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ARTICLES

THE LITHIC INDUSTRIES FROM STAINES CAUSEWAYED ENCLOSURE AND THEIR RELATIONSHIP TO OTHER EARLIER NEOLITHIC INDUSTRIES IN SOUTHERN BRITAIN

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1. INTRODUCTION

The lithic industries under discussion are from the neolithic causewayed enclosure at Staines, Surrey. The site was excavated between 1961 and 1963 by the Department of the Environment (then the Ministry of Public Buildings and Works), in advance of gravel extraction (Robertson-Mackay 1962 and 1965; Robertson-Mackay et al 1981). The analysis of the lithic industry was begun by the late A D Lacaille following the precedents set in the Hurst Fen and Windmill Hill reports (Clark et al 1960; Smith 1965) and the basic data from this analysis, which was largely completed by 1968, were subsequently prepared by us for publication. The definitive report will be given in the final publication. In this article the results of the analysis are outlined, and the relationship of the Staines industry to other broadly contemporary assemblages in southern Britain is reviewed. (Editor's note: for plans showing the location of the causewayed enclosure and the areas excavated see Robertson-Mackay et al 1981, figs. 1-3).

Over 24,500 lithic artefacts were recovered from the excavation; they are described in Table 1 and in section 3. Almost all seem to come from the same cultural tradition although the degree of independent dating varies. The lithic artefacts from the enclosure ditches were directly associated with earlier neolithic ceramics and were in virtually undisturbed contexts (see however 5.1 and 5.3), but the situation in the interior of the enclosure was more complex as it had been much disturbed by ploughing since Roman times. However, there was a considerable amount of earlier neolithic pottery in the interior, similar to that from the enclosure ditches, and very little other prehistoric pottery (see 5.1), so that it is likely that the bulk of the lithic assemblage is also earlier neolithic in date.

2. RAW MATERIALS

The vast majority of the artefacts are of flint. Three different types of flint were identified macroscopically and we are grateful to the Institute of Geological Sciences for their comments and descriptions.

2.1 A poor quality flint, probably obtained locally from the river gravels. It is relatively small in size with a water-worn cortex. It is mottled and predominantly, though not exclusively, dark reddish or pale sepia in colour.

2.2 A better quality flint, possibly from the chalk. (The nearest flint-bearing chalk is in the Maidenhead-Denham area about 15 miles up-stream). This flint must have been of fairly large size as some of the nodules found in the inner enclosure ditch weigh up to 4lb 12oz (2.4 kg). It has an unabraded white cortex and is mottled. It varies in colour from pale grey to a darker sepia.

Table 1. The composition of the flint industry (see note 1)

Artefact type	Outer ditch	Inner ditch	Interior
Hammerstones	4	12(+1?)	26
Abraded edge implements	-	4(+4?)	-
Cores	162	595	16,151 (includes serrated flakes); sample only analysed in detail (see note 2)
Struck nodules	48	88	
Unretouched flakes and blades	1244	5067	
Retouched pieces (unclassified)	1	18	-
Scrapers	45	108	224
Serrated flakes	37	158	x
Laurel leaves	6	23	37
Leaf-shaped arrowheads	2	5	27
Transverse arrowheads	1	2	9
Triangular arrowhead	-	-	1
Axes	1	6	14
Blunted-back knives	-	4	6
Other knives	11	27	55
Single-piece sickle	-	-	1
Fabricators	1	2	9
Awls and piercers	6	26	128
Notched flakes	12	24	82
Saws	-	-	2
Microlithic element	-	-	9
Compound tools (see note 3)	3	5	18
Graver	-	1	-
Totals	1584	6180	16799

Note 1. Non-flint lithic artefacts (hammerstones and axes) are not included in this table, but they are discussed in the text.

Note 2. A sample of the unretouched material from the interior of the enclosure was examined. Details of this sample will be given in the final report.

Note 3. The compound tools category includes artefacts with more than one tool attribute. Therefore, in the detailed typology, there will appear to be a larger number of some types (eg scrapers).

2.3 A fine quality grey flint, only used for axes, which were seemingly brought to the site as finished tools, though broken axes were reflaked.

2.4 Amongst the other raw materials not obtainable locally there are axes of igneous rocks (Groups VI and VII) and a fragmentary knife of black chert (possibly Portland) which were brought in as finished tools, and hammerstones of sarsen.

2.5 The quartzite, also used for hammerstones, and the occasional cretaceous chert flake, probably originate from the local gravels.

3. TYPOLOGY

3.1 Flaking tools

Hammerstones are the only flaking tools present, and their weights vary with the raw material. The quartzite ones are the lightest, weighing between 75 and 110g. Most of the flint hammerstones are fragmentary but the complete ones weigh between 113 and 340g, and most of the sarsen ones between 225 and 450g. Some of the flint and sarsen hammerstones have been shaped but the quartzite pebbles remain unaltered. In the case of the flint hammerstones it is not always certain whether the shaping is deliberate or simply the re-use of a core (cf Saville 1981a, 5).

3.2 Abraded-edge implements

These are large nodules characterized, when viewed from the side, by a markedly concave or 'beaked' profile. The functional end is convex in outline and heavily abraded.

3.3 Cores

The classification of the cores (after Clark _et al_ 1960, 216) from the enclosure ditches is given in Table 2.

Table 2. Typology of a sample of cores from the enclosure ditches

Typology	Outer ditch	Inner ditch	Weight in g (sample size 383) range	average
Class A1	3	7	10-65	32.5
A2	86	367	6-300	49.7
B1	1	3	40-130	79.2
B2	23	81	5-445	53.6
B3	7	32	10-180	56.5
C	8	31	5-497	85.8
D and E	12	31	10-220	58.4
Unclassifiable	10	36	10-165	51.4
TOTAL	150	588	5-497	59

The simple cores are almost all of small size and of gravel flint (2.1), whilst the three-platform cores are larger and of better quality flint(2.2). The average maximum dimension for all cores is 66mm. The simple, partially flaked, single-platform cores have an average of only six flake scars and often have substantial areas of cortex left on them, few being systematically flaked to the point of exhaustion. Platform preparation for these cores is minimal: 53% utilized a thermally fractured surface and the rest a plain flake scar. Trimming between the edge of the striking platform and the core face was noted on about 15% of all cores, and was observed (though not quantified) on some flakes.

3.4 Removals

The removals vary from small, squat flakes to blades and larger blade-like flakes, many of which were chosen for retouch (see 4). The proportion of retouched to unretouched flakes varies from about 9% in the outer enclosure ditch to about 6.5 % in the inner enclosure ditch and 7.5 % in the interior of the enclosure. In the outer ditch a further 17% and in the inner ditch 13%, were edge-damaged possibly resulting from utilization (3.5). The figure for the interior of the enclosure is over 30%.
The unretouched pieces have been subdivided as follows:

	With cortex	No cortex	Trimming and rejuvenation pieces
Outer ditch	49.4%	39.9%	10.6%
Inner ditch	40.8%	50.5%	8.6%
Interior (sample)	58.3%	33.2%	8.4%

True core-rejuvenation pieces form about 40% of the rejuvenation and trimming flakes and include flakes with keeled edges (15%) and flakes struck to renew the edge of the striking-platform (84.5%). The most common type of trimming flake has been struck to remove excessive step-fracturing on the core face. Plunging flakes, originally counted with the core-rejuvenation flakes, are now considered to be an accident of débitage rather than a deliberate technique. (Tixier 1974, 19; Tixier et al 1980, 95). They form about 6% of the trimming flakes from the enclosure ditches.

3.5 Utilization

Utilization or bevelling of Smith's type A (1965, 92) is found on 31.5% of the utilized pieces from the ditches: the other 68.5% have irregular edge-damage but it is not always certain whether this is the result of utilization (Smith's type B) or of accidental damage (cf Moss 1983). Some of these flakes also have a narrow band of high gloss along their edges and may be worn serrated pieces (see also 3.7, and Saville 1981b, 140 and 144-5).

3.6 Scrapers

The typology of the scrapers (modified from Clark et al 1960, 217) is given in Table 3, and the metrical data of the complete ones in Table 5. The contour of the retouched edge is normally rounded, but one concave example is present from the inner enclosure ditch. The retouch is mostly of 'classic' semi-convergent type. However a number of flakes have marginal retouch only, but are otherwise morphologically similar to the artefacts with 'classic' scraper retouch and have been included in the totals. The majority of scrapers have lines of step-fracturing along the retouched edge and some also have

heavy wear on part of the retouched edge. Four scrapers have had flakes removed from their ventral surfaces, possibly to prepare or thin the base (Clark et al 1960, 218).

Table 3. Typology of scraper-edges on struck flakes from the ditches and interior of the enclosure

Scraper-type	Outer ditch	Inner ditch	Interior
A End scrapers	12	42	115
A/D End and side scrapers	22	41	73
C Disc scrapers	3	3	1
D Side scrapers	5	9	21
E Scrapers with bulbar end broken	-	5	-
F Unclassifiable	-	-	2
G On thermal flakes	5	12	19
TOTALS	47	112	230

3.7 Serrated flakes

These are relatively long, narrow flakes (see 4) with fine regular denticulations along one (about 68%) or both (32%) long edges. The number of teeth per centimetre varies from 23 on the finest specimens to between 11 and 14 on 24% and between 8 and 10 on 46%. Gloss was observed on about 14%; macroscopically similar gloss was noted on some of the utilized pieces (3.5) and it is possible that they are worn serrated pieces (cf Escalon de Fonton 1979, 217-220 and Saville 1981b, 140, 144-5). Nine serrated pieces have their distal ends truncated by abrupt retouch as though they were intended to form part of a composite tool (see also Bell 1977, 26, F35).

3.8 Laurel-leaves

A shallow, invasive retouch may cover all of one or both faces. Similar pieces with only marginal retouch may be a variant form.
The examples were subdivided by retouch-type and by size:-
a) larger bifacially flaked pieces with randomly executed chunky flaking;
b) smaller (less than 60mm in length) more regularly flaked artefacts, which although falling into the same length range as some of the larger leaf-shaped arrowheads, are much heavier and thicker objects;
c) morphologically similar pieces but with marginal retouch only;
d) irregularly flaked bifacial artefacts which may be unfinished forms. (Some may even be flat discoidal cores).
Some of the laurel-leaves seem to have been made on flakes struck from discoidal cores, but none, as far as could be determined, had been made from tabular flint as was the case at Hurst Fen (Clark et al 1960, 223).

3.9 Arrowheads

Leaf-shaped arrowheads Only seven of the thirty-four examples are from stratified contexts. Most of the arrowheads are broken, only nine being complete enough to reconstruct and classify after Green (1980, 10).

Type	No	Type	No	Type	No
Class 2B	1	Class 3A	1	Class 4A	2
2C	1	3B	1		
		3C	3		

There are also two fragments of what may have been kite-shaped arrowheads (Green 1980, 22). Retouch in this category is either fine, semi-parallel flaking over all, or part of, both faces (21 examples) or edge-retouch on a suitably shaped blank (12 examples).

Transverse arrowheads The location and typology (after Green 1980, 30) of the transverse arrowheads is as follows:

	Petit tranchet	Chisel	Oblique	Unclassified
Outer ditch	-	1	-	-
Inner ditch	1	-	1?	-
Interior	1	6	1	1

One chisel-ended arrowhead was made on a flake from a discoidal core (cf Green 1974, 84).

Triangular arrowhead There is one triangular arrowhead from a feature in the interior of the enclosure. It may be an unfinished barbed-and-tanged arrowhead (Green 1980, 142).

3.10 Axes

All the axes present are ground-and-polished. Only one complete axe was found, the others are fragments or flakes. Their distribution and re-use is shown in Table 4 below:

Table 4. The distribution and re-use of flint and stone axes

Context	Amount of axe surviving					Re-use		Total
	Complete	Blade fragment	Butt fragment	Other fragment	Flake	Scraper	Core	no of axes represented
Outer ditch	1	-	-	-	1	1	-	2
Inner ditch	-	1	-	1	3 1 (Gp VI)	-	2	5
Interior	-	1	1 (Gp VII)	2	11	2	2	15

The complete axe appears to be made of an exceptionally large piece of gravel flint; it is irregularly shaped and finished. The axes of Groups VI and VII rock as well as the other flint axes seem to have been imported as finished objects and re-used on site (cf Sieveking et al 1972, 151-176; Craddock et al 1983).

3.11 Knives

Blunted-back knives Two sub-types are present:
a) knives with bifacial retouch thinning the presumed cutting edge, the opposite edge being blunted by retouch or cortex (cf Hurst Fen, Clark et al 1960, F51) - six examples;
b) knives with bifacial retouch on the thicker edge (cf Hurst Fen, Clark et al 1960, F54 and Windmill Hill, Smith 1965, 99 F64 and F70). The retouch may extend round the distal end of the knife forming a straight end (5 examples). Step-fracturing similar to that observed on scrapers was noted on 5 knives, and one has been worn smooth.

Plano-convex type knives These knives have invasive retouch on both sides of the blank which tends to encroach on to the surface and in two instances extends all over the surface. (11 from the enclosure ditches, 4 from the interior).

Other knives These are a heterogeneous collection of artefacts, usually blade-like flakes with one long-edge retouched. Some have regular retouch on both edges, (one edge more heavily than the other), whereas the others have light irregular retouch around most of the edge. Four have lengths of retouch rubbed or worn smooth. There is also a group of five flakes from the enclosure ditches which have wide, squared ends and have been invasively retouched. Morphologically they are not dissimilar from a group of so-called 'sickle flints' from Windmill Hill though they do not have any gloss or lustre (Smith 1965, 97 and fig. 42; see also 6.1).

3.12 Single-piece sickle

This artefact is fragmentary and heavily calcined, but appears to be the tip of a bifacially flaked single-piece sickle (Clark 1932).

3.13 Fabricators

All three fabricators have triangular cross-sections; the two from the enclosure ditches have unretouched ventral surfaces, whereas the one from the interior has flat, covering retouch on this face. Areas of heavy wear, characteristic of this tool-type, were observed on the ends of the two from the ditches. In addition to the conventional form of fabricator there are, from the interior of the enclosure, seven narrow flakes with pointed ends and steep triangular cross-sections. All had bruising on the edges, and heavy wear was observed on three. All are made of gravel flint.

3.14 Points (awls and piercers)

Two types have been distinguished:
a) those with minimal retouch on a suitably pointed blank. The retouch strengthens the point rather than modifies the blank;
b) longer and thicker points with heavier retouch. These points are more robust and the point has been deliberately shaped.
Ten points of both types have been retouched from alternate faces as rotating awls (Clark et al 1960, 217). A patch of high gloss was observed on the end of one of these.

3.15 Notched flakes

This is a miscellaneous series of irregular flakes which have in common an abruptly retouched concave area, though it is not always certain whether this is deliberate or accidental. They vary from small semi-circular hollows to shallower concave areas. In size they range from 4mm to 25mm in diameter and from 2mm to 7mm in depth, but the majority are less than 7mm in diameter and about 3mm deep. The notch is usually on the side of the flake towards the distal end, and in two instances it is on the distal end. Double notches are also present, and 11 notches are found in combination with other tool attributes (6 scrapers; 3 knives; 1 piercer; 1 serrated flake) or with utilization on the long edge of the blank.

3.16 Saws

Apart from the flakes and blades with serrations (3.7), there are two artefacts from the interior of the enclosure with larger, more widely spaced teeth, each formed by the removal of two or three spalls.

3.17 Microlithic element

One microlith of scalene form was found in a feature in the interior of the enclosure. Seven small bladelets were also found in the interior of the enclosure, some of which have been retouched, one as a scraper.

3.18 Graver

One double-angle graver was found in the inner enclosure ditch. It is on a Levallois-type blank (identified by A D Lacaille).

4. METRICAL DATA

The complete unretouched flakes as well as the utilized and serrated flakes and the scrapers were measured for length and breadth, and breadth to length ratios were also determined. The method used followed that of Bohmers and Wouters (1956) as used for example at Windmill Hill (Smith 1965, 89), though recent work has revised certain aspects of this (eg Saville 1981b; Ford 1982). The results are summarised in Tables 5-6.

The unretouched flakes have a uni-modal, but slightly skewed, length distribution suggesting that they form a homogeneous population. There is virtually no size difference between the cortical and non-cortical flakes. Although core-rejuvenation flakes were not measured as a separate category it was noted that they tended to be larger and thicker than the other retouched flakes. The unretouched flakes are smaller than the utilized and retouched pieces including the scrapers. Knives (measured only for length) are, as a group, longer than the majority of other types. Ratios of breadth to length show that narrower flakes were selected for utilization, serration and some other edge-retouched artefacts. Broader, thicker flakes were preferred for scrapers.

5. WITHIN-SITE DISCUSSION

Full discussion and interpretation of the lithic industry must await the publication of other aspects of the site in the final report. Nevertheless a few of the more interesting points can be summarised here.

5.1 Date

The typological range of the lithic assemblage indicates that it is largely homogeneous and of earlier neolithic date. In the enclosure ditches it is directly associated with ceramic evidence which confirms

Table 5.

	DITCHES					INTERIOR SURFACE				
	Cortical flakes	Non-cortical flakes	Utilized flakes	Serrated flakes	Flake scrapers	Cortical flakes	Non-cortical flakes	Utilized flakes	Serrated flakes	Flake scrapers
	1270	911	784	155	108	263	102	279	18	143
LENGTH										
10-20mm	113	84	28	6	-	69	51	40	-	-
20-30	555	462	189	25	3	104	36	128	9	9
30-40	416	286	291	52	34	71	12	88	3	67
40-50	146	63	182	51	40	13	3	14	5	48
50-60	32	10	58	19	19	5	-	8	-	17
60-70	6	3	26	2	11	-	-	1	1	1
70-80	1	3	10	-	1	1	-	-	-	-
80-90	-	-	-	-	-	-	-	-	-	-
90-100	1	-	-	-	-	-	-	-	-	1
BREADTH										
0-10mm	50	93	18	2	-	5	6	7	-	-
10-20	653	550	375	80	2	121	64	126	11	9
20-30	456	220	275	61	20	106	30	105	5	35
30-40	95	41	89	9	45	28	2	37	2	51
40-50	14	5	22	3	35	3	-	4	-	38
50-60	2	1	4	-	4	-	-	-	-	9
60-70	-	1	-	-	2	-	-	-	-	1
70-80	-	-	-	-	-	-	-	-	-	-
80-90	-	-	1	-	-	-	-	-	-	-

Table 6.

	DITCHES					INTERIOR SURFACE				
	Cortical flakes	Non-cortical flakes	Utilized flakes	Serrated flakes	Flake scrapers	Cortical flakes	Non-cortical flakes	Utilized flakes	Serrated flakes	Flake scrapers
	1270	911	784	155	108	263	102	279	18	143
B:L RATIO										
0:5–1:5	-	3	1	-	-	-	-	-	-	-
1:5–2:5	94	104	99	31	-	10	1	5	3	1
2:5–3:5	308	223	289	63	13	27	11	37	5	16
3:5–4:5	521	371	268	44	31	94	35	124	8	39
4:5–5:5	274	188	96	16	44	106	40	96	1	46
5:5– >	73	22	31	1	20	26	15	17	1	41
THICKNESS										
0– 3mm	-	-	12	6	-	-	-	36*	-	-
3– 5	-	-	281	60	-	-	-	96	13	3
5– 7	-	-	227	53	7	-	-	102	3	17
7– 9	-	-	138	25	17	-	-	63	1	24
9–11	-	-	84	8	27	-	-	32	1	20
11–13	-	-	22	2	10	-	-	10	-	22
13–15	-	-	10	-	17	-	-	4	-	21
15–17	-	-	7	1	16	-	-	2	-	12
17–19	-	-	3	-	5	-	-	-	-	17
19–21	-	-	-	-	5	-	-	-	-	4
21–23	-	-	-	-	1	-	-	-	-	1
23–25	-	-	-	-	2	-	-	-	-	-
25–27	-	-	-	-	1	-	-	-	-	-

* Including 66 broken flakes.

this cultural attribution. Some Ebbsfleet pottery (less than 2% by vessels) came from a very limited portion of the ditches. This was assumed to be contemporary with the earlier neolithic pottery (Smith 1965, 14). It must now be seen as intrusive (Smith 1971, 96), although the earlier neolithic industry need not necessarily be affected. No other later neolithic pottery was found. Despite attempts, a valid radio-carbon determination has not yet been obtained from the enclosure.

In the interior of the enclosure the dating is less secure, although even there virtually all of the prehistoric pottery is earlier neolithic in date, with other prehistoric pottery very restricted in distribution and quantity. There are also a number of widely distributed features which, although truncated, are similar in content to the enclosure ditches, and confirm earlier neolithic activity in the interior. The bulk of the lithic assemblage is therefore likely to be contemporary with that from the enclosure ditches, though there may be a slight admixture of later elements, of which the triangular arrowhead and the saws seem to be part. (Because the date of the flint from the interior of the enclosure is not absolutely certain, and because there is considerable difference in volume of archaeological deposit, the flint from the interior has not been used for quantitative comparative purposes). The microlith and other related pieces (3.17) suggest that there is also a residue of earlier material. The presence of 'unexpected' forms in the enclosure ditches, for example the burin, the transverse arrowheads and the 'plano-convex' type knives are discussed in 6.1.

5.2 Technology

The industry is largely one of <u>ad hoc</u> flakes which have been struck from simple, partially flaked cores, though there is evidence of specialised core-preparation on a small scale (cf Green 1974, 84). This includes two discoidal cores and a flake struck from a discoidal core used as a blank for a chisel-ended arrowhead, a few flakes with faceted striking platforms, keeled core-rejuvenation flakes and cores with keeled striking platforms. Blade production is minimal as shown both in the core typology and in the breadth to length ratios of the flakes. The Levallois-type flake is discussed elsewhere (see 6.1). The metrical data suggests that particular types of blanks were selected for retouch (see 4). The proportion of cores to flakes is high (1:6, or 1:8 if retouched pieces are included) which is consistent with the apparent profligate use of gravel flint suggested by the cores (3.3). However, although difficult to identify conclusively, blanks of gravel flint seem to have been used only rarely for secondary retouch and where they can be identified often have only minimal retouch. Whether any of the numerous flakes of gravel, or other flint, were used without modification for <u>ad hoc</u> tools, must, in the absence of microwear analysis, remain conjectural (cf Avery 1982, 36). Core typology seems to some extent to have been determined by the raw materials (see also 6.3). The numerous simple partially flaked cores tend to be of gravel flint, whereas the more extensively worked types are less common and of non-gravel flint (2.2).

The only flaking tools recognised are hard hammers (ie hammerstones) although some of the evidence on the flakes suggests that soft hammers were used (Newcomer 1971, 88-90) and they must have been used for some of the finer retouch. It is not known whether antler, wood or bone were employed, but it can be noted here that although bone survived well, no hammers or other flaking tools were recognised amongst the worked bone.

The interpretation of the presence of both local and imported lithic objects both as raw materials and as finished objects will be discussed further in 6.3. More light may be shed on this matter when further details of the ceramic and other evidence are available.

5.3 Spatial distributions

This aspect of the industry has not been described in this paper, although full documentation and discussion is in preparation for the final report. In brief, the preliminary results show that lithic artefacts occur in all excavated areas, but also show definite areas of concentration (see Table 7). For example the inner enclosure ditch had an average of about 19 flints per linear foot in it, whereas the outer and larger, ditch had only about 6 flints per linear foot. Practically no flints were found in areas excavated between the two enclosure ditches, but in the interior of the enclosure nine areas with relatively high concentrations of flint were noted, some of which were associated with neolithic features. Concentrations of flint also occur in the enclosure ditches, and sometimes coincide with concentrations of pottery and bone suggesting dumping of refuse or possible ritual deposits (Mercer 1975; Bamford 1980, 5). Some of these occur at the butt-ends of ditch segments and may indicate thoroughfares. Other concentrations are made up almost entirely of flint débitage, sometimes including hammerstones, and may be sweepings from knapping floors. There is no indication that flint was knapped in the ditches as suggested at Offham (James 1977, 214: it is much more likely that the unwanted cores were dumped in the ditch, rather than special cores being taken away. It may be noted that no hammerstones were recovered at Offham).

On closer inspection the distributions of the retouched material produce some potentially interesting features. In the inner enclosure ditch retouched pieces form a lower proportion of the industry than they do in the outer ditch. A chi-squared test indicated that the difference was significant. The reason for this is unclear but could be because some types do not occur in both ditches. Some tool-types have their distributions limited to, or focused on, the north-western sector of the enclosure and this is an area where there is also much flint in the enclosure ditches and in the interior. The increase in density of finds in one area was also noted at Briar Hill (Bamford 1980, 5) and variation in intra-site distributions was present at Carn Brea (Saville 1981b, 103-107).

With only a palimpsest of occupation remaining in the interior of the enclosure it is difficult to interpret these distribution patterns, but it is to be hoped that future research on causewayed enclosures and other related sites will elucidate the situation. Very limited, broadly contemporary, recutting of the enclosure ditches at Staines was observed during excavation (cf Smith 1971, 98), and this may account for some, but by no means the majority of the differential finds distributions.

6. INTER-SITE COMPARISONS

The general typological composition of earlier neolithic industries is well established (eg Piggott 1954, Clark et al 1960, Smith 1965, Whittle 1977), though its apparent homogeneity has recently been questioned (Bradley 1982). Identification of certain technological trends (Pitts 1978; Pitts and Jacobi 1978) has also raised questions

Table 7. Spatial distribution of flint

	Outer ditch	Inner ditch	Interior
All struck flint	G/X	G/X	G/X
Cores	G/X	G/X	G
Hammerstones	X	O (but G)	G
Scrapers	G/X	G/X	G/X
Laurel-leaves	O (but G)	G/X	G
Arrowheads: leaf-shaped	X	X	G
: transverse	X	X	O
Axes	-/X	X (NW)	X (NW)
Knives: blunted-back	-	X (NW)	X (NW)
: plano-convex	X	X (NW)	O (NW)
Awls and piercers	O	G	G
Notched flakes	G	G	G
Serrated flakes	G/X	G/X	not recorded
Burnt flint	G	G	G
Stone	O	X	G

Key

- \- = Absent or virtually absent
- O = Very few and sparse locations
- X = Distribution in one or two areas (sometimes strong)
- G = Generally even distribution (ie generally sparse or generally dense)
- G/X = General scatter with concentrations in some areas
- (N/W) = North-west half of the enclosure

of location and function of sites in terms of raw material sources (Care 1982).

The data with which the Staines industries are compared have been culled from published material and are hence subject to the limitations inherent in such sources, but there are clear implications for the future of lithic analysis.

6.1 Typology

Tables 8-10 show the range of tools as given in the published excavation reports of selected earlier neolithic industries. These industries differ greatly in size and, as one would expect, in range of types present. The appearance of certain types in the Staines and a few other industries which are not present in the 'standard' lists needs further comment.

Microliths (and associated debris) in fact occur at a number of earlier neolithic sites but are usually dismissed as residual finds. This is probably the case at Staines, but is discussed more fully in the excavation report.

Burins do occur in earlier neolithic tool-kits, most notably at Hurst Fen where one is made on a flake from a polished axe and is unequivocally earlier neolithic in date (Clark et al 1960, 224; see also Wainwright 1972, 68). However, the one from Staines is on a blank clearly of upper palaeolithic technology and the late A D Lacaille considered it to be residual.

Table 8.

SITE and reference	Total flint	Tools: total (%)	Ratio cores: flakes (all)	Raw material: On site	Less than 20 miles	Over 20 miles	Non-flint	Hammerstones
STAINES (ditches)	7764	535 + bevelled (6.8%)	1:8	Yes	Yes	Yes	VI	16 + 4 abraded edge
ABINGDON Avery 1982	5142	536 (10.4%)	1:34	Yes	Yes	-?	VI tuff	11 quartzite sandstone
HURST FEN (sample)	16398	788 (4.8%)	1:28	Yes	-	Yes?	VI	?
" " (all seasons) Clark et al 1960	-	-	-	-	-	-	-	66
BROOME HEATH (primary) Wainwright 1972, Table 3, p.48, 68	9445	373 (3.9%)	1:66	Yes	-	-	-	1
EATON HEATH (shafts) Wainwright 1972, 13	445	22 (4.9%)	1:87	-	?	-	-	1
FENGATE (FNG 1) Pryor 1978	275	13 (4.7%)	-	-	-	-	-	-
ORSETT (lower levels) Bonsall in Hedges and Buckley 1978	329	16 (4.9%)	1:13	Yes	Yes	Yes (axe)	-	-
THE TRUNDLE Curwen 1929 and 1931	2197	59 (2.7%)	1:25	?	?	?	?	-
WHITEHAWK Curwen 1934 and 1936 Ross-Williamson 1930	?	?	?	?	?	?	?	15?
OFFHAM (primary) James 1977	4586	6 (0.1%)	1:87	Yes	-	-	-	7 (cores utilized)
BURY HILL (lower silts) Drewett in Bedwin 1981, 77	3725	35 (0.9%)	1:99	Yes	-	-	-	8

SITE and reference	Total flint	Tools: total (%)	Ratio cores: flakes (all)	Raw material: On site	Less than 20 miles	Over 20 miles	Non-flint	Hammerstones
ALFRISTON (primary) Drewett 1975	936	1 (0.1%)	1:95	Yes	-	-	-	-
BISHOPSTONE (all neolithic pits)	1618	117 (7.2%)	1:30	Yes	-	Yes (axe)	Yes	25
" (pit 357) Bell 1977, Table 1	(770)	(63)(8.2%)	(1:253)	Yes	-	-	Yes	(9)
HEMP KNOLL (neolithic pits) Robertson-Mackay 1980, Table 8	2664	272 (10.2%)	1:23	Yes	Yes	-	-	6 + 2 abraded edge
WINDMILL HILL (primary) Smith 1965	?c. 9000	786 (c.8%)	?1:5	-	Yes	Yes (axes)	XI	19 flint 21 sarsen
DURRINGTON WALLS (middle neolithic) Wainwright and Longworth 1971, 156	806	11 (1.36%)	1:72	Yes	?	-	-	-
KNAP HILL Connah 1965, 14	2759	68 (2.5%)	1:38	-	?	-	-	1
PAMPHILL (pit) Field, Matthews and Smith 1964	94	19 (20%)	1:29	Yes	-	Yes	-	-
HIGH PEAK (total)	725	67 (9.2%)	1:24	Yes	-	Yes (Beer)	IV+jadeite chert-Portland	-
" " (cache) Smith in Pollard 1966, 48f	(30)	(11)	-	-	-	-	-	-
CARN BREA Saville 1981b	26382	1441 (5.5%)	1:176	-	Yes	Yes (?Beer)	Yes chert, I, IV, XVII, XVI + sandstone + greenstone tuffs	?1
MAIDEN CASTLE Wheeler 1943	?	?	?	?	-	-	Yes	?
HEMBURY Liddell 1931-5	?	?	?	?	?	Yes (Beer)	?	?

Totals are from undisturbed contexts where possible.

Bevelled-edge artefacts are totalled with tools.

Table 9.

SITE	Cores	Unretouched flakes	Edge-damaged flakes	Bevelled edges	Scrapers	Serrated flakes	Leaf-shaped arrowheads	Transverse arrowheads	Polished axes	Flaked axes	Laurel-leaves
STAINES (ditches)	757	1750	947		153 (28%)	195 (36%)	7 (1.3%)	3	7	-	29 (5%)
ABINGDON	120	4160	326	44	166 (31%)	272 (58%)	17 (3.1%)	-	11	-	5
HURST FEN (sample)	570	14500	540	-	342 (43.4%)	356 (45%)	← see Table 10 ---				
" " (all seasons)	-	-	-	-	736	?	58/70	1	6+	-	42/44
BROOME HEATH (primary)	140	8931	-	-	254 (68%)	-	7 (1.9%)	2	7 + 21 chips (7.5%)	1?	4 (1.1%)
EATON HEATH (shafts)	5 + 27 frags	417	-	-	14 (63%)	-	-	1	-	-	-
FENGATE (FNG 1)	irreg waste 39	110	114		6 (46%)	2 (15.4%)	-	-	-	-	1 (7.7%)
ORSETT (lower levels)	24	289	-	-	4 (25%)	2 (12.5%)	-	-	1	-	3 (rough-outs) (18.75%)
THE TRUNDLE	86	2052	-	-	12	28	2	← see Table 10 ---			
WHITEHAWK	?	?	266	2	49 + 6 hollow	277	5	1	5	2	-
OFFHAM (primary)	52	4523	5		-	2	4	-	-	-	-
BURY HILL (lower silts)	36 (+ 123 flaked nodules)	3523	-	-	20	6	1	-	1	1	2

SITE	Cores	Unretouched flakes	Edge-damaged flakes	Bevelled edges	Scrapers	Serrated flakes	Leaf-shaped arrowheads	Transverse arrowheads	Polished axes	Flaked axes	Laurel-leaves
ALFRISTON (primary)	10	889 + 26 'waste'	10		-	-	-	-	-	-	-
BISHOPSTONE (all neolithic pits)	47	1243 + 141 (chips)	45		22 (18.8%)	50 (43%)	2	-	1	3	-
" (pit 357)	(3)	(661)	(34)	-	(11)	(43)	(2)	-	-	(1)	-
HEMP KNOLL (neolithic pits)	109	1919	356	73 (incl. misc. ret.)	42 (15.4%)	147 (54%)	-	1	1	-	-
WINDMILL HILL (primary)	446 + 77 unused nodules	sample 2430 (excl. spalls)	?	187 (23.8%)	218 (27.7%)	314 (40%)	19 (2.4%)	-	7+ (in 32 frags)	-	6 (0.76%)
DURRINGTON WALLS (middle neolithic)	8	787 irreg waste	-	3	4 (36.4%)	-	1 (9.1%)	-	1	-	-
KNAP HILL	69	2542	79		12 (17.4%)	5	-	-	-	-	-
PAMPHILL (pit)	3 + 27 frags	46	21	4	-	9 (47.3%)	1 (5.3%)	-	1 (in 7 frags)	-	-
HIGH PEAK (total)	28 + 1	601 + 22	6 (lustre)	9	27 (40%)	-	3 (4.4%)	-	5 (7.5%)	-	1
" " (cache)	-	(19)	-	(2)	(7+)	-	-	-	-	-	-
CARN BREA	86 + 41 frags	20311	633	6	131 (9%)	3	751 (52%)	-	6 (in 42 frags) + 38/45 stone	-	-
MAIDEN CASTLE	?	?	X	?	X	X	X	?	X	-	?-
HEMBURY	?	?	X	X	X	X	X	-	X	-	-

X indicates presence, but numbers unknown.

Table 10.

SITE	Blunted-back knives	Edge-retouched knives	Plano-convex type knives	Single-piece sickles	Fabricators	Awls and piercers	Notched flakes	Burins	Microliths etc.	Miscellaneous retouch	Choppers
STAINES (ditches)	4	27	11	-	3	32	36	1	-	19 + 8 compound tools	-
ABINGDON	10	2	-	1	2	5	-	-	1	-	-
HURST FEN (sample)	---			90 (11.4%)							
" " (all seasons)	10	1 (polished edge)	-	1	8/10	18	-	11	1 micro-burin	-	-
BROOME HEATH (primary)	-	68 (18.2%)	-	-	-	4	1	1	1	-	1
EATON HEATH (shafts)	-	6 (27.3%)	-	-	-	-	-	-	-	-	-
FENGATE (FNG 1)	-	1	-	1	-	-	-	-	-	2	-
ORSETT (lower levels)	1	-	-	-	-	-	1	-	-	4	-
THE TRUNDLE	---			17							
WHITEHAWK	-	-	-	1(?)	-	1(?)	-	-	-	-	-
OFFHAM (primary)	-	-	-	-	-	-	-	-	-	-	-
BURY HILL (lower silts)	-	-	-	-	-	2	-	-	-	2	-

SITE	Blunted-back knives	Edge-retouched knives	Plano-convex type knives	Single-piece sickles	Fabricators	Awls and piercers	Notched flakes	Burins	Microliths etc.	Miscellaneous retouch	Choppers
ALFRISTON (primary)	-	-	-	-	-	-	1	-	-	-	-
BISHOPSTONE (all neolithic pits)	-	1	-	1? (F95)	-	1	12	1	-	23	1
" (pit 357)	-	-	-	-	-	-	-	-	-	-	-
HEMP KNOLL (neolithic pits)	-	-	1	-	-	5	1	-	-	1 saw	-
WINDMILL HILL (primary)	7	11	-	-	2	15	-	-	-	-	-
DURRINGTON WALLS (middle neolithic)	-	1	-	-	-	-	-	-	-	-	1
KNAP HILL	-	-	-	-	-	-	-	-	-	51	-
PAMPHILL (pit)	-	-	-	-	-	1	-	1 (?)	-	1	-
HIGH PEAK (total)	7 (10.4%)	2 (3%)	-	-	-	2	-	1	-	10	-
(cache)	1	-	-	-	-	-	-	-	-	-	-
CARN BREA	-	17	1	-	-	87 (6%)	-	-	9 3 micro-burins 5 truncated	420	-
MAIDEN CASTLE	X	?	-	-	-	-	-	-	-	-	-
HEMBURY	?	?	-	-	-	X	-	-	X	-	-

X indicates presence, but numbers unknown.

Transverse arrowheads have their floruit in the second millennium, but, though rare, do occur with sufficient regularity in earlier industries for them to be regarded as part of the earlier neolithic tool-kit (Green 1980, 111).

'Plano-convex' type knives are usually seen as a product of early bronze age technology (Clark 1933, 271; Smith 1965, 107) but similar flaking on knives can be documented in other earlier neolithic tool-kits including Hemp Knoll (Robertson-Mackay 1980, 135) and Carn Brea (Saville 1981b, 140; see also Pierpoint 1980, 125-6). Of course the technique and style of flaking is well known from leaf-shaped arrowheads.

Laurel-leaves, first clearly defined as an earlier neolithic type at Hurst Fen (Clark et al 1960, 226), though recognised sporadically before that, are found over a wide area, but are by no means ubiquitous (cf Bradley 1982) and do not usually occur in such great numbers as at Hurst Fen. However, there is possible confusion in identification between them and flat discoidal cores and it may be that this has, in some instances, artificially inflated the totals in one or other category.

Blunted-back knives seem to be an earlier neolithic type, and are found over a wide area, though are by no means ubiquitous.

Single-piece sickles originally thought to be predominantly later neolithic, (Clark 1932), are now well established in industries with earlier affinities (Clark et al 1960, 226; Avery 1982, 38-9).

Sickle-flints have in fact been totalled with knives because their definition is vague, and seems to depend on the presence of surface-lustre which is of uncertain origin (Saville 1981b, 140).

Abraded-edge tools are recorded at only one other site namely Hemp Knoll (Robertson-Mackay 1980, 130).

Hammerstones of various raw materials are recorded in several, but not all industries, although quantities vary tremendously. For example industries like Bishopstone and Hurst Fen have a large number (Bell 1977, Table 1; Clark et al 1960, 225), whilst at other sites including Offham (James 1977) and Carn Brea (Saville 1981b, 144) they are virtually absent.

6.2 Composition

From Tables 8-10 we have seen that not all types are present in all industries and it is also clear that proportions of tool-types present vary, especially those of scrapers, serrated flakes, arrowheads and to a lesser extent axes, laurel-leaves and blunted-back knives. Explanations tend to be functional. A pastoral economy will require a different tool-kit from an agricultural one (cf Bradley 1978, 56-60) and a domestic industry is likely to have a very different range and proportion of tools from an industrial one. Both are likely to differ from industries on sites which seem to be centralised gathering places (eg some causewayed enclosures). We must also bear in mind that some types have restricted on-site distributions (5.3 and see Saville 1981b) and the fact that they appear to be absent, may indicate only that a particular area of a site has not been excavated (ie the absence is more apparent than real). Bradley has suggested that the increased proportion of axes and arrowheads to scrapers in enclosed settlements

may indicate some sort of special status for those sites, and has shown what appears to be a relationship between the incidence of decorated vessels and the proportions of axes, laurel-leaves and arrowheads (Bradley 1982, 32), but the numbers involved are in some instances low or from mixed contexts.

On a more general level it can also be demonstrated that proportions of tools to cores and flakes vary from industry to industry. From the evidence to hand the following three patterns can be isolated.

a) Those with a high proportion of tools (about 7% or over) - possibly domestic industries (Bamford 1980, 5, 8). They include Staines, Abingdon, Bishopstone, High Peak, Hemp Knoll, Pamphill, Whitehawk and ? Carn Brea.

b) Those with tools forming about 4 or 5% of the industry - Wainwright's expected proportion (1972, 66). They include Hurst Fen, Broome Heath, Fengate, Orsett and Eaton Heath.

c) Those with a low proportion of tools (less than 2%) - described as 'industrial' or 'core-preparation' sites (James 1977, 217). They include The Trundle, Offham, Alfriston, Bury Hill, Durrington Walls and Knap Hill.

A wide range of tool forms is often present in groups a and b; some of these industries, for example Staines, Hurst Fen and Carn Brea also have a very large number of flints present. The three groups cannot be immediately explained by geographical location, though it is true that industries of type c occur in areas where chalk flint is immediately available; and those of type b are all in East Anglia. Monument type does not seem to be significant either; causewayed enclosures, for instance, have industries of all three types. Pit groups however tend to have a very high proportion of tools, and so do industries where there is little or no local flint.

6.3. Technology and raw materials

It is self-evident that the type of raw material used will partly determine the technology; conversely certain types of raw materials must have been sought after, precisely because they were most suited to a particular technology. Other factors, including the concept of the end-product, may also have influenced the choice of technology employed. In the archaeological record this can be partly assessed from the composition of the tool-kits as we have implied in 6.2, and also from the relationships of the raw materials used to various attributes recorded on the unretouched (unmodified) flakes and on cores and tools. The use of several different types of flint and other stone, some or all of which has been imported on to the site, is recognised in a number of industries including Staines, even if its precise origin cannot be identified (Table 8). The exploitation of good quality quarried flint is only known in the West Country at this time and is documented by the use of Beer flint at Haldon and Hembury and possibly Carn Brea. In other areas chalk flint was exploited from surface or sub-surface deposits (cf Barrett et al 1981) and the use of mined flint restricted to the manufacture of axes which were imported to sites as finished tools. Unfortunately it is only relatively recently that the use of different types of raw materials is being quantified in lithic reports, and examination of the technology of each raw material is rarely detailed (for a noteworthy exception see Saville 1981b, 107-9). But on a general level, Care (1982, 277) has suggested that narrow flakes, which predominate in the industries of Devon and Cornwall, result from a need to use raw material efficiently, particularly in the West Country where resources are poor (but see below on core typology). Table 11 shows the incidence of flake shapes(defined by a simple breadth-

Table 11. Breadth to length ratios of unretouched flakes (as % of each total)

	0.5-1.5	1.5-2.5	2.5-3.5	3.5-4.5	4.5-5.5	5.5+
Staines	-	9	24	41	21	4
Whitehawk	16	31	25	14	7	7
Hembury	10	30	29	13	8.5	9.5
Alfriston	18	55	22	5	-	-
Carn Brea	-	6.1	28.3	23.9	20.1	21.6
Knap Hill	-	5	19	28	20	29
Offham	X	7	23	26	16	28
Broome Heath (fossil soil)	-	6	39	35	15	5
Broome Heath (pits)	-	9	46	30	11	4
High Peak	-	16	46	24	7	6
Durrington Walls (middle neolithic)	-	5	30	30	23	12
Windmill Hill	0.4	11	29	25	21	13
Bury Hill	4	17	28	25	17	9
Abingdon*	3	25	29	10	33	

*ratio classes differently grouped.

to-length ratio) in several industries. About half of these have a high proportion of relatively wide flakes, including Staines, where it could be explained by the use of a virtually inexhaustible supply of gravel flint (Abingdon, Carn Brea, Offham and Knap Hill have an exceptionally high proportion of flakes with a ratio of 4:5 or over). Only three industries have predominantly narrow flakes. One of these is Alfriston which is unexpected since chalk flint was readily available, also the core typology seems more suited to the production of wider flakes (although this is based on a small sample of 10 cores).

The use of breadth-to-length ratios or indices to determine preferred flake shape in an industry, however, does not allow either for the possibility of different knapping methods or for the presence of different types of flake, both of which may alter the picture given in Table 11. Gingell and Harding (1981) have demonstrated that different manufacturing methods can alter the shape and size of a flake. Burton (1980), by describing the different manufacturing stages (using a number of variables) has shown that raw material type and availability can affect technology, and clearly more work is needed in this area. For example, the description of flake shape and type has not yet been satisfactorily resolved, but clearly cannot rest on a simple length-to-breadth (or v.v) ratio. Indices of length-to-breadth, compared to those of length to thickness, have proved satisfactory in distinguishing the different stages in one blade-industry (Manley and Healey 1982) but this has not yet been applied elsewhere.

One would expect the core typology (following Clark et al 1960, 216) to match the type of flake produced, but it is difficult to match these two types because cores tend to undergo a change of form before being discarded (eg about half of the A2 cores at Carn Brea had evidence of earlier use: Saville 1981b, 122), and the classificatory scheme is based on surviving platforms. Table 12 suggests that there is a certain

Table 12. Core typology (% cores)

	A1	A2	B1	B2	B3	C	D	E	Unclassified
Knap Hill	1.4	43.5	1.4	26.1	4.3	3.0	10.1	10.1	-
Windmill Hill	3.7	42.1	0.4	17.7	12.9	8.6	8.6	5.5	-
High Peak	14.3	21.4	-	17.8	14.3	7.1	21.4	-	3.6
Hemp Knoll	1.2	43.4	-	21.7...	19.3	9.6	2.4	2.4	-
Hurst Fen	2.2	38.7	0.2	19.0	1.9	4.9	14.7	18.4	-
Broome Heath	11.4	50.7	2.9	2.9	7.9	4.3	13.6	2.1	4.2
Offham	5.8	15.4	7.7	3.8	13.5	30.8	11.5	11.5	-
Bury Hill	2.8	52.8	-	33.3	2.8	8.3	-	-	-
Staines (ditches)	1.3	61.4	0.5	14.1	5.3	5.3	5.3	-	6.2
Alfriston	20.0	10.0	10.0	10.0	50.0	-	-	-	-
Abingdon	10.8	67.5	3.6	2.4	8.4	2.4	-	-	4.8
Carn Brea	4.7	43.1	-	31.4	1.1	17.5	1.1	1.1	-

amount of uniformity amongst the cores in earlier neolithic industries (see also Whittle 1977, 69). All sites except High Peak, Offham and Alfriston have a majority of type A2 cores. Staines and Abingdon have a particularly high proportion possibly because of the type of raw material available (see above). Hemp Knoll and High Peak have almost equal proportions of A2 and B2/3 or D type cores. Industries with more extensively flaked cores tend to occur in areas where flint is scarce and include sites like High Peak and Carn Brea (cf Saville 1980, 20) but also on sites where chalk flint is immediately available, such as Bury Hill, Offham and Alfriston (see also above). The dimensions and/or weights of cores are not consistently given, but one would expect them to reflect the availability and type of raw material.

Core-to-flake ratios (Table 8) are interesting, though not completely reliable because of the multi-use of some cores and because of such factors as differential recovery and intra-site distribution. However, even allowing for such distortions the same sort of patterns seem to emerge. The industries with a low core-to-flake ratio tend to be in areas where flint is scarce (eg Carn Brea), and those where flint is plentiful and cores are elaborately flaked, some possibly being removed for use elsewhere (James 1977, 217). The conjoining of struck pieces and the re-fitting of flakes to cores will ultimately enable core-reduction sequences to be better understood and assessed.

Saville has indicated that for the late neolithic-early bronze age at least, there is a definite relationship between core size and type, flake shape, and raw material supply and availability (1980, 20; 1981a). For example, in areas where flint is scarce, small multi-platform cores will predominate, whereas in industries where special conditions apply (ie where there is a good supply of good quality flint) large prepared cores have an increased importance in the industry. Both types of core tend to produce broad flakes. There are indications that similar relationships apply in the earlier neolithic although the possibility has not been researched in detail.

Absolute size of artefacts and cores within industries have not been discussed here. How far size is attributable to raw material and how much influence 'cultural' preference has, is a matter for further research especially in the light of the findings at Carn Brea (Saville 1981b, 146).

From the evidence discussed above it is clear that there is some relationship between raw material type and availability, and the technology and composition of industries. However, clarification of classificatory methods, and study of the flaking potential of various raw materials is needed before detailed conclusions can be drawn.

7. SUMMARY AND CONCLUSIONS

This necessarily brief investigation of the relationships of the Staines lithic industry has shown that, though superficially homogeneous, earlier neolithic industries do show marked variation in detail, some of which may be interpretable in the light of ceramic data, (cf Bradley 1982). Definition of these variations using the published data, however, has been hampered by differences in terminology and levels of analysis as well as by scale of excavation and numbers of artefacts recovered. Nevertheless, even though the results are frustratingly inconclusive, two points do seem to emerge.

Firstly, patterns of variations can be detected in several technocomplexes. It is suggested that instead of looking for a 'norm', each industry should be examined on its own merits and interpreted initially in the light of its own environment, rather than in the light of other incompletely understood industries. In this way it may be possible for example to identify specialized sites, and to distinguish between temporary and permanent occupation.

Secondly, there seems to be a relationship between raw material, technology and composition of industries. Care (1982) has suggested that raw material supply and distribution accounts for much of the variation within the earlier neolithic and that certain sites, especially those with imported lithic objects and raw materials have a key role to play. Some of these sites seem to coincide with Bradley's (1982 and see 6.2) special status sites, even though there are insufficient basic data to document this precisely. However, the reasons for techno-typological variations between industries must be complex, and involve a number of unquantifiable factors including cultural bias (Saville 1981b, 146), skill and idiosyncracies of individual knappers as well as functional and environmental factors. Thus it seems unwise, at this stage in our knowledge of lithic industries, to draw up such models to explain variations.

What is clear is that more uniform, refined, quantitative and analytical methods, showing the inter-relationships between size, type and availability of raw materials, technology and typology, urgently need to be evolved and rigorously applied (cf Saville 1981b, 146). In the interpretation of these data the effects of economic, environmental and socio-political factors on the processes of intra-site distributions, accumulation, and discard or exchange, must be considered. Allowances must also be made for differences in taphonomy, excavation and post-excavation analysis. Lithic industries will then have an important role to play in the interpretation of the prehistoric record.

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ARE FIRST IMPRESSIONS ONLY TOPSOIL-DEEP ? THE EVIDENCE FROM TATTERSHALL THORPE, LINCOLNSHIRE

by Frances Healy

This paper describes the provisional results of the study of lithic material collected during field-walking and subsequent excavation at Tattershall Thorpe in east Lincolnshire. The site (at TF/237 608) lies on the gravels of the river Bain just above its confluence with the Witham, which in turn flows into the Fens some 6km to the south. It was discovered in the course of field survey by Peter Chowne of the North Lincolnshire Archaeological Unit and consisted of an even scatter of struck flint over the surface of a 7.5ha field from which an initial surface collection of 897 pieces was made. Following a gradiometer survey which indicated the presence of underlying features, two adjacent areas were stripped and excavated, together with a few small outlying trenches, in two seasons at the beginning and end of 1981. Over both main areas the topsoil was underlain by a thin layer of wind-blown sand containing much prehistoric material in addition to Romano-British and medieval sherds. This layer was cut by medieval plough furrows which penetrated into the subsoil below, in which were features of both prehistoric and Romano-British date.

Most of the prehistoric features were of earlier neolithic date: fourth millennium bc radiocarbon determinations were obtained for a rectangular post-built structure, and for one of a nearby group of pits. The pits were rich in finds, yielding 1317g of pottery and 302 pieces of struck flint. On the other hand, pits containing later neolithic or early bronze age pottery and later bronze age pottery numbered only two and one respectively, and yielded a total of 200g of pottery and 6 pieces of struck flint.

On the face of it, one might expect most of the struck flint from the surface, the topsoil and the wind-blown sand to have been ploughed out of the underlying earlier neolithic features and to be comparable with the material excavated from them. This was not the case. Figures 1 to 3 compare four groups of struck flint:

1) from the surface of the whole 7.5ha,
2) from the surface and topsoil of the area stripped for excavation (approximately 6000 sq m or 8.4% of the whole),
3) from the underlying wind-blown sand over the completely excavated part of the stripped area (approximately 2400 sq m or 3.6% of the whole),
4) from the earlier neolithic pits.

The first three groups are necessarily of mixed, multi-period composition; the last one is securely stratified and likely to be contaminated only by the presence of residual material, of which there is no obvious indication. All four have, however, been recorded and depicted in the same way with the aim of establishing their similarities and differences. Fig. 1 shows the composition of the cores from the four groups, using a simplified classification. Even at this stage it is apparent that, while groups 2 and 3 match each other quite closely, they are not representative of the whole 7.5ha, since the proportions within them of multi-platform and keeled cores are reversed among the cores of group 1. Also, the cores from the pits include a higher proportion of single-platform examples than those of the mixed groups.

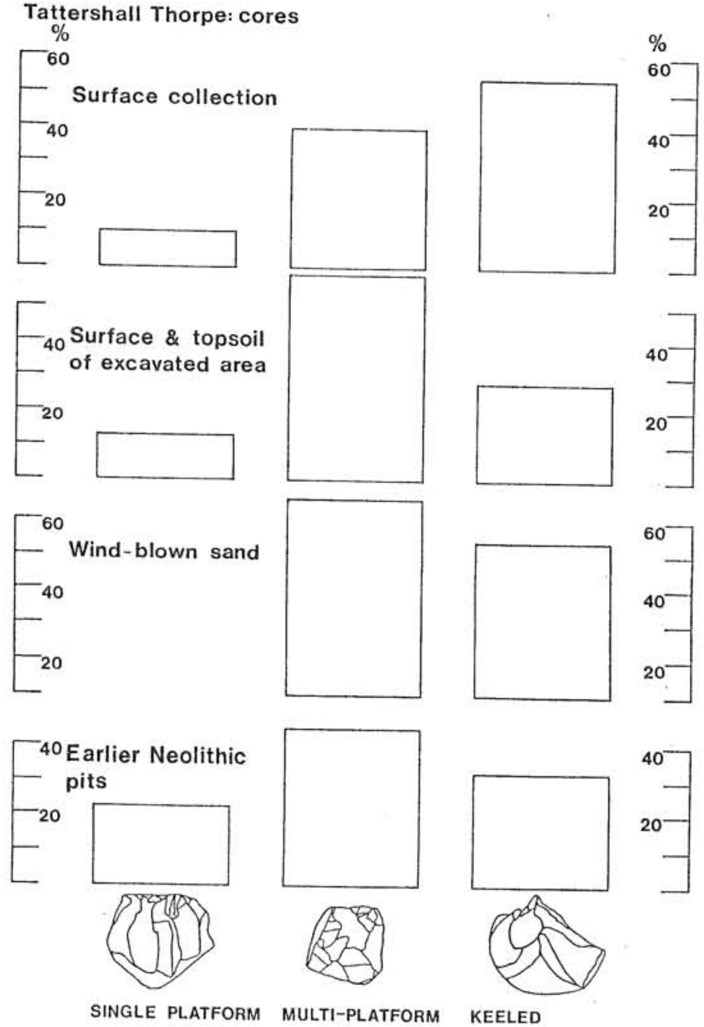

Fig.1. Composition of the classifiable cores in each of the four main flint groups from Tattershall Thorpe.

The same pattern can be seen in the breadth:length ratios of the unretouched flakes (Fig. 2). Again, there is incomplete agreement between groups 2 and 3 on the one hand and group 1 on the other, and even less agreement between all three and the pits, the flakes from which are generally far more blade-like. When it comes to retouched forms (Fig. 3), all three mixed groups include a wider range of types than does the material from the pits, and are distinguished by quite high proportions of borers or points.

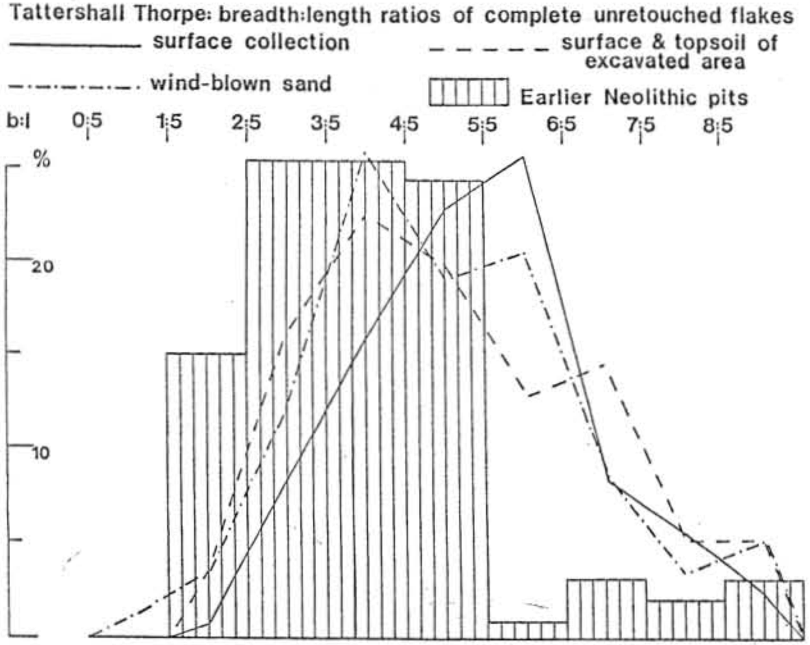

Fig.2. Flake proportions for each of the four main flint groups from Tattershall Thorpe.

It is clear 1) that there was spatial differentiation within the scatter, since the composition of the struck flint from the excavated areas of the topsoil and wind-blown sand does not match that of the initial surface collection, and 2) that all three mixed groups are dominated by a component or components unrelated to the material from the underlying earlier neolithic pits. In other words, the surface collection masked rather than predicted the content of the underlying subsoil features.

Up to a point it is possible to define the dominant component or components of the mixed groups in terms of what is known about post-glacial flint industries in the south and east of England. Such high proportions of broad flakes are unlikely to have been produced before the second half of the third millennium bc (Pitts 1978). Individual retouched forms like chisel and oblique arrowheads (Fig. 3) seem to have become current at a similar date and are, on the basis of their associations, likely to have been at least broadly contemporary with the small quantities of beaker and grooved ware from the site (Green 1980, 111-116). The overall composition of the mixed groups has at least one of the characteristics of later bronze age industries isolated by Saville (1980, 20-21; 1981, 68) and by Ford et al (forthcoming) in the form of relatively high proportions of borers or points, which occur in a number of later bronze age industries but are difficult to match in earlier ones.

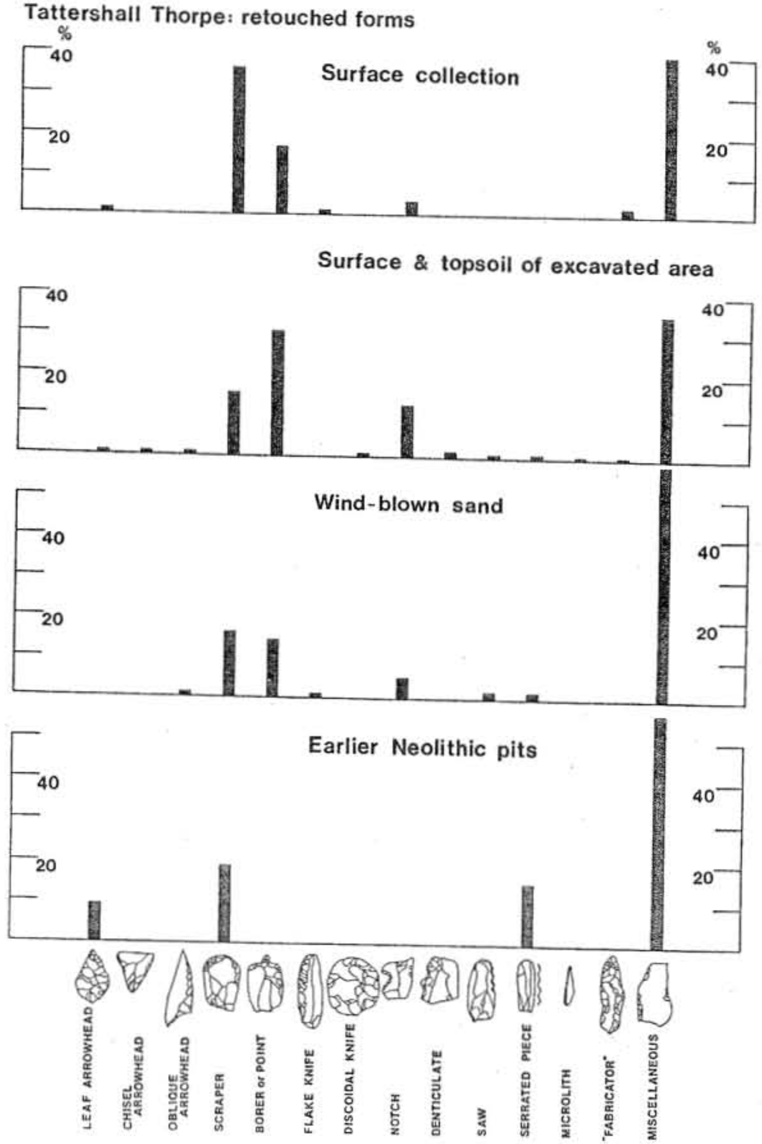

Fig.3. Composition of the retouched pieces in each of the four main flint groups from Tattershall Thorpe.

It seems reasonable to assume that the 2004 pieces of struck flint in the mixed groups are of predominantly later neolithic and/or bronze age date, in contrast to the 308 pieces from securely dated subsoil features, 98% (302) of which are of earlier neolithic date. Later pottery is indeed more frequent outside of subsoil features than inside, accounting for 4% of identifiable prehistoric sherds from features and 40% of those from other contexts. The 40% consists of only 23 small, abraded fragments, but these may represent an originally larger quantity, since the ploughsoil, aeolian sand and, in the case of one of the outlying trenches, alluvial deposits in which they were found would have been less conducive to pottery preservation than would undisturbed pits.

This situation, in which earlier neolithic activity is represented mainly by subsoil features and later phases mainly in superficial deposits, is a recurrent one. An obvious example is Broome Heath, Norfolk (Wainwright 1972), where numerous pits were dug in the mid-third millennium bc, but where late third and second millennium activity was represented by an earthwork, material preserved underneath it, a flint scatter with beaker pottery, and stray Peterborough ware and bronze age sherds. Similarly, on the multi-period site of Spong Hill, also in Norfolk, which was excavated primarily as a pagan Saxon cemetery, five clusters of earlier neolithic pits, all rich in artefacts, contrasted with a few isolated features containing later neolithic or early bronze age pottery. Yet, where there were concentrations of struck flint in superficial and post-prehistoric contexts, these are of generally late aspect, like the mixed groups from Tattershall Thorpe.

In each case, it is possible to suggest explanations. One of the simplest is that later features may have remained unexcavated in adjacent areas. If so, it is curious that later features are so often excluded and earlier ones so often included when areas are chosen for excavation. It is pertinent to consider observations made by Crowther (1983) with reference to the occurrence of Romano-British pottery in ploughsoil and in subsequently excavated subsoil features in the Welland valley. He suggests that a lack of correlation between the contents of the ploughsoil and the contents or even the presence of underlying subsoil features may result from 1) the deposition of material in the course of off-site activities which would not have involved the cutting of subsoil features, and 2) the derivation of ploughsoil material from a vanished land surface or surfaces as well as from subsoil features.

This second possibility touches on an awkard characteristic of later neolithic and bronze age settlement in lowland Britain, already exemplified by Broome Heath and Spong Hill. While pits and other subsoil features are almost ubiquitous on late fourth and early third millennium bc settlement sites, they become less frequent from the late third millennium onwards. Some second and early first millennium bc sites do, it is true, include pits, enclosures and substantial structures; but a large number consist entirely or almost entirely of rubbish deposits, surviving when protected by earthworks, by alluvial or colluvial deposits, or by deposition in pre-existing hollows. Without such protection, the deposits constituting the pre-barrow occupation of Arreton Down, the occupation of Plantation Farm, the post-mining occupation of Grime's Graves, and many others like them would have been reduced to flint scatters.

I would suggest that not only may the contents of a scatter be unrepresentative of the contents of underlying subsoil features, but that the evidence of subsoil features will often be biased in favour of the earlier neolithic and against the later neolithic and the bronze age, evidence for which may often survive mainly or exclusively in the ploughsoil and on the surface. To machine-off unsampled ploughsoil before excavation, by no means a practice of the past, is to distort an already distorted record. Further understanding of the nature of individual later neolithic and bronze age settlements will come from exceptional, well-preserved sites, especially water-logged ones. Any understanding of the frequency and extent of contemporary activity across the landscape must, on the other hand, draw on the evidence of desiccated sites. Flint scatters may prove as fundamental to the study of the later neolithic and the bronze age as they are to that of the mesolithic.

Acknowledgement

I am grateful to the North Lincolnshire Archaeological Unit, and especially to Peter Chowne, for the opportunity to work on the Tattershall Thorpe material and for permission to publish this paper, which is an amended version of a paper given at a seminar on lithic scatters and settlement patterns held in Oxford on 5 November 1983.

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December 1983

DERIVING THE SIMPLE FROM THE COMPLEX - WHAT MIGHT THE EARLIEST AMERICAN ARTEFACTS LOOK LIKE ?

by R Esmée Webb

The problem of the earliest evidence for human occupation of the New World is a highly controversial topic which has gained in interest for British archaeologists since the Research Laboratory for Archaeology and the History of Art at Oxford is proposing, once its accelerator becomes operational, to date some of the early American sites about which there is considerable discussion. Dating material from these sites is contentious, either because they are considered to be too old for conventional radiocarbon counting techniques, or because obtainable samples are too small for even the high precision small counters, such as at Seattle or Harwell, to provide finite dates. Whether or not this project will produce satisfactory results remains to be seen given the high error terms expected on dates older than 30,000BP.

I first became interested in the controversy when it was suggested that the first settlement of Australia and the Americas should be included in Year 1 of the Diploma in Archaeology of the University of London, which I teach. Even a cursory glance at the general literature (Griffin 1976; Jennings and Norbeck 1964; MacNeish 1973; Wormington 1957) quickly revealed that there are two opposing views among North American researchers. Each view now has firmly entrenched proponents and debate between the two camps is vehement and acrimonious (Browman 1980; Bryan 1978, 1981; Carter 1980; Ericson et al 1982; Shutler 1982). Traditionally the earliest acceptable artefacts are the sophisticated Llano assemblages comprising pressure-flaked projectile points and some retouched flake tools, mainly scrapers and drills, for which antecedents can be found in the eastern Siberian upper palaeolithic. More controversially, claims for a great antiquity, possibly dating back to the Middle Pleistocene, are made for certain apparently 'primitive' collections of stone pieces, on analogy with apparently similar Eurasian lower and middle palaeolithic material.

Much of the controversy hinges on the question whether these 'primitive' assemblages for which an early date is claimed are really humanly-made tools, or the fortuitous product of natural flaking. An Old World archaeologist, trained in the recognition and analysis of stone tools in a variety of raw materials, might be able to make a significant contribution towards resolving this controversy. This is particularly true as some of the American protagonists in this debate lack sufficient expertise to make any distinction between artefacts and geofacts, while those American archaeologists trained in Old World lithic analysis do not wish to become involved in the debate. Moreover, my own non-involvement in the petrified attitudes which have been adopted in America could bring a welcome objectivity of approach to an embattled situation. Certainly during my field work I have been well-received by members of both camps and able to study any collection I wished to see. To date I have seen most of the collections from both the eastern and western parts of North America. I still need to see some of the Alaskan material and some collections from the Great Lakes area. However, I have studied sufficient material to begin to draw some conclusions.

The earliest prehistory of North America is too vast a topic to tackle here in its entirety. Instead I want merely to consider some aspects

of lithic technology and typology. However, some information on the Quaternary background is necessary to set the scene. People did not evolve separately in North America; therefore, their origins must be sought in northeast Asia. The earliest known site in that area is, of course, Zhoukoudian (Choukoutien) where simple tools, possible traces of fire, and human remains probably date back to about 400-200,000BP. Peking lies at 40°N and has a continental climate which, suggests that by the Middle Pleistocene Homo erectus was beginning to develop the technology to cope with cool, temperate, climatic conditions. Whether Homo erectus could have made the crossing to North America is unknown. However, evidence for people with a truly artic-adapted life-style only becomes available much later in the early Upper Pleistocene of eastern Siberia, in the last 100,000 years. Therefore, colonisation was presumably effected by Homo sapiens sapiens. Certainly there is no good evidence for any other physical type, although there is evidence to suggest that modern Amerinds are of very recent origin (Laughlin and Harper 1979; Taylor in Megaw 1977).

In North America physical geography had a crucial role to play. The land mass is without marked internal barriers to movement from north to south. The major mountain systems trend southwards down the western seaboard. Interior America is an area of relatively low relief whose major river sytems also trend southwards. Even the eastern mountain systems follow this southerly trend. Therefore, Palaeo-Indian people coming from far eastern Asia would have found movement within North America fairly unrestricted. The early European settlers experienced difficulties because they were trying to move westwards across the physiographic grain, especially when attempting to cross the Rocky Mountains.

The actual pattern of movement into North America is unknown. It is assumed that people arrived from far eastern Asia across the Bering Straits some time during, or immediately after, the last glacial maximum of 22-15,000BP, when lowered sea level would have exposed the vast Beringian land area which served as a faunal bridge throughout the Pleistocene. Recent geological work suggests Beringia was also exposed at 75-50,000BP and again at 42-35,000BP (Hopkins et al 1982). The Alaska-Yukon area seems to have been largely ice-free during glacial episodes with a herb-tundra or grassland vegetation capable of supporting sufficient animals to serve as a refugium for humans as well (Hopkins et al 1982; West 1981). Human movement from Alaska into the mainland United States was undoubtedly influenced to a large extent by the presence of the Wisconsin glacier which comprised two major ice masses. Alpine glaciers built up over the Rocky Mountains to form the Cordilleran ice sheet which possibly calved into the Pacific to the west and fingered out onto the northern High Plains in Canada. The Laurentide ice sheet built slowly and massively out from the Hudson Bay across the Canadian shield, reaching south to the Great Lakes and in the west possibly coalescing with the Cordilleran glaciers during the glacial maximum. The presence or absence of an ice-free corridor east of the Rocky Mountains at 22-15,000BP is another controversial topic (AMQUA 1978). To presuppose movement down an ice-free corridor as a means of ingress predicates human entry into the mainland United States either in the last interglacial or in the early or late Wisconsin. Whether or not such a corridor existed, environmental conditions within it would have been unpleasant and probably only marginally capable of sustaining animal or human life until well into the late glacial.

The alternative route along the coast proposed by Fladmark (in Bryan

1978) has the advantage that it is not time-dependent. It presupposes people with a fairly sophisticated marine oriented technology. However, there is now plenty of evidence from Australasia (Mulvaney 1975; White and O'Connell 1982) which strongly suggests the presence of boats, or at least rafts, in the Pacific by about 100,000BP. Moreover, while the earliest evidence of human settlement in the Japanese archipelago is regrettably not entirely satisfactory (Ikawa-Smith 1978), those islands appear to have been settled more recently than 50,000BP, when boats would have been essential. Finally, a boat-borne colonisation is the neatest way to explain the littoral distribution of known early sites in South America, which are as early as, if not earlier than, Palaeo-Indian sites in the North. No sites, clearly older than 15,000BP have yet been found along the western seaboard of North America, but that is not surprising given the effects of post-glacial eustatic sea-level rise. Moreover, it is unlikely that such sites will ever be found, should they exist, for there is little or no continental shelf on this seaboard due to the subducting eastern Pacific plate.

In summary then, entry into North America by land was certainly possible by about 75,000BP and by boat from about 100-50,000BP. Therefore, if people did arrive then, there should be evidence for a pre-Llano technology probably analogous to the eastern Asian middle and early upper palaeolithic.

My objective has been to study the authenticity of the 'primitive' collections claimed to belong in this time slot and to compare them with the classic Palaeo-Indian assemblages, particularly the earlier Clovis material. I presumed that authentic earlier assemblages might be expected to show some technological similarities either with Old World middle palaeolithic assemblages or with the later Llano material, particularly in details of flake production and retouch, or with both.

The Llano complex is divided into two facies. Sites belonging to the later, Folsom, facies have been found only in the southwest United States and date to about 11-9000BP. The tool kit comprises basally-fluted, leaf-shaped, pressure-flaked, projectile points frequently made on heat-treated stone. The flake tool component clearly derives from the Clovis facies and includes some larger, surprisingly crude pieces. Sites attributed to the earlier, Clovis, facies have been found all over the continental United States, including the northeast (Newman and Salwen 1977), and date to about 12-10,500BP. The tool kit comprises larger projectile points, often retouched by soft hammer direct percussion, usually not basally thinned or heat treated. The flake tool component comprises simple edge-retouched pieces including knives, piercers, and simple, thumbnail and fan-shaped scrapers (Fig. 1). There is usually a rather cruder component including biface preforms. Overall there is great similarity in the edge-retouched flake tool component of both facies of the Llano tradition. American research has concentrated on the projectile points which show considerable morphological variation both in time and space with many types and sub-types being recognised. However, they clearly represent a high input of technological energy coupled with low cost-effectiveness. It requires not

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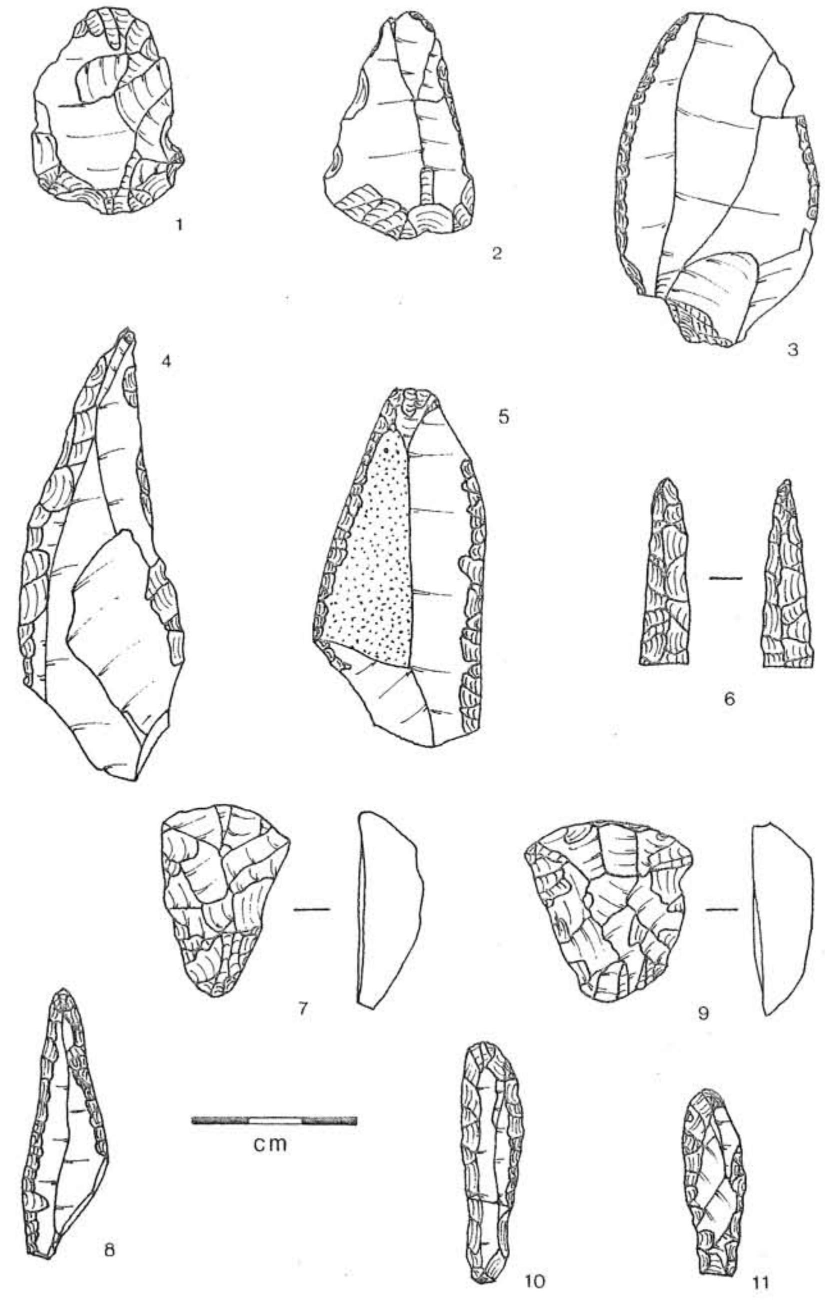
Fig. 1 (on facing page).
CLOVIS TRADITION RETOUCHED FLAKE TOOLS: 1-3 scrapers from Murray Springs, Arizona; 4 scraper from Lubbock Lake, Texas; 5 scraper from Domebo, Oklahoma; 6 drill from Meadowcroft, Pennsylvania; 7-8 scrapers from Shoop, Pennsylvania; 9-11 scrapers from Vail, Maine.



only considerable time and skill to produce even a Clovis point, but a casual inspection of any assemblage shows a high percentage of broken points. Some of them clearly broke on impact in use but others, no doubt to the fury of the knapper, broke in manufacture, usually during final thinning. The possibility that projectile points represent a high-energy speciality grafted onto a simple, retouched flake tool technology, with the discovery that heating certain stones increased their tractability, has recently been revived (Humphrey and Stanford 1979).

I, therefore, decided to concentrate on the flake tool component which might conceivably have middle palaeolithic antecedents, and to study as much of the controversial early material as possible. My basic hypothesis was that if a pre-Llano technology existed it would comprise simple edge-retouched flake tools, plus perhaps a biface component, and would be as recognisably of mode 3 type as are the early Australian horse-hoof core tool and scraper assemblages. This is not so. There are two main categories of potentially early artefacts: worked bone and crude stone. Neither is convincing for the reasons outlined below.

An early date has been claimed for broken bones found in the Yukon and elsewhere (Humphrey and Stanford 1979). I have studied the collections in Toronto, Ottawa and the Smithsonian Institution. None of the material I have seen can be considered incontrovertibly of human workmanship, a view with which some of the excavators now agree ! Moreover, most of these 'bone tools' have not been found <u>in situ</u> but redeposited by fluvial action after erosion from unconsolidated deposits. Thus their age is debatable. In the Old Crow Basin, however, a reworked <u>C. elaphus</u> tibia, radiocarbon dated to 28,000BP, was also found. It has been suggested that this bone might either have been worked when already in a fossil state, or had stayed green post-mortem due to its inclusion in the artic mucks. Neither view can now be substantiated since the piece was destroyed in dating. A forthcoming issue of <u>Quaternary Research</u> is to consider the whole problem of bone breakage by geological process under freeze/thaw conditions. Its conclusions should prove very interesting.

An early date has also been claimed for stone artefacts of lower palaeolithic aspect found widely scattered in California, and elsewhere throughout the southern United States. Much of this material was found either on the present land surface without any indication of its age, or redeposited in geological sediments which might be of early or pre-Wisconsin age. A good example would be Calico Hills (Simpson in Browman 1980). Most of this material is only susceptible to dating by typological means hence its artefactual status is of crucial importance. This is a perennial problem with unstratified, technologically simple material (Lab Prehist Musée L'Homme 1981). On examination most of this 'primitive' material is clearly non-artefactual. It comprises starch fractures, pot lids, spalls of various types, etc. However,

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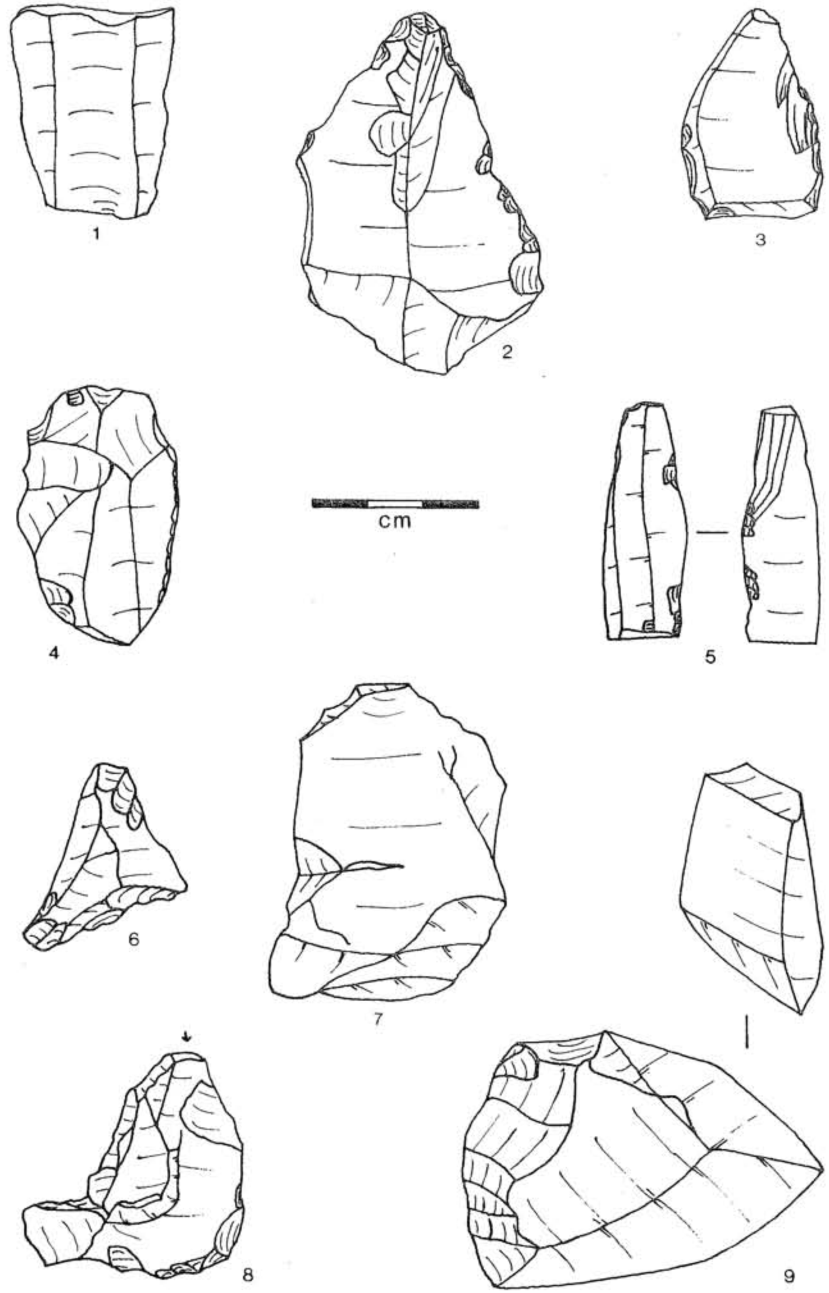
Fig. 2 (on facing page).
PRE-LLANO MATERIAL: 1-5 from Calico Hills, California, classified by the excavator as: 1 blade; 2 Mousterian point; 3-4 scrapers; 5 bipolar blade. 6-8 from Friesenhahn Cave, Texas: 6 classified by the excavator as a scraper; 7 has a possible bulb of percussion; 8 has a possible platform. 9 a large Archaic scraper in metamorphic rock, surface find from California.



none of the raw material is cryptocrystalline silicate so that it must be borne in mind that the evidence traditionally associated with human flaking would be less easy to see. A further argument for dismissing the 'American lower palaeolithic' lies in the typology of the geofacts themselves. The pieces usually comprise large cores from which often only one flake has been removed, large flakes with simple edge damage, and pieces showing crude bifacial working (Fig. 2). There is no apparent continuity with the Llano tradition which followed, nor with the technologies of eastern Asia. Moreover, there is no coherent pattern within the material itself. Material from one site cannot be usefully compared with that from another. It is hard to imagine that people able to cross the Bering Straits would so easily have forgotten the technologies their ancestors had used in Asia. Nor is it likely, since in all probability the earliest Americans were fully modern Homo sapiens sapiens with a spohisticated intelligence, that they would have been incapable of working the raw materials they found in America, even if these were less tractable.

It has been suggested that in Beringia people were forced to use bone as a raw material because there were no good stone sources available. This argument is not entirely satisfactory. While it is true that in such a permafrost environment finding good stone sources may have been difficult, if the age of the Old Crow flesher is acceptable it would imply that people might have lived in eastern Beringia for 10,000 years before being able to move overland into the mainland United States. It seems unlikely that Homo sapiens sapiens would have been unable to find in that time the stone sources exploited by later artic peoples. Until people learned to work obsidian, which was used for projectile points, especially of Folsom type, (probably due to its improved flaking qualities after heat treatment), they made use of any locally available raw material. There was no high quality flint, analogous to British Upper Cretaceous flint, available to the Palaeo-Indians. The raw materials frequently used included low quality chert, jasper, rhyolite and other fine-grained igneous and metamorphic rocks. In some parts of the United States various materials were used simultaneously for different tool types. For example, crypto/micro-crystalline materials were used for projectile points, but igneous, metamorphic, or even sometimes sedimentary rocks for flake tools. All this suggests both a dearth of good raw materials and an appreciation by the knappers of the flaking properties of the different rock types and the tools for which they were most suitable. Such a knowledge of practical geology makes some of the pre-Llano geofacts even more difficult to accept as artefacts. Supposing that this material is genuinely of late middle or early upper Pleistocene age, then early Americans showed less appreciation of simple geology than their contemporaries elsewhere. Much of this early material is made on materials either difficult to knap or with strong, natural cleavage planes. The resulting 'artefacts' are definitely inhibited by the raw material in which they were made; if they were made by other than natural processes. However, it is apparent that at approximately the same time in other parts of the world people were able to make recognisable artefacts in equally intractable raw material. The very poor quality of the pre-Llano geofacts argues against them being artefacts in my opinion. It is difficult to believe people could have moved so far into an alien environment from their Asiatic homeland with such a minimal technology; one which was, moreover, considerably cruder than that of the putative ancestral assemblages.

In conclusion, of the material I have studied that is assumed to be of pre-Llano age, I have seen little or none from geologically early

contexts which comprises convincing human artefacts. This seems to indicate that if people did enter North America prior to the last glacial maximum then they were present in very small numbers and their remains have not survived. Perhaps more Palaeo-Indian research should be devoted to identifying the pre-Wisconsin land surface which might survive in the south or southwest. However, given that in Tennessee even the Archaic is now buried under 10m of Holocene alluvium, it is always possible that any early Wisconsin human traces have been destroyed by post-Wisconsin geomorphological processes.

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January 1984

NOTES

CONSIDERATIONS FOR THE ILLUSTRATION OF LARGE LITHIC ASSEMBLAGES

by Hazel Martingell

This article is the result of a recent look at the presentation of large lithic collections and their illustration for inclusion in excavation reports. With small assemblages it is common practice to illustrate most or all of the retouched pieces along with a selection of the principal waste components such as cores. In the past some of the larger collections were dealt with in the same way, but now that most publications are controlled from the beginning within set cost limits, it is unlikely that there will be either sufficient printing space available or sufficient finance for a large quantity of detailed, and time-consuming, artwork.

Selection of which pieces to illustrate is always a problem, and is inevitably something of a compromise, but the choice will relate typologically to the units and levels of analysis employed in the written report. Context is also important, and with recently excavated material it is possible to base the selection on well-stratified examples. Of course the governing factor of all illustrations will be the transmission of the maximum amount of information in the minimum amount of space, and with this in mind certain points do emerge.

1. Some pieces will require detailed, often multi-view, graphic description. Obviously the rarer tools such as discoidal knives and laurel-leaves deserve this kind of special attention, as do unusual and irregular pieces with complex technology to be conveyed (eg Fig. 1).

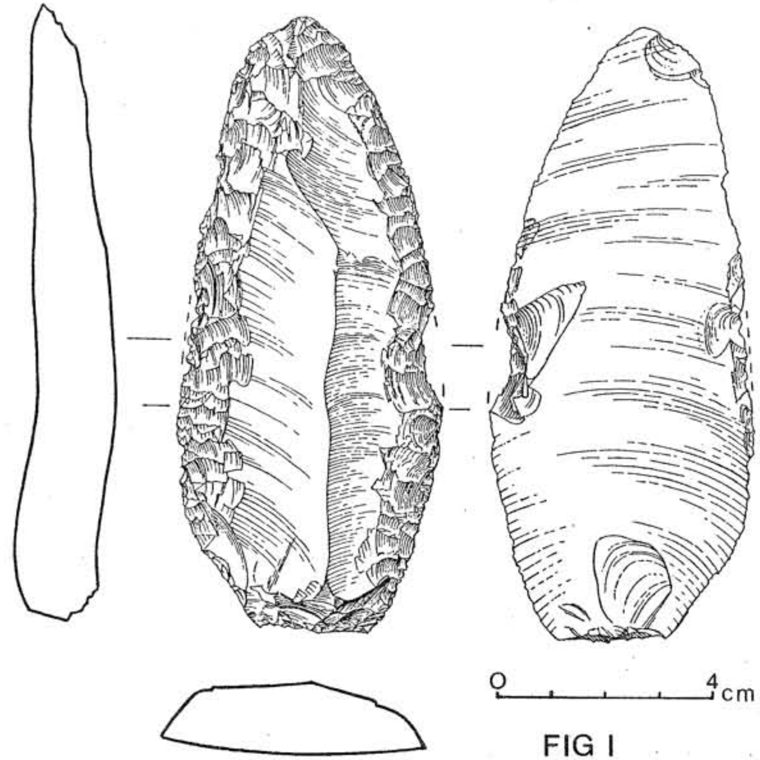

FIG I

2. More common pieces, such as flake scrapers, can be dealt with in a simpler style, using an 'open' drawing, on which negative flake scars are shown only in outline. This type of drawing will normally only involve a dorsal view, together with a section or side profile (Fig. 2).

3. As a substitute for the information lost by the absence of detail, or by the non-depiction of the ventral view or the end-on view of the platform, it is possible to use a range of conventions and symbols, coupled with an explanatory key (Figs. 2 and 3).

The symbols used in Fig. 2 were chosen initially to describe a particular assemblage for which it was necessary to depict three aspects of the platform: width, type, and the position of the bulb of percussion. The symbols in Fig. 3 are among those in current use by lithic analysts (eg Bell 1977; Green and Healey 1980; Saville 1981) to demonstrate near-microscopic attributes such as edge gloss and serration, and to convey information such as platform presence and position. The individual analyst will choose in the case of each assemblage what information must be shown, and which symbols are to be used. It is essential, however, that a key like Fig. 3 is included with each report to explain

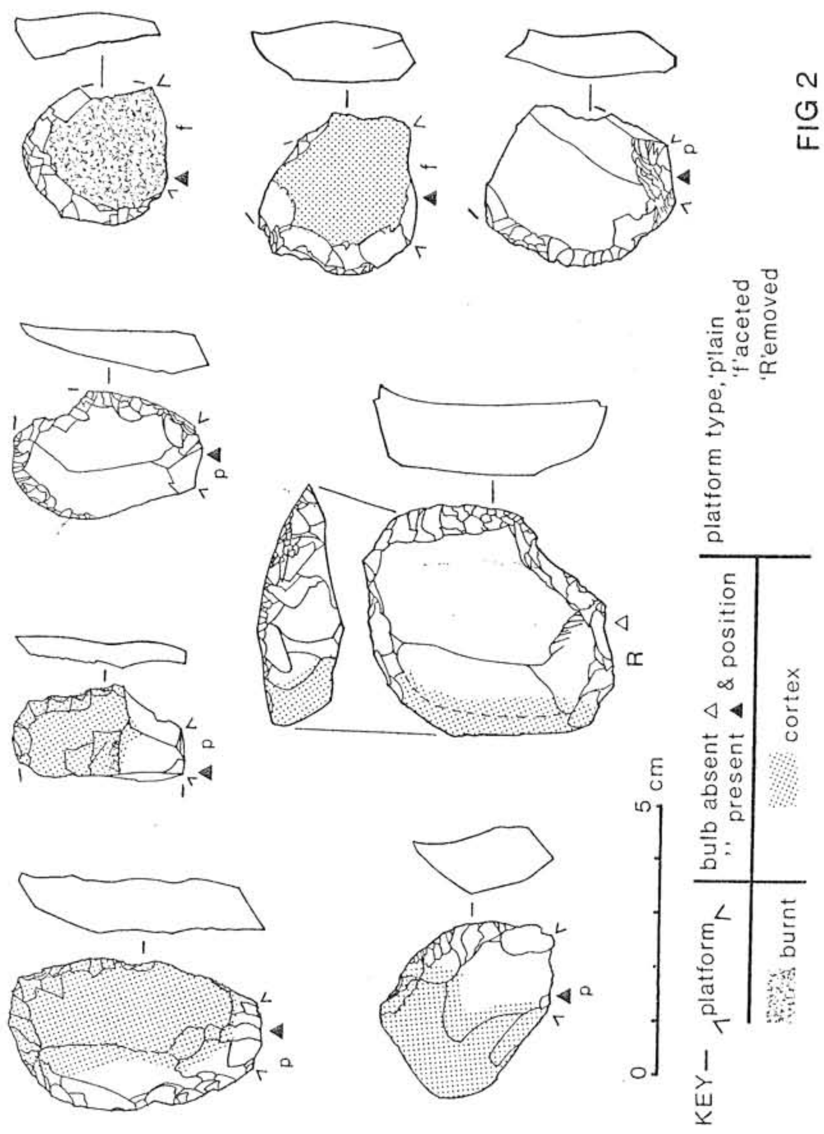

FIG 2

BASIC SYMBOLS already in use.

▲ or ┼ indicates position and presence of bulb of percussion on a struck flake.

△ or O indicates proximal end of a struck flake when bulb is absent.

⌐ ¬ indicates extent of platform.

P or R indicates plain or retouched surfaces, unillustrated.

vvvvvvv serrated edges.

——— extent of edge retouch when not clear on illustration.

...... edge gloss.

FIG 3

the conventions and symbols in use to avoid any possible confusion (eg the symbol 'R' has a different meaning in Figs. 2 and 3). In due course it may be possible to arrive at a set of standardised conventions which will obviate the need to include a key with each report.

The current constraints on the publication of archaeological reports have brought the question of the use of microfiche into the foreground, and the arguments for and against the inclusion of artefact illustrations on fiche are as yet unresolved. As a general principle in cases where fiche must be used, it is preferable, all things being equal, to have the illustration printed and the accompanying detailed description/analysis on fiche. However, if lithic illustrations are included on fiche, the analyst or illustrator must ensure that the original inked artwork, at 1:1 or 2:1 scale, is used. Photocopies and reductions do not reproduce as well as the original. It may well be in the illustrator's own interests to have xeroxed copies of the original artwork available for circulation to colleagues, rather than rely on enlargements from the fiche.

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January 1984

TWO EGYPTIAN FLINT KNAPPING SCENES

by S. R. Snape and J. A. Tyldesley

In an article in the Newsletter of Lithic Technology, Bruce Bradley (1972) suggested an "inductive technological sequence" for the manufacture of two types of flint implement from predynastic Egypt. He based this hypothetical manufacturing sequence on his observation of the "chronological truncations of flake scars and/or ground surfaces on the finished implement", paying special attention to what appeared to be the final shaping of the implement by pressure flaking. Evidence confirming the use of a tipped baton in the pressure flaking of flint knives in Egypt, although from a later period than those discussed by Bradley, may be found in two remarkable tomb scenes whose existence may well be unknown to many lithic specialists.

The scenes in question come from the tombs of two provincial magnates of the early Middle Kingdom (c. 2000-1900 BC) at Beni Hasan, Middle Egypt (Griffth 1896, pls. 7 and 8). A regular feature of the tombs of Egyptian nobles of this period was the depiction of scenes of daily life, including various crafts and industries. Tomb 15 depicts the work of four flint knappers, accompanied by the legend in hieroglyphic

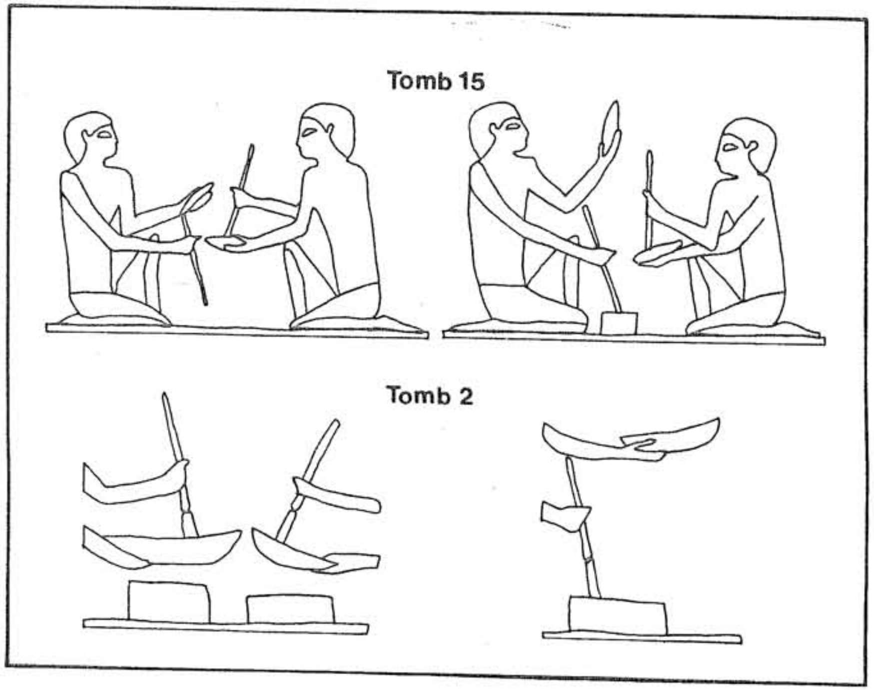

Fig.1. The flint knapping scenes from Tombs 15 and 2 (after Griffith 1896, pls. 7 and 8).

text, "striking flint/knives" (for a discussion of the various Egyptian terms for flint see Midant-Reynes 1981). These artisans appear to be completing the final stage of manufacture, holding the almost-finished implement in the left hand and pressing, rather than hitting, the flint tool with a long baton. Tomb 2 shows flint workers seated around what appears to be an anvil, again apparently putting the finishing touches to flint knives by pressure flaking. The batons in the latter tomb appear to have a separate tip of a different material, the original drawing showing a black baton with a brown end-piece.

It is not intended to suggest that the illustrations are "photographic" reproductions of flint knapping in Egypt. Stylistic licence must be taken into account, as must the artist's selection of those scenes of manufacture which, to him, best represented the activity. The fact that only the final stage of the sequence leading to the production of flint knives is depicted must not be taken to imply anything about the location or organisation of the previous stages of manufacture.

Acknowledgement

The authors are grateful to the Egypt Exploration Society for permission to publish the illustration which accompanies this article.

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August 1983

WORKED FLINTS FROM COASTAL SITES IN HAMPSHIRE (WARBLINGTON - EMSWORTH AREA)

by Ted Masson Phillips

The foreshore at the two sites described here consists of flint-gravel on top of eroded clay, or Coombe-rock. The natural beach flint is apparently derived from the erosion of the Coombe-rock and the individual flints are angular and battered, and discoloured orange-red or brown, or sometimes white. Among them, especially at site I, there are many undiscoloured, humanly-struck flakes of glossy black flint and a small number of definite implement types.

The only reference I have been able to find to this area occurs in the Archaeological Review for 1968 published by the Council for British

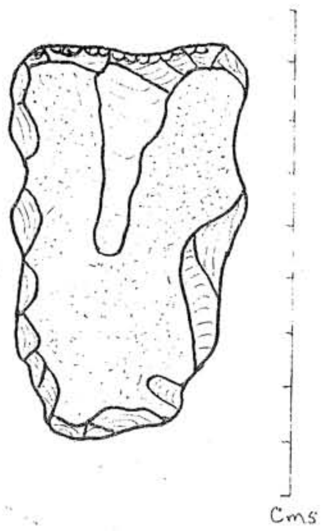

Fig.1. Heavy flake implement, Hampshire coast.

Archaeology (Groups 12 and 13) where there is a note recording the finding of mesolithic and neolithic worked flints in the cemetery at Warblington (SU 729054).

Site I. Foreshore between Conigar Point (near Warblington church) and the mouth of the Nore Rithe stream at Emsworth (SU 736051 to SU 739053).

This piece of coastline is sheltered by Conigar Point and a considerable width of saltings. Worked flints, derived from loam overlying the low bank of Coombe-rock at the back of the beach, occur all along the foreshore, on the beach, above and below high water mark. The loamy soil (alluvium?) rests on Coombe-rock which overlies clay. The Coombe-rock contains angular chalk rubble and flints, mostly stained orange-buff, which show no sign of human flaking, with the exception of one triangular flake found on the beach. All the other artefacts found on the beach, totalling about one hundred, are of glossy black flint. The majority are struck flakes, some of which show signs of utilisation, but there are also some implements, including one tiny round scraper, one end scraper on a flake, one hollow scraper, one small ovate implement faceted on both faces, struck from a flake, and one heavy flake implement (Fig. 1).

To me the artefacts have a neolithic 'look' but there is nothing definitive to confirm this tentative dating. Several cores were found and some flints were fire-crackled.

Site II. Foreshore beach west of Warblington Quay (SU 722052).

This site is exposed to west winds and to wave action. There is considerable erosion of the low bank and very little in the way of saltings. Consequently, the worked flints which occur on this beach are battered and worn, presumably after being washed out of the low bank which again consists of loam overlying Coombe-rock and clay. The only implement I found here was a rough side-scraper worked on a flake.

November 1983

REVIEW

Post-Glacial communities in the Cambridge region by Christopher Y. Tilley, pp. 107, pls. 5, figs. 44. British Archaeological Reports, British Series 66, Oxford 1979. Price £2.50.

This is the published version of an undergraduate dissertation, composed with inherently limited time and resources which were unfortunately inadequate for the ambitious scope of the selected topic. The author proposes a model for mesolithic and, to a lesser extent, late glacial and early neolithic settlement in the Cambridge region based on a reconstruction of contemporary topography, vegetation and fauna. Such reconstructions are always problematical; this one is particularly so because a large part of the study area consists of Fenland within which the pace and scale of post-glacial topographical change have been greater than in most of Britain and within which much palaeoenvironmental research has been carried out, the results of which cannot be hastily mastered. Not surprisingly, the settlement model sits insecurely in an under-researched landscape. The drainage pattern shown on the distribution and site catchment maps is that published by Fox in 1923, although this was already modified by field study of extinct watercourses in the 1930's and can be further re-drawn in the light of the accumulating evidence of aerial photography and field survey. More misleadingly, fen peat is shown at its modern extent for the entire period of study. There is indeed, as Tilley points out, evidence for Boreal peat formation in parts of the area, but he neglects to note that it is confined to river channels and other particularly wet and low-lying locations. The evidence of stratigraphy, radiocarbon dating and pollen analysis consistently indicates that large-scale peat growth did not begin in the southern fens until the early third millennium bc.

In these circumstances, Tilley's estimation of the importance of fenland resources like rhizomes, fish, eels, wildfowl and beaver in the local mesolithic economy becomes questionable. Doubt must equally be cast on his conclusion that a concentration of mesolithic sites and finds along the present fen edge ecotone reflects deliberate siting of settlements to exploit both upland and fenland resources. The frequency of mesolithic sites in the zone may simply result from their former preservation by peat growth and recent exposure by peat wastage.

Artefacts, the assessment and location of which form the second support on which Tilley's settlement model rests, receive scant attention. Excavated assemblages and surface collections, many of them otherwise unpublished, are summarily described, and stray finds figure on distribution maps, but no objects are illustrated. It is thus almost impossible for the reader to form a clear impression of the material involved or to make an independent assessment of it. A note to the effect that tranchet axes were probably not used as exchange items reads strangely in view of their demonstrable transport from flint to non-flint areas in southern England.

The study would have repaid further work. It should not, however, have been published in its present form, in which considerable powers of imagination, synthesis and argument are applied to ill-assimilated information.

Frances Healy
September 1983

SPECIAL FEATURE

LITHICS AND COMPUTERS: TOWARDS A STANDARD QUESTION LIST

by Elizabeth Healey and Jonathan Catton

Introduction

The listing which follows is a revised version of the Question Source File (hereafter QSF) used in the preliminary analysis of the Mucking, Essex, flint assemblage. The Lithic Studies Society is considering a recommendation to the DOE /Commission on Historic Buildings and Monuments that a substantially similar method become normal for the proper study of lithic assemblages, though we would wish to avoid a situation where methods of analysis become straight-jacketed and where further refinement is precluded. It is suggested that the Mucking QSF, which

is flexible, could form the basis for further discussion and it is, therefore, being circulated to members of the Society and to other interested parties for comment before any submission is made. The revised document would also be included in the proposed "Guidelines" on lithic assemblages, currently being prepared by the Society.

The source file and other computing information

The QSF has been drawn up by Jonathan Catton from information supplied by Elizabeth Healey, to cope with the analysis of over 20,000 pieces of flint found in a wide variety of contexts at Mucking. Full details of the computing methods used can be found in Catton et al (1981).

The flint question list has been designed to be as flexible as possible, so that it can be expanded or contracted as future circumstances dictate or other assemblages require. Apart from questions requiring numerical answers, keywords (which are very quickly memorised) are used in the answers. The code letter beneath the question number indicates the type of answer acceptable for that particular question. Thus questions signalled K (Keyword) require a single answer; those with M may have more than one answer; those with N require a numerical answer; those with T (Text) allow free comment (though these comments cannot be used in statistical analysis). The answer type can be altered in later editions if required. Although the question list appears long, it is not in fact complicated to use, because the answers to questions presented by the computer (or pro forma) can lead to the by-passing of subsequent questions which are irrelevant for a particular artefact type. This is summarized in the diagrammatic view of the structure at the beginning of the QSF.

In so far as manipulation of data is concerned, it is possible to compare any variable with any other variable. Retrieval systems include programmes for totals and percentages, pie charts, histograms, graphs, digital plotting, etc. Other programmes covering specific problems and more refined statistical tests are in preparation.

Archaeological considerations

The variables selected for recording have been arrived at from experience rather than theory (after examination of many thousands of lithic artefacts from a variety of archaeological and geographical contexts over a number of years), as well as from the study of experimental knapping. The selection of variables has not been determined by traditional typologies.

It is to be hoped that the list of questions is reasonably comprehensive (though it excludes functional analysis), but at the same time it must be remembered that it has been designed to answer 'Mucking-specific' questions. This is especially true of questions of identification and raw material. However, in practice this need not present any major difficulties since the QSF is flexible: questions can be altered or expanded or contracted as circumstances demand and the type of answer (K, M, N, T) altered if necessary.

Acknowledgements

Numerous people have contributed, wittingly and unwittingly, to the compilation of the QSF and we are very grateful to them. In particular we would like to thank Dr Mark Newcomer, who discussed the embryonic idea of such an approach as early as 1971 and has been helpful ever since; Caroline Wickham-Jones, who has patiently discussed and demonstrated knapping variables and classification theory and methods; Dr Stephen Green and Dr Frances Healy, who have discussed several aspects; Dr Ian Graham and Jonathan Moffett, who have advised on the computing side; Alan Saville, who has bravely encouraged the publication of the QSF in its interim state; Margaret Jones (director of the Mucking excavations), who has generously allowed her material to be used; and Ann Clark, who has been encouraging throughout and has arranged for the agreement of the Department of the Environment to the publication of the QSF at a preliminary stage. The QSF remains subject to Crown Copyright.

Proposals

We would be pleased to receive comments and criticisms on all aspects of the proposals, so that the Society can formulate its recommendations. The Society is anxious that as wide a spectrum of opinion as possible should be consulted; please do not hesitate to submit your own views. These should be sent to Elizabeth Healey as soon as possible and preferably before the end of April.

Consideration and discussion of the QSF may be hampered by the use of idiosyncratic terminology, expressions, and approaches, as well as by the absence of detailed definitions. The latter could not be included here for various reasons, but are available on request from either of the authors.

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GRAYS, Essex RM17 5DX

REFERENCE

Catton, J.P.J., Jones, M.U., and Moffett, J.C. 1981. The 1965-1978 Mucking Excavation Computer Database. In I. Graham and E. Webb (eds.), Computer Appl Archaeol 1981, 36-43. Inst Archaeol Univ London.

Amendments to the following list

05 Insert question NO - None of these
06 Questions A-H refer to both tang and barbs
23 Delete ACT and OBT. Insert EAA - Edge angle too acute
71 Insert STP - Stepped flaking and SER - Serial flaking

Mucking, Essex. Flint computer question source file.

Simple view of Flint question source file structure

```
               Start
                 !
                 v
- - ->> Computer bag no.
!                !
!                v
!    - - >> Flint context no.
!    !           !
!    !           v
!    !   Identification - - - - - - - - - - - - -
!    !       !              !                   !
!    !       v              v                   v
!    !  unretouched    edge damaged    tool types and cores <<- - - -
!    !  -----------    ------------    --------------------         !
!    !       !              !                   !                    !
!    !       !              !                   v                    !
!    !       !              !           specific questions           !
!    !       !              !                   !                    !
!    !       !              !                   v                    !
!    !       !              !             free comment               !
!    !       !              !                   !                    !
!    !       !              !                   v                    !
!    !       !              !           Multiple artefact >> - - - - -
!    !       !              !                   !
!    !       v              v                   v
!    !   D e s c r i p t i o n   o f   r e m o v a l
!    !       !              ! \        ^      / !
!    !       !              !  \       !     /  !
!    !       !              !     R e t o u c h !
!    !       !              !                   !
!    !       v              v                   v
!    ! R a w   m a t e r i a l   a n d   c o n d i t i o n
!    !        \             !                  /
!    !         \            !                 /
!    !          \           v                /
!    !            F r e e   c o m m e n t
!    !                      !
!    !                      v
!     - - - - - - - - << another flint
!                           !
!                           v
 - - - - - - - - - << another context No.
```

MUCKING, ESSEX. FLINT QUESTION SOURCEFILE Mrs E.Healey, Mr J.P.J.Catton
=======================================

Provisional listings 20-02-84

.
01: Computer bag number
N

.
02: Flint context number
N

.
03: Identification

K	DUB	Dubious identification	(GOTO 03)
	UNR	Unretouched	(GOTO 45)
	EDD	Edge damage	(GOTO 45)
	AHX	Arrowhead uncertain type	(GOTO 43)
	LEF	Arrowhead leaf shaped type	(GOTO 04)
	B+T	Arrowhead Barbed and Tanged type	(GOTO 06)
	TRA	Arrowhead Transverse type	(GOTO 10)
	TRI	Arrowhead Triangular type	(GOTO 39)
	AXE	Axe Ground and Polished type	(GOTO 11)
	AXN	Axe Not ground type	(GOTO 11)
	TAX	Axe Tranchet type	(GOTO 11)
	BP	Piece Backed type	(GOTO 43)
	NTP	Piece Notched type	(GOTO 15)
	TP	Piece Tanged type	(GOTO 43)
	SP	Piece Shouldered type	(GOTO 43)
	TRB	Blade Truncated uncertain type	(GOTO 43)
	TRT	Blade Truncated transverse unctype	(GOTO 43)
	TRO	Blade Trunc/Trans oblique type	(GOTO 43)
	TRS	Blade Trunc/Trans straight type	(GOTO 43)
	TRC	Blade Trunc/Trans convex type	(GOTO 43)
	BU	Burin uncertain type	(GOTO 43)
	BOB	Burin on break type	(GOTO 43)
	BTR	Burin truncation type	(GOTO 43)
	BDH	Burin dihederal type	(GOTO 43)
	BSP	Burin spall type	(GOTO 43)
	BKN	Knife Backed type	(GOTO 43)
	KNX	Knife uncertain type	(GOTO 43)
	ERK	Knife Edge retouched type	(GOTO 43)
	PCX	Knife Plano-convex type	(GOTO 43)
	EPK	Knife Edge polished type	(GOTO 43)
	DSK	Knife Discoidal type	(GOTO 43)
	CH	Chopper	(GOTO 43)
	CHT	Chopping tool	(GOTO 43)
	CHI	Chisel	(GOTO 43)
	COR	Core	(GOTO 19)
	DA	Dagger	(GOTO 43)
	DEN	Denticulate	(GOTO 43)
	FAB	Fabricator	(GOTO 43)
	HS	Hammerstone	(GOTO 28)
	LL	Laurel leaf	(GOTO 43)
	MIC	Microlith	(GOTO 43)
	MBU	Microlith manufacturing debris	(GOTO 17)
	PTS	Points 'awls/piercers' uncertain	(GOTO 43)
	PMF	Point Meche de foret	(GOTO 43)
	PCR	Point convergent retouch	(GOTO 43)
	PSR	Point short minimal retouch	(GOTO 43)
	PSH	Point short heavy retouch	(GOTO 43)
	PEE	Point elab retouch elongated	(GOTO 43)
	PLE	Point light retouch elongated	(GOTO 43)

	PSI	Point spurred implement	(GOTO 43)
	PHB	Points on heavy blanks	(GOTO 43)
	AWL	Point awl	(GOTO 43)
	ROD	Rod	(GOTO 43)
	SAW	Saw	(GOTO 43)
	SC	Scraper	(GOTO 32)
	SCC	Scraper Concave	(GOTO 32)
	SER	Serrated flake	(GOTO 37)
	SHI	Shaft hole implement	(GOTO 43)
	WST	Waisted tool	(GOTO 43)
	0	Other type of identification	(GOTO 43)
	RET	Retouched otherwise unidentifiable	(GOTO 45)

.
C Specific tool or core questions

.
04: Type of Leaf shaped arrowhead

K	1?	1 ABC Green 1980	
	2?	2 ABC " "	
	3?	3 ABC " "	
	4?	4 ABC " "	
	0	Other type Free comment	(GOTO 83)
	UNC	Uncertain no attempt at identification	
	DUB	Dubious attempt identification	(GOTO 04)

.
05: Is Leaf shaped arrowhead Kite shaped / Ogival / Polished

K	KSH	Kite shaped	(GOTO 39)
	OGV	Ogival	(GOTO 39)
	POL	Polished	(GOTO 39)
	0	Other identification free comment	(GOTO 84)
	UNC	Uncertain no attempt at identification	(GOTO 39)
	DUB	Dubious attempt identification	(GOTO 05)

.
06: Tang and barb shapes

M	A	Green 1980	
	B	" "	
	C	" "	
	D	" "	
	E	" "	
	F	" "	
	G	" "	
	H	" "	
	BYA	Ballyclare A	
	BYB	" B	
	BYC	" C	
	SNA	Sutton A	
	SNB	" B	
	SNC	" C	
	CYH	Conygar Hill type	
	GL	Green Low type	
	KIL	Kilmarnock type	
	0	Other identification free comment	(GOTO 85)
	UNC	Uncertain no attempt at identification	
	DUB	Dubious attempt identification	(GOTO 06)
	N	No more	(GOTO 07)

.
07: Breadth of Tang in mms
N

.
08: Barb length in mms
N

.
09: Tang length in mms
N (GOTO 39)

10: Transverse arrowhead identification
K PTT - Petit tranchets (GOTO 39)
CHE - Chisel ended (GOTO 39)
OBL - Oblique type (GOTO 39)
ORF - Oblique ripple flaked (GOTO 39)
OBR - Oblique British type (GOTO 39)
OIR - Oblique Irish type (GOTO 39)
0 - Other identification free comment (GOTO 86)
UNC - Uncertain no attempt at identification (GOTO 39)
DUB - Dubious attempt identification (GOTO 10)

11: Axe shape of Cutting edge / side / butt
M CST - Straight cutting edge
CCX - Convex " "
CAS - Asymmetric " "
CRG - Cutting edge re-ground
CIR - Irregular " "
BTH - Thinned butt
SST - Straight side
STP - Tapered side
SWS - Waisted side
0 - Other identification free comment (GOTO 87)
EGX - Edge Uncertain no attempt at further identification
SDX - Side " " "
BTX - Butt " " "
TS1 - Tranchet scar one face
TS2 - Tranchet scar two faces
DUB - Dubious attempt identification
N - No more (GOTO 12)

12: Axe Transverse section shape
K TSO - Oval
TPO - Pointed oval
TSQ - Squared sides
0 - Other identification free comment (GOTO 88)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 12)

13: Evidence of Hafting
K HFT - Hafting
0 - Other identification free comment (GOTO 89)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 13)
N - No evidence

14: Amount remaining
K CPE - Complete (GOTO 39)
BBT - Broken butt (GOTO 39)
BBL - Broken blade (GOTO 39)
BMD - Broken middle (GOTO 39)
FFR - Flake from axe (GOTO 39)
BKX - Broken uncertain part (GOTO 39)

15: Width of notch in mms
N

16: Depth of notch in mms
N (GOTO 43)

17: Where is notch on micro-burin
K BRN - Butt right hand notch
BLN - Butt left hand notch

TRN - Tip right hand notch
TLN - Tip left hand notch
0 - Other identification free comment (GOTO 90)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 17)

18: Further type of micro burin
K DMB - Double micro burin (GOTO 43)
KMB - Krukowski micro burin (GOTO 43)
USM - Un-snapped micro burin (GOTO 43)
0 - Other identification free comment (GOTO 91)
UNC - Uncertain no attempt at identification (GOTO 43)
DUB - Dubious attempt identification (GOTO 18)

19: Number and relationship of striking platforms on core
K 1PAR - 1 platform removed all way round = Clark A1
1PPR - 1 " " part way round = Clark A2
2PP - 2 " parallel = Clark B1
2P1O - 2 " 1 at oblique angle = Clark B2
2PRA - 2 " at right angles orthogonal = Clarke B3
3+RF - 3+ " regularly flaked = Clark C
3+IR - 3+ " irregular
3+GL - 3+ " globular
DIS - Discoidal
SDS - Sub discoidal
PTSF - Platforms truncated by subsequent flaking
0 - Other identification free comment (GOTO 92)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 19)

20: Type of striking platform
K CXA - Cortex all
CXP - Cortex part
FKS - Flake scar
2FS - Two flake scars
FAC! - Facetted + Number
CFC - Core face
TMS - Thermal scar
KD! - Keeled edges Clark D/E
0 - Other identification free comment (GOTO 93)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 20)
N - No more (GOTO 23)

21: Type of removal from core
K PTF - Platform (GOTO 21)
FLK - Flake
BLD - Blade
BLF - Blade-like flake
B/F - Blades and flakes
0 - Other identification free comment (GOTO 94)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 21)
N - No more (GOTO 20)

22: No of flakes removed from each platform
N (GOTO 21)

23: Evidence of rejuvenation/ edge trimming / reasons for discard
M REJ - Rejuvenated free comment (GOTO 95)
TMG - Trimming on edge
CTS - Core too small
EAO - Edge angle too obtuse

ACT - Acute
OBT - Obtuse
BAT - Battered
FLW - Flawed
NAR - No apparent reason
N - None or No more (GOTO 24)
O - Other identification free comment (GOTO 95)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 23)
.
24: Max Dimensions along flaking axis in mms
N
.
25: Size of longest scar
N
.
26: Maximum size of nodule
N
.
27: Amount of nodule flaked
K 1FC - one face (GOTO 42)
1FS - one face and side (GOTO 42)
2FS - two faces and side (GOTO 42)
ALL - All faces (GOTO 42)
O - Other identification free comment (GOTO 96)
UNC - Uncertain no attempt at identification (GOTO 42)
DUB - Dubious attempt identification (GOTO 27)
.
28: Max circumference of hammerstone in mms
N
.
29: Extent of abrasion by %
R (1,100)
.
30: Position of abrasion
K 1ED - One end
BED - Both ends
MED - Medial
AOV - All over
UNC - Uncertain
.
31: Shape of hammerstone
M NOD - Nodule
COR - Core
SPH - Spherical
PHS - Prepared HS
FRG - Fragmentary
FHS - Flake from HS
O - Other identification free comment (GOTO 97)
UNC - Uncertain no attempt at identification (GOTO 39)
DUB - Dubious attempt identification
N - No more (GOTO 39)
.
32: Type of scraper
K EDS - End single type
EDD - End double type
EDX - End extended
SDE - Side type
E/S - End and side type
DSC - Disc type
OBF - On broken flake
OTF - On thermal flake
O - Other identification free comment (GOTO 98)

UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 32)
.
33: Width of retouched edge in mms
N
.
34: Length of retouched edge in mms
N
.
35: Depth of retouched edge in mms
N
.
36: Specific conditions on scraper
M AER - Additional edge retouch
SEU - Scraper edge undercut
W/S - Worn smooth
PB - Prepared base
DUB - Dubious attempt identification
O - Other identification free comment (GOTO 99)
N - No more (GOTO 43)
.
37: Specific conditions on serrated flake
M GLS - Gloss on edge
ROE - Retouch on end
RES - Retouch on ends
BAK - Backing
DUB - Dubious attempt identification
O - Other identification free comment (GOTO A1)
N - No more (GOTO 38)
.
38: Number of teeth per cm
N (GOTO 43)
.
39: length in mms
N
.
40: Breadth in mms
N
.
41: Thickness in mms
N
.
42: Weight in grms
N
.
43: Free comment on this identification
T
.
44: Is this a multiple tool
K MTP - Multiple tool (GOTO 03)
N - No (GOTO 45)
.
C Removal section
. ---------------
45: Is this made on Removal / Core / Thermal Fragment
K REM - Removal
COR - Core
TFR - Thermal fragment
O - Other identification free comment (GOTO A2)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 45)
N - Not applicable in this section (GOTO 72)

46: Is this Unretouched / Utilised / Retouched / Ground / Accidental
K UNR - Unretouched
WS - Worn smooth (GOTO 64)
USP - Utilised sporadic = Smith 1965 class B (GOTO 64)
URS - Regular squilling Smith 1965 cls. A bevelled edge (GOTO 64)
RET - Retouched (GOTO 64)
ACD - Accidental damage (GOTO 64)
G/P - Ground and Polished (GOTO 64)
0 - Other identification free comment (GOTO A3)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 46)
N - No more (GOTO 47)

47: Is this artefact complete / broken
K COM - Complete
DST - Distal
MED - Medial
BUT - Butt
D+M - Distal and medial
M+B - Medial and butt
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 47)

48: Length dimension in mms
N

49: Breadth dimension in mms
N

50: Thickness dimensions in mms
N

51: Type of removal
K FLK - Flake
BLD - Blade
BLF - Blade like flake
IFB - Indeterminate flake or blade
SPL - Spall
CHP - Chip
CHK - Chunk
TFK - Trimming flake
PFK - Preparation flake
RFT - Rejuvenation flake tablet type
RFE - Rejuvenation flake edge type
RFO - Rejuvenation flake other type
RSF - Rejuvenation step fracture
CBL - Crested blade
OPS - Outre passe'
0 - Other identification free comment (GOTO A4)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 51)

52: Gingell and Harding type
K GH1A - Type 1a
GH1B - Type 1b
GH2 - Type II
GH3 - Type III
0 - Other identification free comment (GOTO A5)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 52)
INC - Incomplete

53: Type of Striking platform on removal

M CXA - Cortex all
CXP - Cortex part
PLN - Plain
TMG - Trimming
DIH - DiHedral 2 scars
FAC - Facetted
A/R - Abraded / Rubbed
LIN - Linear
SHT - Shattered
PUC - Punctiform
CRF - Core face
0 - Other identification Free comment (GOTO A6)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 53)
N - Not applicable if butt not present (GOTO 59)

54: Length of Striking platform in mms
N

55: Breadth of Striking platform in mms
N

56: Platform type
K PVF - Platform to ventral face
PDF - Platform to dorsal face
LED - Lipped edge (GOTO 58)
SHT - Shattered and not recordable (GOTO 58)
0 - Other identification free comment (GOTO A7)
UNC - Uncertain no attempt of identification (GOTO 58)
DUB - Dubious attempt identification (GOTO 56)
N - No (GOTO 58)

57: Angle of platform in degrees
N (GOTO 56)

58: Is Bulb Prominent / Diffuse
K PRM - Prominent
DFS - Diffuse
UNC - Uncertain or not observable

59: Flake terminations and section shapes
M HNG - Hinged
FET - Feathered
THK - Thick
NOR - Normal
BRK - Broken
TRI - Triangular
TPZ - Trapezoidal
IRR - Irregular
ITZ - Irregular trapezoidal
ITR - Irregular triangular
STR - Straight
CCV - Concave
CVX - Convex
SSH - S shaped
NOS - Not observable
0 - Other identification Free Comment (GOTO A8)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 59)
N - No more (GOTO 60)

60: Direction of flaking
K SDR - Same direction

OPP - Opposite 180
RA - Right angled
AA - Acute angle
OB - Obtuse angle
MDR - Multi-directional
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 60)
N - No more (GOTO 62)

.
61: Number of scars on dorsal face
N (GOTO 60)

.
62: Rejoin computer bag number and context number ie 435.23
N

.
63: Rejoining evidence
K REJ - Rejoins (GOTO 62)
N - No evidence of rejoin (GOTO 72)

.
C Retouch section
. ---------------

64: Position of Retouch/ grinding / edge wear
K END - End (GOTO 65)
SDE - Side (GOTO 65)
DST - Distal (GOTO 65)
PRX - Proximal (GOTO 65)
MES - Mesial (GOTO 65)
LFT - Left (GOTO 65)
RGT - Right (GOTO 65)
0 - Other identification free comment (GOTO A9)
UNC - Uncertain (GOTO 65)
DUB - Dubious (GOTO 64)
N - No more (GOTO 66)

.
65: Length of retouch in mms
N (GOTO 64)

.
66: Type of Retouch
K DRT - Direct
INV - Inverse
ALT - Alternate
ALG - Alternating
BIF - Bifacial
CRS - Crossed retouch on an anvil
SPR - Stepped retouch
TCX - Through cortex
0 - Other identification free comment (GOTO B1)
UNC - Uncertain no attempt at identification
DUB - Dubious (GOTO 66)
CNT - Continuous
D/S - Discontinuous / sporadic
PRT - Partial

.
67: Extent of retouch
K SII - Semi invasive
INV - Invasive
ALO - All over
0 - Other identification free comment (GOTO B2)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 67)

.
68: Shape of Retouched edge
K STR - Straight

CON - Concave
CVX - Convex
NOT - Notched
DEN - Denticulated
NSD - Nosed
TGD - Tanged
TOD - Tongued
REG - Regular
IRR - Irregular
0 - Other identification free comment (GOTO B3)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 68)

.
69: Angle of retouched edge
K ABR - Abrupt 80/90
SAA - Semi abrupt 65/80
SAB - Shallow <45
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 69)

.
70: Depth of retouch in mms
N

.
71: Morphology of retouch
K SCD - Scaled (GOTO 46)
SCA - Scalar (GOTO 46)
SBP - Sub parallel (GOTO 46)
PAR - Parallel ripple flaking (GOTO 46)
CON - Convergent (GOTO 46)
SCV - Semi convergent (GOTO 46)
0 - Other identification free comment (GOTO B4)
UNC - Uncertain no attempt at identification (GOTO 46)
DUB - Dubious attempt identification (GOTO 71)

.
C Raw material and condition section
. ---------------------------------

72: Colour of flint
M DRK - Dark
MED - Medium
L/P - Light/pale
G/B - Grey/Black
BRN - Brown
YLW - Yellow
WHT - White
BHD - Bull Head
MTD - Mottled
TLO - Translucent / Opaque
INC - Inclusions
0 - Other identification free comment (GOTO B5)
DUB - Dubious attempt identification (GOTO 72)
N - No more (GOTO 73)

.
73: Condition and type of cortex
K FRH - Fresh
W/R - Weathered/rolled
THK - Thick
THN - Thin
STD - Stained
0 - Other identification free comment (GOTO B6)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 73)

.
74: Position of cortex

K DST - Distal
PRX - Proximal
LFT - Left
RGT - Right
CEN - Central
0 - Other identification free comment (GOTO B7)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 74)

.

75: Amount of Cortex in %
N

.

76: General condition of object
M URD - Unrolled
R/A - Rolled / abraded
GLS - Gloss sand or wind
PTN - Patina
THM - Thermal scars
MEC - Mechanical scars
PDD - Post depositional damage
STD - Stained
0 - Other identification free comment (GOTO B8)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification
N - No more (GOTO 76)

.

77: Breakage
K CMP - Complete
BBE - Broken butt end
BDE - Broken distal end
BMD - Broken middle
0 - Other identification free comment (GOTO B9)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 77)

.

78: Cortication
K NCT - No cortication present
PFL - Pre flaking
PSW - Post working
2PH - Two phase
0 - Other identification free comment (GOTO C1)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 78)

.

79: Degree of Cortication
K HVY - Heavy
LGT - Light
OSM - Other surface modification
0 - Other identification free comment (GOTO C2)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 79)

.

80: Burning
K HCL - Heavily calcined
SLC - Slight cracking
DHT - Deliberate heat treatment
0 - Other identification free comment (GOTO C3)
UNC - Uncertain no attempt at identification
DUB - Dubious attempt identification (GOTO 80)

.

81: Free comment on this flint
T

.

82: Is there another flint in this context
Z (IF YES GOTO 02
IF NO GOTO 01)

.

C Free comment section
.

83: Other type of leaf shaped arrowhead
T (GOTO 05)

.

84: Other specific shape of leaf shaped arrowhead
T (GOTO 06)

.

85: Other type of barbed and tanged arrowhead
T (GOTO 07)

.

86: Other type of transverse arrowhead
T (GOTO 39)

.

87: Other type of axe edge / side / butt
T (GOTO 11)

.

88: Other type of axe transverse section shape
T (GOTO 13)

.

89: Other evidence of hafting
T (GOTO 14)

.

90: Other type of notch position on micro burin
T (GOTO 18)

.

91: Other type of micro burin
T (GOTO 43)

.

92: Other relationship of striking platform on core
T (GOTO 20)

.

94: Other type of removal from core
T (GOTO 22)

.

93: Other type of striking platform
T (GOTO 21)

.

95: Other type of rejuvenation
T (GOTO 23)

.

96: Other amount of nodule flaked
T (GOTO 42)

.

97: Other shape of hammerstone
T (GOTO 31)

.

98: Other type of scraper
T (GOTO 33)

.

99: Other condition on scraper
T (GOTO 36)

.

A1: Other condition on serrated flake
T (GOTO 37)

.

A2: Other removal/core/thermal frag
T (GOTO 46)

.

A3: Other utilised / retouched / ground / accidental
T (GOTO 47)
.
A4: Other type of removal
T (GOTO 52)
.
A5: Other type of Gingell + Harding type
T (GOTO 53)
.
A6: Other type of striking platform on removal
T (GOTO 53)
.
A7: Other type of platform
T (GOTO 58)
.
A8: Other type of scarring pattern on dorsal face
T (GOTO 59)
.
A9: Other position of retouch / grinding / wear
T (GOTO 64)
.
B1: Other type of retouch
T (GOTO 67)
.
B2: Other extent of retouch
T (GOTO 68)
.
B3: Other shape of retouched edge
T (GOTO 69)
.
B4: Other morphology of retouch
T (GOTO 46)
.
B5: Other colour of flint
T (GOTO 72)
.
B6: Other condition of cortex
T (GOTO 74)
.
B7: Other position of cortex
T (GOTO 75)
.
B8: Other general conditions
T (GOTO 76)
.
B9: Other type of breakage
T (GOTO 78)
.
C1: Other type of cortication
T (GOTO 79)
.
C2: Other type of degree of cortication
T (GOTO 80)
.
C3: Other type of burning
T (GOTO 81)
.

End of flint question source file

February 1984

RECENT PUBLICATIONS RELEVANT TO LITHIC STUDIES

The listings in this issue are restricted to Britain and Ireland, mainly for reasons of space, but also because of a poor response to the appeal for information on foreign publications. (An alternative suggestion has been that we might feature review articles of the most important recent literature on lithics in individual countries - are there any research students working on relevant theses willing to undertake this?). Once again I am grateful for help in the compilation of this listing to Stephen Green, Frances Healy, Mike Pitts, and Caroline Wickham-Jones.

BRITAIN AND IRELAND: REGIONAL STUDIES

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Barton, N. and Huxtable, J. 1983. New dates for Hengistbury Head, Dorset. Antiquity 57, 133-135.

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Jacobi, R.M. 1982. Ice age cave-dwellers 12000-9000 BC. In M.A. Aston and I.C.G. Burrow (eds.), The archaeology of Somerset: a review to 1500 AD, 10-13. Somerset County Council.

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Minnitt, S. 1982. Farmers and field monuments, 4000-2000 BC. In M.A. Aston and I.C.G. Burrow (eds.), The archaeology of Somerset: a review to 1500 AD, 22-27. Somerset County Council.

Mitchell, G.F. and Robinson, P. 1983. Flint flake in situ at Prah Sands, Cornwall. Quaternary Newsletter 40, 12-14. (Possible meso flake).

Norman, C. 1982. Mesolithic hunter-gatherers, 9000-4000 BC. In M.A. Aston and I.C.G. Burrow (eds.), The archaeology of Somerset: a review to 1500 AD, 14-21. Somerset County Council.

Pitts, M.W. 1982. On the road to Stonehenge: a report on investigations beside the A344 in 1968, 1979, and 1980. Proc Prehist Soc 48, 75-132. (Incl. study of sarsen-working debris).

Smith, G. 1982. The Lizard project. Cornish Archaeol 21, 184. (Incl. note of Goonhilly Downs early meso broad-blade industry).

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Steele, P. 1982. Flint implements from Great Hammett, St Neot. Cornish Archaeol 21, 172.

2. SOUTH-EAST ENGLAND

Adkins, R.A. 1983. A fragment of a neolithic axe from Warlingham. Surrey Archaeol Collect 74, 211-212.

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Bell, M. 1983. Valley sediments as evidence of prehistoric land-use on the South Downs. Proc Prehist Soc 49, 119-150. (Incl. F.Healy, brief report on retouched pieces among the Kiln Combe flint, microfiche frames 7-9).

Bott, A. 1983. A mesolithic mace-head from the Thames foreshore at Ham. Surrey Archaeol Collect 74, 203-204.

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THE LITHIC STUDIES SOCIETY

The Lithic Studies Society, formed in 1979, seeks to advance the international study of lithic industries in the broadest possible context. New members are welcome, and further details of the Society's activities and membership application forms may be obtained by sending a stamped, addressed envelope to Caroline Wickham-Jones, Artifact Research Unit, National Museum of Antiquities of Scotland, 5 Coates Place, Edinburgh, EH3 7AA.

The officers of the Society for 1983-84 are: Alan Saville (Chairman), Elizabeth Healey (Vice-Chairman), Stephen Green (Secretary), Caroline Wickham-Jones (Treasurer/Membership Secretary). Members serving on the General Committee are: Frances Healy, Martin Hemingway, Hazel Martingell, Mark Newcomer, Penny Robinson, and John Wymer.

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Contributions to any section of the next edition - Lithics 5 - are invited, and should be sent to Alan Saville, Art Gallery and Museums, 40 Clarence Street, Cheltenham, Gloucestershire, GL50 3NX, England. Copy for Lithics 5 should arrive before the end of October 1984. Texts should be submitted in double-spaced type, with all references given in full, using the Harvard system as in this edition. Illustrations must be submitted in an overall size no larger than 15 x 25 cms, and be capable of reduction by half.

This newsletter is circulated free of charge to all members of the Society. Non-members may obtain copies by writing to Alan Saville at the address above, from whom back-copies are also available.

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