	5.8	-	55.5	14.6	
Phase 8b	-	3	1	1	2	1	2	-	6	4	20
%	-	15.0	5.0	5.0	10.0	5.0	10.0	-	30.0	20.0	
Phase 8a	-	-	-	-	4	-	1	-	12	6	23
%	-	-	-	-	17.4	-	4.3	-	52.2	26.1	
All	-	7	5	1	29	3	11	-	94	30	180
%	-	3.9	2.8	0.6	16.1	1.7	6.1	-	52.2	16.7	

Table 20.4 Phase 8: cores, two (marked *) also used as percussors

Phase	*Context*	*Find ID*	*Cnd*	*%Cx*	*DSC*	*ML*	*WtG*	*Notes*
8c	40102	Δ.40488	1	6	8	80	209	Unstained/unpatinated; pointed end of cylindrical nodule with alternating flake removals at other end; fresh chip from possible use as a percussor on rounded cortical tip
	40048	Δ.50019	2	1	10	57	103	Small broken irregular waste with scars from several removals; loamy adherents suggest possibly intrusive from modern or Late Prehistoric deposits
		Δ.50085	2	5	7	122	966	Large lump; end of sub-cylindrical nodule with alternating flaking around opposing end and part of sides to form sinuous bifacial edge; could perhaps just be failed attempt at a handaxe; fresh chip on rounded cortical end suggests use as a percussor
		Δ.50124	3	5	6	87	206	Small flattish lump from end of a nodule, with a few opposing alternating flakes to leave a flattened bifacial form with a sinuous edge; but no sign of edge-straightening to suggest intention to make a handaxe
8b	40047	Δ.50093	3	2	3	99	443	Unstained; ugly globular frost-fractured chunk with a few removals from opposing ends of one platform; slightly lenticular in profile, could perhaps be central part of broken biface, abandoned early in its reduction
		Δ.50099	2	-	-	-	345	Stained deep ochre; large flake, broken along frost-fracture, then used as core for some medium flakes

8b. Nonetheless, the technological profiles for all three assemblages are broadly similar, consisting mostly of flakes (30-55%), followed by irregular waste (14–26%), handaxes (15–18%), flake-tools (4–10%) and low proportions of the other technological categories, when present. Although no specific percussors were identified, chipping due to impact on the rounded cortical parts of two of the cores (see below) was interpreted as due to their use as knapping percussors. The most notable features of these assemblages are firstly, the presence of a significant proportion of handaxes; and secondly, the high proportion of handaxes relative to the quantity of debitage. This is discussed in more detail further below, in the section on debitage.

Cores and percussors

Six cores were found, individual details of which are given in the accompanying table (Table 20.4); although no separate percussors were identified in their own right in the Phase 8 assemblages, two of the cores (Δ.40488 and Δ.50085) had fresh chips on their rounded cortical protrusions, suggesting short-lived use for knapping.

The cores from Phase 8 were, to be frank, a pretty sorry group. One of them (Δ.50019, from Phase 8c) had greyish-brown loamy adherents, suggesting it was probably a modern or late prehistoric intrusion. As discussed subsequently (Chapter 21), there is evidence of late prehistoric activity and post-medieval flint knapping at the site from deposits directly overlying the Phase 8 gravels, and cut into them in places. Two of them (Δ.50085, from Phase 8c; and Δ.50093, from Phase 8b) could possibly just be broken parts of failed attempts at handaxe manufacture; neither of them showed any sign of removals other than small flakes, and both were broken due to frost fracture and had a crude tendency towards creation of a bifacial perimeter.

The other three cores showed similar technological approaches to knapping reduction as those from Phase 6. Two of them (Δ.40488 and Δ.50124, both from Phase 8c) were small remnants of flint nodules retaining a cortical nub opposed by simple alternating platform flake

Table 20.5 Handaxe (core-tool) and handaxe (on-flake) shape categories

Shape category	*Wymer type*	*Description*
0 - Unspecific	-	Indeterminate, eg when broken or unclassifiable to other categories
1 - Rough-out/abandoned	-	Pieces which appear to have been abandoned before completion, for instance because of frost-fracturing, persistent failure to achieve thinning, or breakage
2 - Simple	Proto	Includes McNabb and Ashton's (1992) 'non-classic' handaxes, simple bifacial or unifacial edges opposed to natural handles
31 - Crude pointed (large)	D	Large (≥100mm) pointed/sub-pointed biface, no soft-hammer, thick, wavy edges, thicker and heavier at butt
32 - Crude pointed (small)	E	Small (<100mm) pointed/sub-pointed biface, no soft-hammer, thicker and heavier butt, thick, wavy edges
4 - Classic pointed	F	Well-made pointed handaxe with clear butt, straightish sides and thinned towards tip, can be any size; butt can be unworked or crudely worked
50 - Sub-cordate	G	Progression from type F with convex sides, often more rounded point, thick/heavy butt, widest part of handaxe well towards butt; butt can be unworked, crudely worked
51 - Sub-cordate (plano-convex)	G	Similar to above but with clear plano-convex profile, cf. Wolvercote Channel
52 - Sub-cordate (twisted)	-	Sub-cordate plan shape, but tip distinctly twisted relative to butt
60 - Sub-ovate	GK	Much more ovate version of sub-cordate; tip is smoothly rounded without any well-defined point, widest part of handaxe is nearer middle of long axis, clear working to shape/thin butt and sides as convex curve, although not as much as for true ovate or cordate
7 - Cordate	J	Cutting edge all round tool with thinning and shaping around butt, centre of gravity near middle, bit more rounded than sub-cordate, but still has clear tip, with widest part of handaxe towards butt
71 - Twisted cordate	-	Cordate plan shape, but tip distinctly twisted relative to butt
80 - Ovate	K	Cutting edge and thinning/shaping all round, centre of gravity near middle, more rounded at base than cordate with widest part of handaxe towards middle, usually one end recognisable as tip by being more elongated from widest part of handaxe and often tranchet sharpened
81- Twisted ovate	K	Ditto above, but clearly twisted tip
9 - Side-chopper	L	Segmental chopping tool, one knapped bifacial edge or sharper edge opposed by flat edge or natural backing; crucial distinction with cleaver is that business edge is parallel with main longitudinal axis rather than transverse
10 - Classic ficron	M	Very pointed with symmetrical concave sides and well-defined heavy butt, cf. Furze Platt, Cuxton (Wenban-Smith 2004)
11 - *Bout coupé*	N	Flat-butted cordate, trimmed all round butt, but with distinct corners between gently convex base and sides
12 - Cleaver	H	Key characteristic is straight cutting edge at tip end, transverse to main longitudinal orientation of tool, cf. Cuxton (Wenban-Smith 2004)

removals. And the final core (Δ.50099, from Phase 8b) was a very thick flake, which appeared to have broken along a pre-existing frost fracture during knapping, and then to have subsequently had a few further medium-size flakes removed, using the frost fracture as a striking platform.

Handaxes

In contrast to the cores, the Phase 8 deposits produced a fine collection of over 30 handaxes (Table 20.6), all of them stratigraphically provenanced to specific contexts within the Phase 8 gravels, and most of them with their precise location surveyed. The handaxe collection (including handaxes made on flakes) was classified by shape broadly following the groups established by Wymer in his analysis of Swanscombe handaxes (1968, 45-68). The main difference between the shape categories applied in this analysis (Table 20.5) and Wymer's typology is the recognition of twisted-profile versions of ovates and cordates as distinct types (shape categories 52 and 81) for ease of tabulation. Handaxes are also grouped into 'pointed' and 'ovate' forms; as can be seen, the majority of handaxes are in the pointed categories, although about 15% of the assemblage is of more ovate character, all except one of which have twisted profiles.

Considering that Phase 8a was restricted in extent, it provided a relatively substantial collection of artefacts, including four handaxes. All are in very fresh condition and two of them are illustrated (Δ.50055, a strongly twisted sub-cordate, Fig. 20.2a; and Δ.40106, a quite crudely made, but sharply pointed form, Fig. 20.2b). The twisted specimen had its tip twisted anticlockwise relative to its butt, when viewed from above, creating a Z-shaped rather than an S-shaped side profile. The other two handaxes from Phase 8a were both broken; one of them (Δ.40067) was entirely unclassifiable, but the other retained a sharp pointed tip, so was classified as a 'classic pointed' form (type 4).

Phase 8b was less restricted in extent than Phase 8a, but produced a roughly similar size assemblage, of both handaxes and other artefacts, suggesting that artefacts were generally less abundant within it (although there are unfortunately no precise quantitative data of sediment volumes to support this observation). It produced three bifacial core tools (not illustrated), one of which (Δ.50169, in fresh condition) had a long blunt cortical edge opposed to a bifacially flaked edge and so was classified as a side-chopper (type 9). The other two handaxes from Phase 8b are both in moderately abraded condition. One of them (Δ.50031) is a straight-sided, convex-pointed and thick-butted sub-cordate form (type 50); the other (Δ.50095) is very similar, although its butt was more trimmed and thinned, and it has a twisted Z-profile. However, it was not classified as a twisted type because of its general crudity and the fact that various step and hinge fractures on its faces reflect problems in its manufacture. It is therefore not possible to be confident that its twist was deliberate, rather than being the accidental outcome of thinning/shaping failures.

By far the largest assemblage of the Phase 8 collection was that from Phase 8c, from which 25 handaxes were recovered (Table 20.6). Deposits of Phase 8c were extensive across the site. No controlled record was made of the volume of excavated/investigated sediment compared with Phases 8a and 8b. Therefore it is not possible to quantify the relative abundance of artefacts in these phases; however, it is estimated that they were generally slightly less abundant in Phase 8c, and that the larger quantity of lithic material recovered is due to the much larger volume of sediment investigated.

The Phase 8c assemblage includes a wide diversity of handaxe shapes, including both pointed and ovate forms, a representative selection of which are illustrated (Fig. 20.3). The illustrated specimens are: an absolutely mint condition, unstained/patinated sharply pointed handaxe with slightly concave sides and very slightly plano-convex in side profile, which was classified as a ficron (Δ.40480, Fig. 20.3a); a thick-butted pointed form in fresh condition which was classified as type 4 'classic pointed' (Δ.40057, Fig. 20.3b); a bluntly pointed form with a thick, flat butt, with convex sides in plan-view and a very straight side profile, which was classified as sub-cordate (Δ.50008, Fig. 20.3c); and a bluntly pointed cordate form, trimmed all around the butt, which had a distinct Z-twisted profile and so was classified as a twisted cordate, type 71 (Δ.50071, Fig. 20.3d).

Table 20.6 Phases 8a-8c: handaxes and handaxes-on-flakes, shape categories

	Unspecific			*Pointed*					*Ovate*				*Illustrations*
	0 - Unspecific	*1 - Rough-out, abandoned*	*9 - Side-chopper*	*31 - Crudely pointed (large)*	*32 - Crudely pointed (small)*	*4 - Classic pointed*	*10 - Ficron*	*50 - Sub-cordate*	*7 - Cordate*	*71 - Twisted cordate*	*81 - Twisted ovate*	*Total (n)*	
Phase 8c	-	4	-	2	4	*5	*1	*5	1	*1	2	25	Fig. 20.3
Phase 8b	-	-	1	-	-	-	-	2	-	-	-	3	-
Phase 8a	1	-	-	*1	-	1	-	-	-	*1	-	4	Fig. 20.2
All	1	4	1	3	4	6	1	7	1	2	2	32	

* illustrated examples

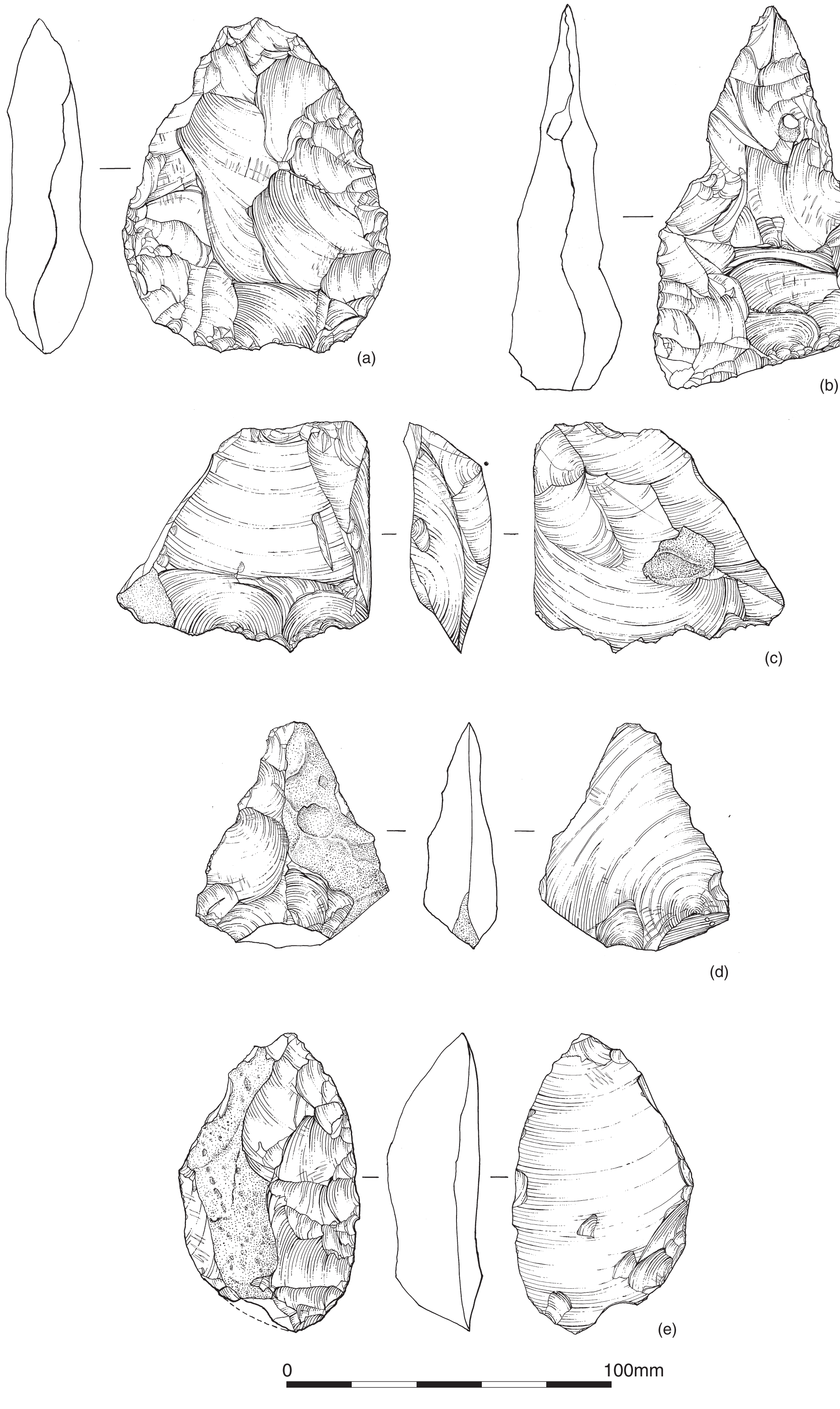

Figure 20.2 Phases 8a and 8b, handaxes and flake-tools: (a) Phase 8a – twisted cordate handaxe Δ.50055; (b) Phase 8a – pointed handaxe Δ.40106; (c) Phase 8a – double/linear notched flake-tool Δ.50030; (d) Phase 8b – double/linear notched flake-tool Δ.50022; (e) Phase 8b – miscellaneous flake-tool, 'Quina-type' scraper Δ.50113 [ill. B. McNee]

In general, the Phase 8 handaxe collection shows great diversity, with pointed and ovate forms both being present from top to bottom of the sequence. There are, however, some faint trends in the relationship of shape to degree of abrasion that hint at a subtler pattern. In Phase 8a, all of the handaxes are in fresh condition, and they include a combination of pointed and ovate forms, suggesting both types of handaxe shape were being manufactured in the close vicinity contemporary with deposition of the basal fluvial gravel bed. The evidence from Phase 8b is too limited to contribute to this discussion, with one atypical form in fresh condition and two sub-cordate forms in abraded condition. In Phase 8c, of the twelve straight-sided pointed forms (types 10, 31, 32 and 4), eight of them are in mint or fresh condition and four of them are in abraded condition. Of the five sub-cordate forms (type 50), two of them are in fresh condition and the other three are in abraded condition; of the four ovate forms (types 7, 71 and 81), all of them are in abraded condition. This suggests that there is at least some manufacture of pointed forms contemporary with deposition of the Phase 8c gravel beds, but that with all of the ovate forms being abraded, there is the possibility that they were reworked from earlier sediments rather than contemporary with Phase 8c.

Although (a) the numbers are too low for statistical significance and (b) there is also uncertainty over whether the degree of abrasion reflects reworking from

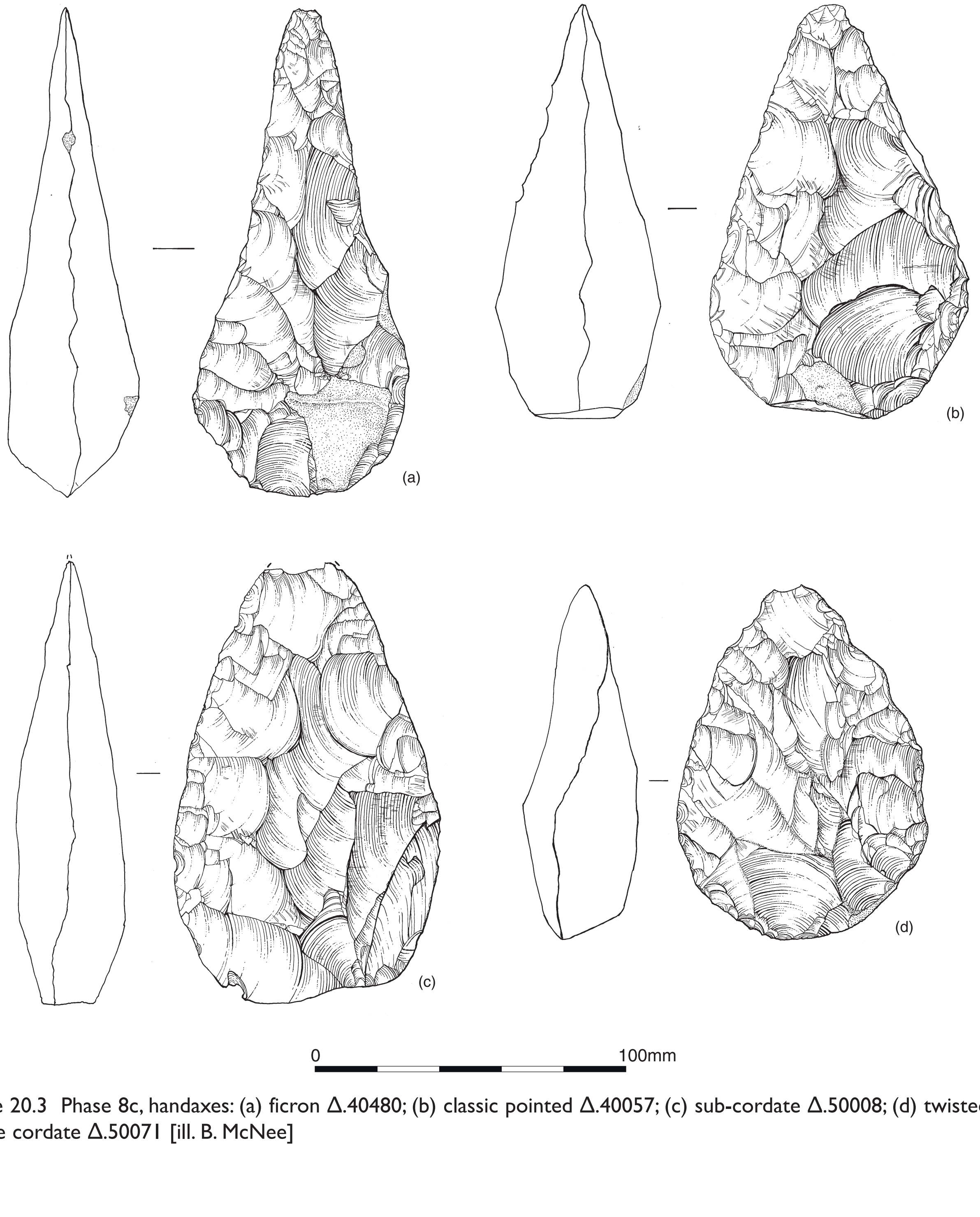

Figure 20.3 Phase 8c, handaxes: (a) ficron Δ.40480; (b) classic pointed Δ.40057; (c) sub-cordate Δ.50008; (d) twisted-profile cordate Δ.50071 [ill. B. McNee]

earlier gravel beds or whether it is merely due to the haphazard chance of varying degrees of reworking within the same gravel bed, it is possible that these trends reflect a decline in the manufacture of ovate handaxe forms upwards through the sequence. This suggestion is easily reinforced or falsified by further investigations; even though the gravel at the site was mostly removed in course of the archaeological investigation, substantial parts of it survive immediately to the north of the investigated area where it could be researched further.

Flake-tools

Complementing the core-tool element of the Phase 8 assemblage, there were also several (n=11) flake-tools recovered, most of them from Phase 8c (Table 20.7). It was not always possible to clearly differentiate some of these from simple handaxes when they had a pointed shape in plan. The interpretation here of two ambiguous specimens (Δ.50030, Fig. 20.2c; and Δ.50022, Fig. 20.2d) as linear notched flake-tools rather than handaxes on flakes was based upon the regularity of the secondary flaking, the fact that it was only carried out on one edge and one face of the parent flake, and because there was no attempt to straighten the secondarily flaked edge with more delicate flaking away of the ridges between the secondary flake scars.

The only flake-tool found in Phase 8a was a flake with two notches side-by-side transversely across its distal end (Δ.50030, Fig. 20.2c). This piece was in abraded condition, and was of similar type to several of the double/linear notched flake-tools from Phase 6. Hence it is possible that it was derived, as the Phase 8 gravels unconformably truncate the Phase 6 deposits and so must incorporate a reasonable proportion of reworked artefacts from them.

Two flake-tools were found in Phase 8b, both of which are illustrated (Fig. 20.2). One of them (Δ.50022, Fig. 20.2d) was very similar to the double/linear notched flake-tool from Phase 8a, and was likewise abraded, so could equally be derived from the Phase 6 clay. The other (Δ.50113, Fig. 20.2e) was quite different, and in fresh condition, making it less likely that it was derived. If found in a cave in south-west France it would probably be classified as a Mousterian 'Quina-type' side-scraper (Bordes 1979); one side of quite a large, thick flake has been carefully and methodically flaked with very numerous secondary flake removals to leave a steep, scaled convex edge. Nothing like this was present amongst the large selection of flake tools in the lower Phases 3, 5 and 6 at the site, all of which contained a range of much more simply made flake-tools with less-structured secondary flaking.

In Phase 8c, eight flake-tools were found, a representative selection of three of which are illustrated here (Fig. 20.4). Two utilised flakes were recovered, one described in the tabular summary (Δ.50047, Table 20.7) and the other both described and illustrated (Δ.50016, Fig. 20.4a). The latter also has some possible secondary flake-scars that could represent trimming of the opposing

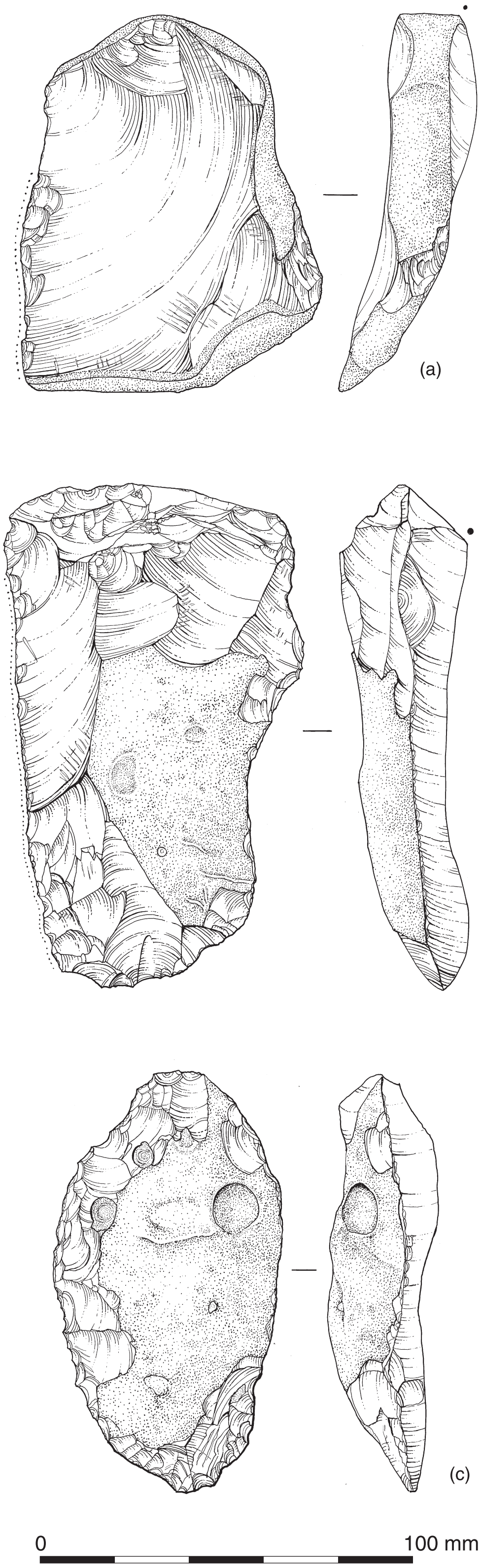

Figure 20.4 Phase 8c, flake-tools: (a) utilised flake Δ.50016; (b) 'flake-knife' Δ.50007; (c) miscellaneous flake-tool, 'Quina-type' scraper Δ.50003 [ill. B. McNee]

Table 20.7 Phase 8: flake-tools

Phase	*Flake-tool type*	*Find ID*	*Whl*	*Cnd*	*%Cx*	*DSC*	*ML*	*WtG*	*Notes*
8c	61 - Utilised flake	Δ.50016	1	2	3	2	94	202	Large flake with long straight edge showing clear macro use-wear; also some minor possible secondary flaking to facilitate handling [Fig. 20.4a]
		Δ.50047	1	2	-	-	125	495	Huge, thick flake, broken down middle with one heavily battered/chipped straight edge, some of which also may be invasive secondary flaking
	62 - Flake-knife	Δ.40135	1	4	0	3	87	115	Heavy abrasion obscures possible secondary flaking, but row of small flakes across one blunt edge opposite a straight and sharp edge suggests deliberate trimming to facilitate handling as a knife
		Δ.40145	1	2	0	9	74	110	Distal edge and one side of large bifacial thinning flake seem to have been slightly trimmed, leaving one sharp edge that could have been used for cutting
		Δ.50007	1	2	4	6	118	292	Large flake with natural straight sharp edge down two-thirds of one side, with the distal part of the edge trimmed to straighten it; clear macro use-wear [Fig. 20.4b]
		Δ.50092	-	4	5	0	62	55	Segmental scrap of flint with thick cortical back opposing sharp straight edge; several small flakes removed across cortical back to regularise its convex curve
	66 - Miscellaneous	Δ.40493	4	2	3	2	72	99	Unpatinated, slightly greenish-stained flake with numerous secondary removals, including: scalar 'scraper' retouch; invasive thinning across ventral surface; and two notches struck on ventral surface
		Δ.50003	1	2	9	0	98	200	'Mousterian Quina-type' side-scraper [Fig. 20.4c]
8b	64 - Linear/double notch	Δ.50022	1	3	5	2	61	68	Shape looks like small pointed handaxe in plan, but the only secondary flaking is notching along straight edge opposing cortical back [Fig. 20.2d]
	66 - Miscellaneous.	Δ.50113	1	2	-	-	90	144	'Mousterian Quina-type' side-scraper [Fig. 20.2e]
8a	64 - Linear/double notch	Δ.50030	20	3	2	3	91	136	Medium-size flake with two notches side-by-side across distal end [Fig. 20.2c]

blunt cortical edge. It also has very clear scaling that is probably macro use-wear on the straight edge, although it could also perhaps reflect deliberate fine-flaking of the edge to make a straight and finely denticulated cutting edge. Four flake-knives were recovered, one of which is described and illustrated (Δ.50007; Table 20.7 and Fig. 20.4b). The others are described in more detail in the accompanying table. Finally, there were also two miscellaneous flake-tools from Phase 8c. One of these (Δ.50003, Fig. 20.4c) was another Mousterian 'Quina-type' scraper, virtually identical to that from Phase 8a. The other (Δ.40493, not illustrated but described in Table 20.7) combined the remnants of what might once have been a thick convex scraping edge with two much more invasive secondary flakes that have left two deep notches in the ventral surface, orthogonal to each other.

There are too few flake-tools to consider whether they are any trends through Phases 8a to 8c. The two double/linear notched flake-tools may be derived from the Phase 6 deposits. Besides these, there is a significant element of utilised flakes and flake-knives, tool-types that exhibit a considerable overlap, with the only difference being recognition of secondary flaking to facilitate handling of the tool for cutting. These tool-types also occur in Phase 6, although the specimens found in the Phase 8 gravels are often bigger than any from Phase 6, and the fresh condition of the majority indicates their contemporaneity with the gravel. The most interesting type of flake-tool recovered was the 'Quina-type' scrapers, two of which were found, both almost identical to each other, Δ.50030 from Phase 8a (Fig. 20.2c), and v.50003 from Phase 8c (Fig. 20.4c). The similarity of these tools, and the carefully positioned secondary flaking suggest that these tools were deliberately conceived following a mental template. As such, they provide key points of contrast with the flake-tools from

Phase 6, in the intensity of secondary flaking that has shaped them, in their final form, and in the suggestion that this final form was pre-conceived as a type.

Debitage

The largest element of the Phase 8 collection was waste debitage, with almost 100 pieces recovered (Table 20.3): 12 from Phase 8a (five of them mint/fresh), 6 from Phase 8b (one of them fresh), and 76 from Phase 8c (20 of them fresh). Some basic size statistics were calculated for these assemblages, using only the whole flakes (Table 20.8). These were compared with size statistics for 210 flakes from complete reduction sequences of three experimental handaxes of similar pointed/sub-cordate shape to the majority of those in the Phase 8 collection (data from Wenban-Smith 1996). The size data from Phases 8a and 8c were remarkably similar, with average size of *c* 55mm long x 40-45mm wide x *c* 15mm thick, and an average weight of *c* 65-80g. Abraded flakes in both these assemblages were very slightly larger, on average. Flakes in Phase 8b were much smaller, but their low quantity makes it inappropriate to generalise.

In general the flakes from Phase 8 were slightly smaller than the comparative experimental data. It is likely that the smaller elements of the archaeological material were either present but not recovered, or had been winnowed out of the gravel by fluvial action, or perhaps both these factors have occurred. Most of the excavated debitage was technologically undiagnostic, but there were also a reasonable number that were clearly identifiable as from handaxe manufacture, including one tranchet-thinning flake (Δ.50133, not illustrated). The distribution of whole flakes in different size ranges was recorded, and also for each size-range the proportion of flakes that were identifiable as from handaxe manufacture (Table 20.9). These data were compared with the experimental model for complete reduction sequences. Rather than exclude broken debitage in the excavated collection that was clearly from handaxe manufacture, the likely lengths of the broken pieces were estimated.

Table 20.8 Phase 8: size and weight statistics for flakes (only whole pieces included), compared with combined experimental dataset from manufacture of three handaxes (from Wenban-Smith 1996)

Phase		*Fresh (n=16)*				*Abraded (n=44)*				*All (n=60)*			
		ML	*MW*	*MT*	*WtG*	*ML*	*MW*	*MT*	*WtG*	*ML*	*MW*	*MT*	*WtG*
8c (n=47,	Max	87	80	33	381	119	105	75	328	119	105	75	381
13 of them	Q4/Q3	71.0	59.0	15.3	109.0	73.3	58.0	22.0	93.0	72.0	59.0	22.0	97.5
fresh)	Mean	54.2	39.7	13.3	66.8	57.5	45.9	18.0	68.1	56.6	44.1	16.8	67.8
	Q2/Q1	39	24	7.75	9	36.75	30	11	16.25	37.5	26.5	9	13.5
	Min	28	16	3	3	21	10	5	3	21	10	3	3
	SD pop	19.4	20.4	9.6	103.5	24.4	21.0	12.9	79.2	23.2	21.0	12.3	86.6
8b (n=5,	Max	37	31	4	6	40	36	15	24	40	36	15	24
1 of them	Q4/Q3	-	-	-	-	37.8	34.5	15.0	21.8	37.0	34.0	15.0	21.0
fresh)	Mean	37	31	4	6	34.5	30.8	12.8	17.0	35.0	30.8	11.0	14.8
	Q2/Q1	-	-	-	-	32.75	29.75	12.3	14.75	35	31	7	6
	Min	37	31	4	6	26	20	7	5	26	20	4	5
	SD pop	-	-	-	-	5.2	6.3	3.3	7.2	4.8	5.6	4.6	7.8
8a (n=8,	Max	81	58	16	77	85	75	40	411	85	75	40	411
2 of them	Q4/Q3	66.8	49.8	14.3	58.8	64.0	44.3	17.8	53.3	72.8	48.3	16.8	65.8
fresh)	Mean	52.5	41.5	12.5	40.5	53.5	41.7	15.8	89.5	53.3	41.6	14.9	77.3
	Q2/Q1	38.25	33.25	10.8	22.25	41.25	29.75	7.38	14.25	38.75	28.5	8.38	11.25
	Min	24	25	9	4	35	27	5	6	24	25	5	4
	SD pop	28.5	16.5	3.5	36.5	17.9	16.3	11.8	144.9	21.0	16.3	10.5	128.6
All	Max	87	80	33	381	119	105	75	411	119	105	75	411
	Q4/Q3	71.5	58.3	14.5	85.0	70.3	55.0	21.3	68.3	71.0	55.8	20.0	78.8
	Mean	52.9	39.4	12.6	59.8	54.8	43.9	17.2	66.4	54.3	42.7	16.1	64.6
	Q2/Q1	35.5	24	7.5	8	35.75	29.75	10	15.5	35.75	27	9	12.25
	Min	24	16	3	3	21	10	5	3	21	10	3	3
	SD pop	20.6	19.4	9.0	95.6	23.4	20.0	12.3	89.5	22.7	19.9	11.7	91.2
Exp data	Max	-	-	-	-	-	-	-	-	122	109	47	-
(n=210)	Q4/Q3	-	-	-	-	-	-	-	-	59.5	50.75	14	-
	Mean	-	-	-	-	-	-	-	-	46.67	39.44	10.39	-
	Q2/Q1	-	-	-	-	-	-	-	-	30	27	5	-
	Min	-	-	-	-	-	-	-	-	2	10	1	-
	SD pop	-	-	-	-	-	-	-	-	21.91	18.88	8.33	-

Table 20.9 Phase 8: identifiability of debitage from handaxe manufacture

Flake-length (mm)	*Exp. data*		*Phase 8a*		*Phase 8b*		*Phase 8c*		*All Phase 8*	
	Total	*%HA*	*Total*	*%HA*	*Total*	*%HA*	*Total*	*%HA*	*Total*	*%HA*
20-40	90	24	2	50	4	0	14	7	20	10
40-60	62	30	* 4	25	1	0	** 15	13	20	15
60-80	33	12	2	0	-	-	* 12	33	14	29
80-100	14	21	* 2	20	-	-	** 9	30	11	36
>100	6	0	-	-	-	-	2	0	2	0

Total = total number of flakes in size-range; %HA = the percentage of them that are identifiable as from handaxe manufacture
* Includes estimated length of one broken flake recognisable as from handaxe manufacture
** Includes estimated length of two broken flakes recognisable as from handaxe manufacture

This analysis demonstrates at least three points of interest. Firstly, the size distribution profile of the archaeological material is quite different to that of the experimental model, with a marked absence of material less than about 50mm long. Secondly, of the archaeological debitage that was present, the smaller pieces are less likely to be identifiable as from handaxe manufacture than in the experimental model; whereas conversely, the large pieces are (slightly) more likely to be identifiable as such. This is perhaps an indication that later stages of handaxe reduction are not typically represented in the smaller debitage, as the experimental work clearly showed that smaller and more identifiable pieces were much more commonly produced in the end stages of handaxe manufacture (Wenban-Smith 1996). Thirdly, whatever the finer interpretation of variations in the percentage of identifiability for debitage of different size ranges, the key take-home message must be that there is a near-ubiquitous presence (apart from in the small assemblage of five whole flakes from Phase 8b) of a reasonable proportion of flakes identifiable as from handaxe manufacture. Disregarding the size of flakes and whether they are broken or whole, out of the whole debitage collection of 94 flakes (26 of them in fresh condition), thirteen of them were clearly identifiable as from handaxe manufacture (two of which are in fresh condition).

The final analysis carried out on the debitage collection was a more detailed attempt to model the expected composition of the assemblage if the debitage from the handaxes found was fully represented in the recovered collection. As pointed out in the interim report (Wenban-Smith *et al.* 2006) it is instantly clear to anyone with some experience of handaxe manufacturing that the proportion of debitage recovered was a gross under-representation of what would be expected from full reduction sequences of the handaxes found. This general assertion is supported here by quantitative data derived from experimental work. Numerous experiments have consistently demonstrated that manufacture of a handaxe typically leads to around 50-70 flakes ≥ 20mm being produced (Newcomer 1971; Wenban-Smith 1996 and 2004b). A crude estimate of the expected debitage composition in different size-ranges was then calculated, based on the three experiments reported in Wenban-Smith (1996) and assuming (which we already know to be wrong) complete representation of all categories of debitage size. The results of this model (Table 20.10), even allowing for the proven under-representation of smaller debitage, emphasise the staggeringly great under-representation of debitage in relation to the number of handaxes found. Another recognised source of error in the model is that it is based on the manufacture of sub-cordate and thick-butted handaxes, whereas the archaeological collection also includes cordate and ovate forms. However, these would probably have produced even greater numbers of more recognisable debitage, so their absence only serves to emphasise the disproportionate under-representation of debitage in the archae-

Table 20.10 Phase 8: expected quantities of debitage from handaxe manufacture in Phase 8 assemblages

Flake-length (mm)	*Phase 8a Handaxes=4*		*Phase 8b Handaxes=3*		*Phase 8c Handaxes=25*		*All Phase 8 Handaxes=32*	
	*Exp.**	*Act.*	*Exp.**	*Act.*	*Exp**	*Act.*	*Exp.**	*Act.*
20-40	80	2	75	4	465	14	614	20
40-60	56	4	51	1	321	15	423	20
60-80	29	2	27	-	171	12	225	14
80-100	12	2	12	-	73	9	95	11
>100	5	-	5	-	31	2	41	2

Exp. = expected number of flakes in size-ranges based on experimental model (data from Wenban-Smith 1996)
Act. = the actual quantities of debitage recovered in each size-range
* Expected flakes model reduced to match proportions of broken flakes of uncertain length in archaeological assemblages: Phase 8a, by 33%; Phase 8b, by 17%; Phase 8c, by 38%; Phase 8, by 36%.

ological assemblages. This point is even further reinforced by the fact that they probably include some debitage from non-handaxe reduction, based on the presence of some cores.

Consequently, two important points seem very clear. Firstly, even allowing for some bias in the non-recovery of debitage, there is a spatially organised pattern for the technological *chaîne opératoire* in relation to handaxe manufacture that reflects raw material collection and handaxe-manufacture *elsewhere* in the landscape, beyond the catchment of the Phase 8 gravels, and then their movement to, and abandonment at, the site, or at least within the catchment of the Phase 8 deposits. Secondly, even when handaxe manufacture is apparently not taking place at the spot (at least nowhere near to the degree that matches the number of handaxes found) there is still a significant representation of handaxe-manufacturing debitage in the lithic collection. This would in turn suggest that where there is a consistent absence of any debitage evidence for handaxe manufacture in a fluvial context, such as in the Lower Gravel at Barnfield Pit, one can be confident about the lack of handaxe manufacture not just in the close vicinity, but in the much wider neighbourhood.

DISCUSSION AND CONCLUSIONS

The Phase 8 gravels represent a return to fluvial conditions after the interlude of swampy stagnation and slopewash deposition represented by the Phase 6 deposits, and the more substantial slopewash and mass slope movement represented by Phase 7. Although the date, climate and local environment of Phase 6 are reliably established to the early temperate sub-stage Ho II of the first, main part of the Hoxnian interglacial (MIS 11c), the climate and environment associated with the overlying deposits of Phase 7 and Phase 8 are entirely unknown as are the time periods represented by firstly, the transition from one depositional phase to the next, and secondly, the deposition of the sediments associated with Phases 7 and 8 respectively.

The Phase 8 gravels are thought to most likely also date to MIS 11, on the basis primarily of their geomorphological relationship to the Lower Middle Gravels of the Swanscombe 100-ft terrace (see Chapter 4). However, both this dating, and also a specific correlation with the Lower Middle Gravel, are by no means certain. The gravels could represent quite a different stage within the grand sweep of the later parts of MIS 11, which include both a stadial of arctic cold and a return to interglacial conditions, as represented at Hoxne (Ashton *et al.* 2008). Alternatively, they could perhaps represent a post-MIS 11 phase of deposition.

Whatever their precise date, the Phase 8 gravels contain abundant evidence of a handaxe-dominated lithic material culture that is present in the lowermost deposits of Phase 8a, and which at this level includes production of both pointed and ovate handaxe forms, with the ovate forms (technically a cordate in the classificatory scheme applied here, due to its flattened butt) being pronouncedly Z-twisted in side-profile. Although the Phase 8 deposits directly truncate the Phase 6 deposits in places, and therefore create an illusion of a sharp cultural transition, it is important to remember that they are separated by Phase 7 which (a) produced no archaeological material apart from that thought to have been derived from Phase 6, and (b) that the time period separating the occupation of Phase 6 from the occupation of Phase 8 is entirely unknown. Although both events are thought likely to have occurred within MIS 11, this still leaves around 40,000 years to play with; plenty of time for even the slowest drift in material cultural adaptation to lead to radically different technological and typological practices.

Within the Phase 8 sequence there is a slight suggestion that the more ovate handaxe forms (most of which had a Z-twisted profile) are more commonly produced in the bottom part of the sequence. Those found higher up are in abraded condition and therefore potentially reflect a history of derivation from earlier deposits. From a material cultural point of view, although there was clearly an emphasis on handaxe manufacture, there was also a small but significant element of flake-tool manufacture. These include both simple utilised flakes and partly-trimmed flake-knives, and also more apparently designed convex unifacially flaked side-scrapers, similar in appearance to the Mousterian 'Quina-type' scrapers of south-west France.

Complementing these contrasts in technology and typology between Phase 6 and Phase 8, there is also a radically different structure to the spatial organisation of the *chaîne opératoire*. In Phase 6, all the evidence suggests that the *chaîne opératoire* was not spatially organised around the landscape. Rather, allowing for some small-scale mobility of flake-tools and partly-worked cores, it was (a) generally started and finished in the same part of the landscape, stimulated by an encounter with a resource such as a dead elephant, and (b) the distribution of lithic remains across the landscape was homogenised by the random nature (at least within the part of the landscape contributing to the horizon investigated at the site) of the distribution of resources requiring the application of lithic technology.

In contrast, there is a clear pattern in the evidence from the Phase 8 gravels of a consistent spatial organisation of the technological *chaîne opératoire*. The handaxes that were the predominant tool-type were mostly made elsewhere in the landscape, before becoming abandoned at, or in the vicinity of, the site. This is a complementary pattern to that represented at, for instance, the site at Red Barns in Hampshire. There it appears that an exposure of flint-rich chalky slope-wash deposits served as a location for the manufacture of handaxes that were then mostly taken away, leaving a disproportionate amount of debitage in relation to the small number of handaxes found (Wenban-Smith *et al.* 2000; Wenban-Smith 2004b).

Finally, there are some important points to make about the archaeological remains from the Phase 8 gravels concerning their recognition and value as a heritage resource. When first encountered, they were immediately recognised as fluvial (although there was some uncertainty about whether or not they were Pleistocene, or significantly earlier). However, there was no immediate indication that they contained any artefactual remains. Furthermore, even if there had been, there are many in the heritage curatorial world who would regard any lithic (or other archaeological) remains from river gravels as *de facto* 'disturbed' and therefore not of value for the business of investigating ancient societies, for which only '*in situ*' remains from undisturbed occupation surfaces are deemed worthy of investigation.

It was only after prolonged and systematic investigation that it began to become clear that there was a persistent artefactual presence within the Phase 8 gravel. The resulting relatively substantial collection was the result of systematic sieving of more than $5m^3$ of sediment and, as a very rough guess, the careful monitoring of the machining of several hundred cubic metres. This demonstrates that an initial apparent absence of artefacts in a deposit might prove to be misleading after more thorough investigation.

Furthermore, concerning the value of the artefacts that were eventually recovered, these prove to range in condition from absolutely mint (for example handaxe Δ.40480, Fig. 20.3a) to well-abraded. The mint and fresh specimens, even if not found on a recognisably intact landsurface, are nonetheless likely to have hardly moved since their deposition and to have been rapidly buried. Hence, even though found within fluvial gravel, they can be regarded as essentially representing undisturbed evidence of activity contemporary with formation of the gravel. However, even the more abraded remains also have value as an interpretive resource. Although it would be very beneficial to understand their taphonomic history more fully, they nonetheless represent a sample of material cultural activity from a catchment area in the vicinity of their discovery location and from a not-necessarily-huge time period up to and including the deposition of their eventual context of discovery. Such evidence can in fact provide a more useful and reliable sample of broad cultural trends through the long vistas of the Lower/Middle Palaeolithic than the instinctively appealing undisturbed remains of short-lived episodes of activity perhaps only lasting one afternoon. Therefore it is necessary to start to take Pleistocene fluvial gravels more seriously as a potential Palaeolithic resource, and to investigate them in advance of development. On the occasions where no artefacts are found, it should be remembered that they may be present in reasonable numbers, but not necessarily commonly enough to have been identified in a limited evaluation. Additionally, it should be considered that a negative result in one part of a body of gravel, or even in the entirety of a substantial body, should not tarnish the potential of gravel in general as an archaeological resource. After all, just because one field doesn't contain a Roman villa, it doesn't mean that one shouldn't look in the next one!