Flake tools and handaxes at High Lodge: patterns in size and shape?

Article

Accepted Version

Hosfield, R. ORCID: https://orcid.org/0000-0001-6357-2805 (2013) Flake tools and handaxes at High Lodge: patterns in size and shape? Lithics: Journal of the Lithic Studies Society, 34. pp. 23-33. ISSN 0262-7817 Available at https://centaur.reading.ac.uk/40013/

FLAKE TOOLS AND HANDAXES AT HIGH LODGE: PATTERNS IN SIZE AND SHAPE?

Dr Robert Hosfield[1]

ABSTRACT

This paper explores possible size and shape patterning in Lower Palaeolithic flake tools and handaxes, using the published (Ashton & Cook 1992) primary metrics of the High Lodge Old Collections as a case study. Comparison of coefficient of variation (C.V.) values suggests that while raw artefact metrics and shape proxy values inevitably differ by artefact type, the degree of variability by type is frequently comparable for scrapers, notches and denticulates, flaked flakes, and handaxes. The data from this preliminary investigation therefore suggests that long-standing descriptions of Acheulean flake tools as ad hoc *and unstandardised might merit further and fuller re-investigation.*

Hosfield, R.T. 2013. Flake tools and handaxes at High Lodge: patterns in size and shape? *Lithics: Journal of the Lithic Studies Society* 34: XX–XX.

INTRODUCTION

This short paper is a speculative exploration of size and shape patterning across two principle categories of Lower Palaeolithic tools: flake tools and handaxes, using the High Lodge Old Collections (Ashton & Cook 1992) as a case study. The primary purpose is to test whether flake tools are significantly different to handaxes in terms of their various primary metrics and two proxy metrical descriptors of shape, with particular reference to relative variability rather than absolute values. In doing so the paper seeks to test long-standing assumptions about the *ad hoc* nature of Lower Palaeolithic flake tools in Acheulean assemblages (e.g. Wymer 1968: 61), and concludes by considering possible explanations for the detected patterns. Its second intention is simply to invite comment, both in regards to its tentative conclusions concerning similarities and differences in the size and shape variability of flake tools and handaxes at High Lodge, and with respect to its use of primary metrics as a method for classifying artefact shape.

BACKGROUND

Much of the discussion of flake tools in the British Lower Palaeolithic has focused on Clactonian assemblages (e.g. McNabb 2007; Pettitt & White 2012: 173–193; but *cf*. Brumm & McLaren 2011), not least because of the small number of Acheulean assemblages with significant numbers of scrapers or other flake tools (Roe 1968a; Pettitt & White 2012: 146). However Wymer (1968: 61) has nonetheless argued that, with the exception of rare sidescrapers, no standardised flake tools occur in Acheulean assemblages (Figure 1), with retouching only carried out to alter the suitability of the edge to meet various functions.

More recently Pettitt & White (2012: 166) have argued that only those flake tools requiring either a regular edge (for scraping) or a steep, strong edge (for chopping) were retouched, and furthermore that the retouch on hide scrapers may be the product of re-sharpening rather than

[1] Department of Archaeology, School of Archaeology, Geography & Environmental Science, University of Reading, Whiteknights, Reading, RG6 6AB. E-mail: r.hosfield@rdg.ac.uk

intentional shaping. This has also been supported by Brumm & McLaren's (2011) exploration of the High Lodge scrapers, which argued that their shapes were a by-product of the combined effects of original blank shape and re-sharpening histories.

The nature of Lower Palaeolithic flake tools, both in Acheulean and non-Acheulean assemblages, is significant with regards to three wider issues: (i) the relationship between Acheulean and non-Acheulean industries (Clactonian flake tools, for example, have been described as haphazard and non-specialised; e.g. Wymer 1968: 40 & fig. 12; but see more recent re-interpretations: White 2000; Pettitt & White 2012); (ii) the ongoing primacy of the handaxe and other bifaces, e.g. cleavers, when discussing Acheulean assemblages (although it is acknowledged that this is largely an unavoidable by-product of collection histories, there are nonetheless assemblages, such as High Lodge, where the bifacial and flake tool components can be compared; Pettitt & White 2012: 146); and (iii) comparisons between the flake tools of the Lower Palaeolithic and those of the prepared core technologies, e.g. Levallois, of the Middle Palaeolithic (see also Brumm & McLaren 2011: 199).

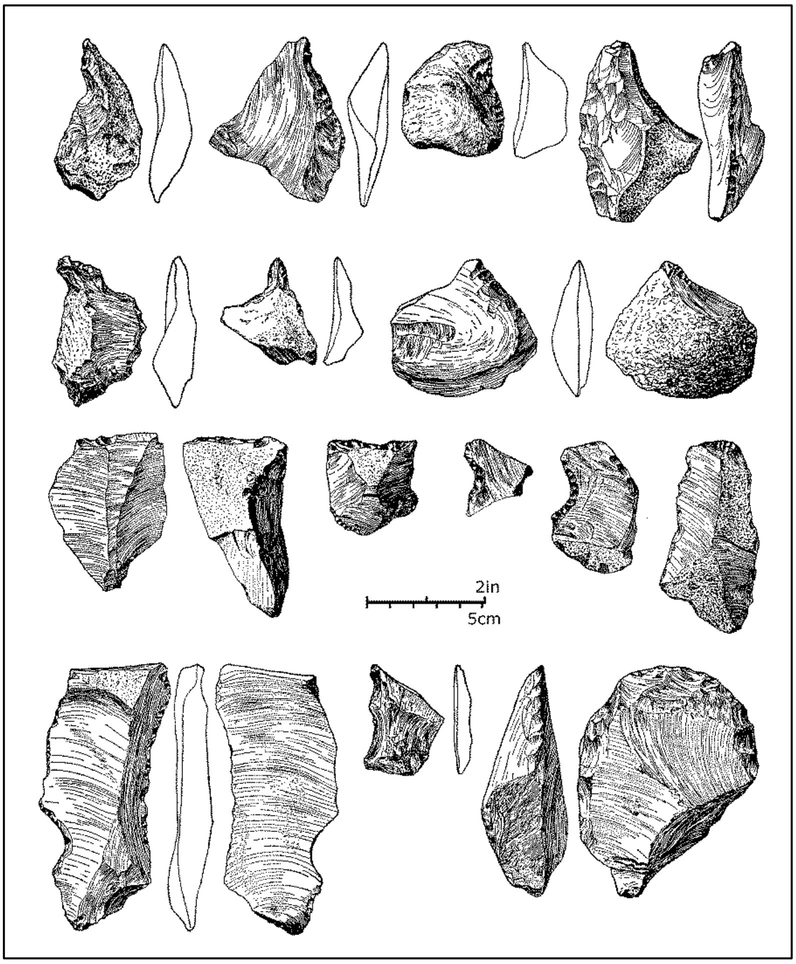


Figure 1: Flake tools from Acheulean industries (Wymer 1968: fig. 29)

DATA

This paper utilises the primary metrics published for the British Museum's Old Collections of handaxes and flake tools from the British Lower Palaeolithic site of High Lodge (Ashton *et al*. 1992). The High Lodge artefacts are argued here to be MIS 13 in age (after Ashton *et al*.

1992, but see Gibbard *et al*. 2009 for an alternative chronology). The Old Collections' artefacts were acquired by workmen and antiquarians between the 1870s and the 1920s: there is a paucity of contextual information, and the proportions of basic artefact types (cores, flakes, flake tools and bifaces) indicate a bias towards the acquisition of finer pieces (see Ashton 1992: 124 and Brumm & McLaren 2011: 186 for further discussions). Yet as Ashton (1992: 124) notes, while the Old Collections can "not be treated as an excavated assemblage...they are valuable for providing large samples of both flake tools and bifaces for technological and typological analysis". It is in this regard that the Old Collections are used here.

These artefacts (n=243) predominantly derive from the Sturge Collection (n=217; 89.3%), with single pieces and small numbers of artefacts (< 10) from the Franks, Greenwell, Institute of Archaeology, Lacaille, Lawrence, Marr(?), Trechmann, Trigg, Wellcome and White-Knight collections (Table 1 for summary). It is therefore acknowledged that the sampled artefacts at least partially reflect the collecting habits and preferences of several individuals, as well as hominin technological behaviour in and around High Lodge.

Collection	***n***	***Collection***	***n***
Franks	2	Sturge[1]	217
Greenwell	4	Trechmann	2
Institute of Archaeology	3	Trigg	5
Lacaille	2	Wellcome	5
Lawrence	1	White-Knight	1
Marr (?)	1		

Table 1: Sources, by Collection, of the British Museum's High Lodge artefacts in the Old Collections (summarised from Ashton et al. 1992: Part II). [1]The Sturge Collection is primarily composed of artefacts purchased from Greenwell, with others bought from Fenton, Rosehill and Worthington-Smith (Ashton & Cook 1992: 191).

The High Lodge bifaces include both handaxes and cleavers, while the flake tools incorporate scrapers (single and double sidescrapers, transverse, end and offset scrapers), notches, denticulates, flaked flakes, and a small number of other types (Table 2). Single and double scrapers were distinguished in this analysis to take account of the potential role of resharpening pathways and intensity on the proportions of single and double scrapers in an assemblage (e.g. Rolland & Dibble 1990; McLaren & Brumm 2011). The British Museum catalogue recorded length (L), width (W) and thickness (Th) dimensions for each flake tool, and the same dimensions plus the L_1 (length from the butt to the point of maximum width) and mid-point width (from base to tip) dimensions for the bifaces (after Bordes 1961; selected dimensions were not recorded on six broken or roughed out specimens).

METHODS

Artefact size and shape was compared for both 'groups' (all flake tools, notches, denticulates flaked flakes, handaxes) and 'types' (single sidescrapers, 'double' scrapers [including double sidescrapers, convergent scrapers and offset scrapers, as all are characterised by retouch on two (or more) edges; Table 2], endscrapers, transverse scrapers, pointed handaxes, ovate handaxes; Tables 3–7). Handaxes were sub-divided into points and ovates using the L_1/L ratio (Roe 1968b). Artefact size was measured using the three primary metrics (L, W and Th). Artefact shape was measured using the following two proxies:

- W/L: a proxy measure of relative elongation, with high values (towards 1.0 and above) indicating a ‘square’ or squat piece, and low values an elongated piece (values of 0.5 = an artefact twice as long as it is wide);
- Th/W: a proxy measure of relative thinness, which increases with lower values.

For each sample the mean and coefficient of variation (C.V.) values were calculated, and inter-quartile ranges and outliers were visualised as box plots. Comparisons between samples were by the non-parametric Mann-Whitney method, due to parametric test assumptions not being met. The test level of significance (p) was 0.01.

This methodology is by admission a far less complex exploration of flake tool form and morphology than that utilised by Brumm & McLaren (2011: 189–191), which explored the extent (Kuhn’s GIUR) and perimeter of retouch, edge angles and curvature, invasiveness indices, and retouch termination types. However it meets this paper’s two primary goals: (i) to assess the degree of shape and size variability in the High Lodge flake tools and handaxes, in both two (L, W, W/L) and three (Th and Th/W) dimensions; and (ii) to test the use of primary artefact metrics as a means for classifying size and shape variability.

Group	***Type***	***n***	***Bordes’ (1961) types***
Scrapers	Single sidescraper	48	9, 10, 11
	Double, convergent & offset sidescrapers[1]	56	13, 15, 17, 19, 21
	Transverse scraper	29	22, 23, 24
	End scraper	12	30, 31
	Other types	2	25
Notches		5	42
Denticulates		6	43
Flaked Flakes		10	NA
Other flake tools[2]		6	36, 62
Bifaces	Handaxes	63	5, 6, 7, 8, 10, 11, 12, 20, 21
	Cleavers	5	13
	Roughout	1	NA

Table 2: High Lodge Old Collections’ (n=243) artefact sample composition, by type (Ashton & Cook 1992). [1]Double, convergent and offset scrapers are treated together here as all are characterised by retouch on two (or more) edges. [2]The ‘other flake tools’ category includes Composite tools (4), Backed knives (1) and Miscellaneous pieces (1).

RESULTS

Summary statistics for each of the artefact groups are presented in Tables 3–7 and Figure 2.

Group	*n*	*Mean*	*Minimum*	*Maximum*	*Range*	*C.V.*
All flake tools	174	82.32	40	170	130	0.29
Single sidescrapers	48	83.33	54	170	116	0.30
'Double' scrapers[1]	56	83.77	50	136	86	0.25
Endscrapers	12	105.58	65	159	94	0.29
Transverse scrapers	29	72.07	40	140	100	0.29
Notches	5	61.60	52	82	30	0.20
Denticulates	6	88.50	59	123	64	0.28
Flaked Flakes	10	81.50	45	123	78	0.34
Handaxes[2]	60	116.27	64	194	130	0.26
Pointed handaxes[3]	12	120.75	86	194	108	0.29
Ovate handaxes[3]	45	114.80	64	189	125	0.26

Table 3: High Lodge Old Collections' artefact length (mm), by group and type. [1]Includes double sidescrapers, convergent scrapers and offset scrapers; [2]Excluding 5 cleavers, 1 roughout, and 3 broken pieces from the High Lodge Old Collections' biface sample; [3]Defined by L_1/L (Roe 1968b).

Group	*n*	*Mean*	*Minimum*	*Maximum*	*Range*	*C.V.*
All flake tools	174	69.99	26	135	109	0.29
Single sidescrapers	48	66.48	33	129	96	0.31
'Double' scrapers[1]	56	72.34	36	135	99	0.31
Endscrapers	12	68.42	42	98	56	0.28
Transverse scrapers	29	76.03	47	97	50	0.19
Notches	5	49.40	40	63	23	0.19
Denticulates	6	76.33	53	114	61	0.29
Flaked Flakes	10	67.40	26	111	85	0.39
Handaxes[2]	60	74.15	46	101	55	0.18
Pointed handaxes[3]	12	75.83	50	101	51	0.20
Ovate handaxes[3]	45	73.29	46	98	52	0.19

Table 4: High Lodge Old Collections' artefact width (mm), by group and type. [1]Includes double sidescrapers, convergent scrapers and offset scrapers; [2]Excluding 5 cleavers, 1 roughout, and 3 broken pieces from the High Lodge Old Collections' biface sample; [3]Defined by L_1/L (Roe 1968b).

Group	*n*	*Mean*	*Minimum*	*Maximum*	*Range*	*C.V.*
All flake tools	174	23.90	9	48	39	0.31
Single sidescrapers	48	23.19	12	48	36	0.32
'Double' scrapers[1]	56	23.38	9	44	35	0.26
Endscrapers	12	30.00	17	45	28	0.34
Transverse scrapers	29	23.07	10	42	32	0.34
Notches	5	20.00	16	28	12	0.24
Denticulates	6	27.33	19	35	16	0.24
Flaked Flakes	10	24.30	12	34	22	0.34
Handaxes[2]	60	32.12	17	69	52	0.36
Pointed handaxes[3]	12	33.25	24	50	26	0.30
Ovate handaxes[3]	45	30.60	17	69	52	0.36

Table 5: High Lodge Old Collections' artefact thickness (mm), by group and type. [1]Includes double sidescrapers, convergent scrapers and offset scrapers; [2]Excluding 5 cleavers, 1 roughout, and 3 broken pieces from the High Lodge Old Collections' biface sample; [3]Defined by L_1/L (Roe 1968b).

Group	*n*	*Mean*[4]	*Minimum*	*Maximum*	*Range*	*C.V.*
All flake tools	174	.888	.388	2.025	1.637	0.318
Single sidescrapers	48	.815	.521	1.554	1.033	0.245
'Double' scrapers[1]	56	.891	.465	1.692	1.227	0.305
Endscrapers	12	.660	.470	1.032	.561	0.206
Transverse scrapers	29	1.126	.593	2.025	1.432	0.316
Notches	5	.806	.712	.925	.213	0.104
Denticulates	6	.871	.650	1.036	.386	0.157
Flaked Flakes	10	.864	.388	1.311	.923	0.352
Handaxes[2]	60	.653	.503	.901	.398	0.138
Pointed handaxes[3]	12	.644	.521	.800	.279	0.140
Ovate handaxes[3]	45	.654	.503	.901	.398	0.142

Table 6: High Lodge Old Collections' artefact W/L (relative elongation), by group and type. [1]Includes double sidescrapers, convergent scrapers and offset scrapers; [2]Excluding 5 cleavers, 1 roughout, and 3 broken pieces from the High Lodge Old Collections' biface sample; [3]Defined by L_1/L (Roe 1968b). [4]W/L, where lower values = increasing relative elongation.

Group	*n*	*Mean*[4]	*Minimum*	*Maximum*	*Range*	*C.V.*
All flake tools	174	.354	.125	.638	.513	0.274
Single sidescrapers	48	.360	.160	.568	.408	0.239
'Double' scrapers[1]	56	.339	.194	.619	.425	0.286
Endscrapers	12	.441	.296	.368	.342	0.224
Transverse scrapers	29	.310	.125	.569	.444	0.339
Notches	5	.407	.321	.500	.179	0.170
Denticulates	6	.367	.298	.482	.184	0.191
Flaked Flakes	10	.375	.245	.481	.236	0.227
Handaxes[2]	60	.430	.244	.800	.556	0.260
Pointed handaxes[3]	12	.440	.329	.600	.271	0.218
Ovate handaxes[3]	45	.414	.244	.800	.556	0.261

Table 7: High Lodge Old Collections' artefact Th/W (relative thinness), by group. [1]Includes double sidescrapers, convergent scrapers and offset scrapers; [2]Excluding 5 cleavers, 1 roughout, and 3 broken pieces from the High Lodge Old Collections' biface sample; [3]Defined by L_1/L (Roe 1968b). [4]Th/W, where lower values = increasing relative thinness.

These data indicate a number of key patterns:

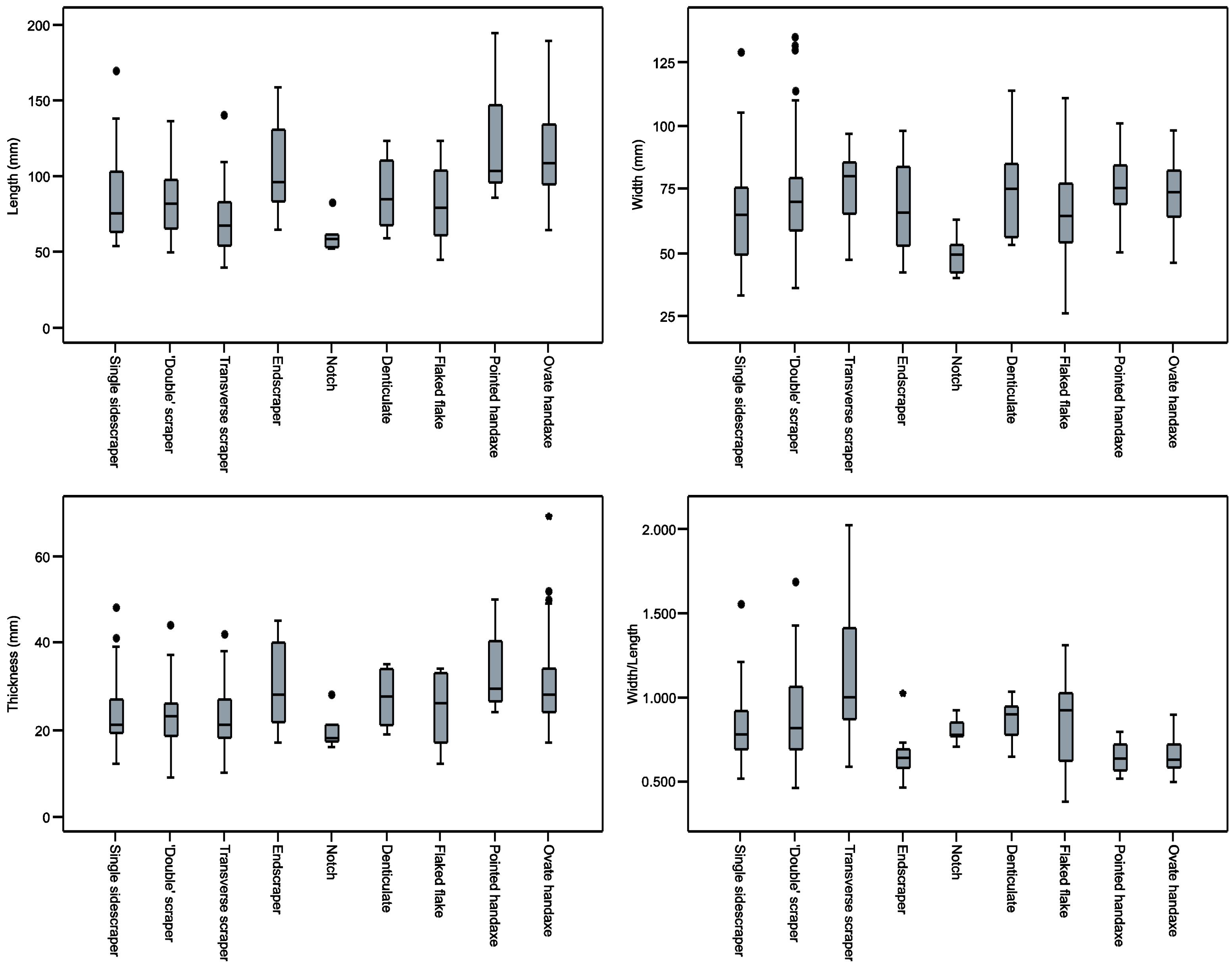
- The flake tools are significantly shorter than the handaxes (Mann-Whitney U = 1866.500; $p < 0.01$), but relative variability across the individual types is comparable (C.V. = 0.25–0.30), with the exception of the notches (C.V. = 0.20) and the flaked flakes (C.V. = 0.34);
- The flake tools are comparable to the handaxes in width (Mann-Whitney U = 4249.500; $p = 0.03$), with the exception of the notches (Mann-Whitney U = 18.500; $p < 0.01$). However the flake tools have a higher relatively variability (C.V. = 0.28–0.39, compared to handaxe values of 0.18–0.20), with the exception of the notches and transverse scrapers (C.V. = 0.19);
- The flake tools are significantly thinner, by *c*. 5–10mm, than the handaxes (Mann-Whitney U = 2775.000; $p < 0.01$), but have comparable relative variability (C.V. = 0.30–0.36), with the exception of the notches, denticulates and 'double' scrapers which are less varied (C.V. = 0.24 and 0.26);

- The flake tools are significantly less elongated (W/L) than the handaxes (Mann-Whitney U = 2208.000; $p < 0.01$), with the unsurprising exception of the endscrapers (Mann-Whitney U = 340.500; $p = 0.768$), but are also more variable (C.V. = 0.206–0.352, compared to handaxe values of 0.138–0.142), with the exception of notches and denticulates (C.V. = 0.104 & 0.157);
- The flake tools are significantly relatively thinner (Th/W) than the handaxes (Mann-Whitney U = 3279.000; $p < 0.01$), but have comparable variability (C.V. = 0.218–0.286), with the exception of the notches and denticulates (C.V. = 0.170 & 0.191) and the transverse scrapers (C.V. = 0.339).

Overall the range of metrical data presented does not strongly suggest that the High Lodge flake tools are excessively variable in form (measured by primary dimensions, elongation, and relative thinning) in comparison to the handaxes. The main axis of greater variability was in artefact width (and in the associated elongation proxy W/L), which might partially be a by-product of varying degrees of re-sharpening on side, convergent and offset scrapers (C.V. = 0.31). This issue of reduction intensity has been highlighted for the High Lodge scrapers by Brumm & McLaren (2011: 191–194 & 197), who noted that single scrapers were consistently retouched on fewer zones and edges than, in turn, double scrapers and convergent scrapers, but that the flakes selected for retouching into scrapers were broadly similar in ‘starting’ dimensions. However in that regard it is interesting to note that the ‘double’ scrapers (double sidescrapers, convergent scrapers and offset scrapers) are wider than the single sidescrapers (72.3 compared to 66.5mm), although their variability is comparable (C.V. = 0.31 in both cases).

A notable result was the relatively low levels of variability amongst the notches, especially, and denticulates. While the small sample sizes for these artefact types certainly encourage caution, the data raise the interesting possibility that these forms were preferentially produced on flake blanks of particular sizes and shapes (the notches were shorter and narrower than the scrapers, but comparable to the sidescrapers in terms of elongation ratio), although whether that reflected the requirements and usage(s) of these tools or the limited usability of smaller-sized blanks for other purposes is unknown. This is in-keeping with Ashton’s (1992: 150) earlier analysis, which also noted that the blank sizes for the High Lodge notches and flaked flakes were significantly smaller than those which were modified with scraper retouch (and that in some cases it was difficult to distinguish between multiple Clactonian notches and denticulates), although this analysis found the flaked flakes to be much more variable in size and shape than the notches.

The W/L (elongation) ratio of the majority of the flake tools (*c*. 0.8, i.e. relatively ‘square’ in form) is in-line with Ashton’s (1992: 137) previous observation that the High Lodge flakes were generally slightly longer than they were wide. However the greater and lesser elongation of the endscrapers (*c*. 0.6) and transverse scrapers (*c*. 1.1) respectively is therefore of interest as it highlights a possible relationship between scraper type and initial blank form (Brumm and McLaren [2011: 197] have previously argued that many of the High Lodge transverse scrapers probably ‘began’ as transverse scrapers and did not change their typology through continued retouching).



Length (mm)
Width (mm)
Thickness (mm)
Width/Length
Single sidescraper
'Double' scraper
Transverse scraper
Endscraper
Notch
Denticulate
Flaked flake
Pointed handaxe
Ovate handaxe

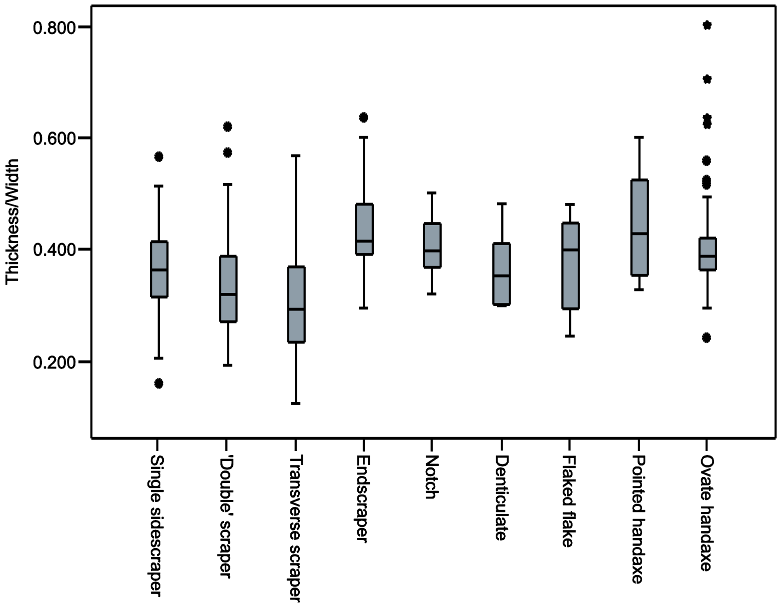


Figure 2: Metric distributions (L, W, Th, W/L & Th/W) for flake tools and handaxes from the High Lodge Old Collections (data source: Ashton & Cook 1992)

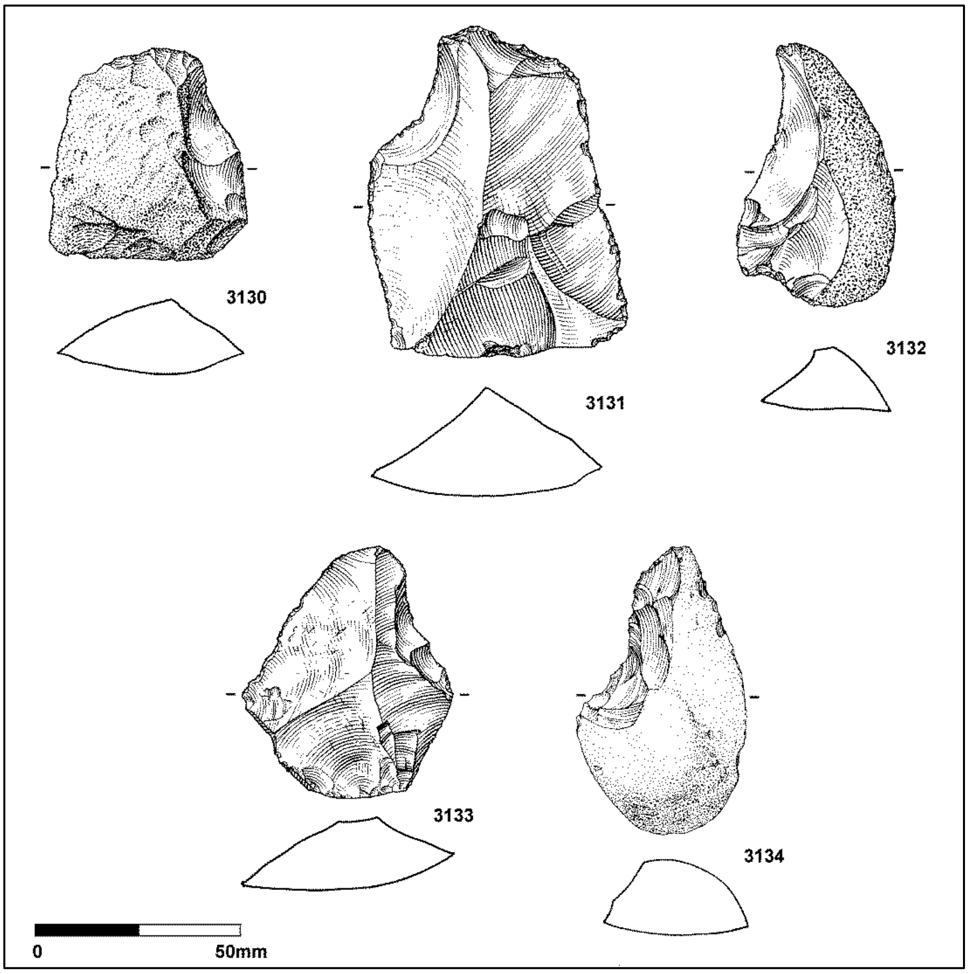


Figure 3: Notches from the High Lodge Old Collections (after Ashton & Cook 1992: Plates 29–30).

As a whole the flake tools were significantly shorter and thinner, but not narrower, than the handaxes. While the differences in thickness are likely to reflect variations in blank form (Ashton [1992: 157] noted that the making of bifaces on flakes rather than nodules could only be demonstrated in 8% of cases) and handaxe thinning as opposed to flake tool retouching, the contrasts in length raise the question of the relative importance of functional requirements, modes of use, and/or raw material restrictions. Ashton (1992: 137) noted that the majority of flakes varied between 20–70mm (maximum dimension), while the cores were normally reduced to between 60–100mmm (maximum dimension) and usually retained a small amount of cortex (potentially suggesting that the original nodules were not significantly larger). While the mean length of the handaxes (116mm) indicates the potential availability of larger flake blanks from the High Lodge flint sources at earlier stages in their reduction sequences (and the use of large nodules for handaxe reduction), the normal reduction of the cores' maximum dimension to between 60–100mm would seem to indicate the perceived usability of flakes in that size range. Indeed if the generally 'square' shape of the flake tools (W/L = *c*. 0.8; i.e. blanks that are approximately $^{4}/_{5}$s as wide as they were long) was a genuine preference, perhaps for prehensile purposes, then this may even have restricted choices to shorter blanks (i.e. there were relatively few blanks that were sufficiently large in both length and width), with the possible exception of the elongated endscraper forms (W/L = 0.66). This is supported by the mean lengths and widths of the flake scars on the cores (40.2mm & 38.2mm respectively; Ashton 1992: table 11.7) which is also suggestive of relatively 'square' blanks.

This notion of differential and preferential use of blanks of different sizes and shapes is therefore supported by the evidence for predominantly fresh raw material sources (over 75% of nodules were collected shortly after eroding from the local bedrock Chalk deposits; Ashton 1992: 137), the evidence for hard hammer core reduction from predominantly unprepared platforms (Ashton 1992: 137), the evidence that the largest, thickest flakes were selected for turning into scrapers (Brumm & McLaren 2011: 200), and the generally comparable variability (C.V.) data reported above, which together suggest that flakes of specific size and shape (e.g. contrast the W/L values for side, end and transverse scrapers, and compare the primary metrics for notches and the various types of scrapers) were selected for specific purposes from a wide-ranging flake 'population'.

DISCUSSION & CONCLUSIONS

This paper's goals were to evaluate, using the High Lodge Old Collections, whether Lower Palaeolithic flake tools are significantly different to handaxes in terms of size and shape variability, and explore whether primary metrics are an effective method for classifying artefact form.

The preliminary data outlined above suggests that the flake tools at High Lodge, while differently sized, are not significantly more variable than the handaxes in terms of their dimensions (primary metrics) or shape (elongation and relative thinning), and perhaps offers a metrical challenge to Wymer's (1986) assertion that Acheulean assemblages lack standardised flake tools. Notably these similarities extend across all of the High Lodge flake tool categories, not only the scrapers, and in that regard offer a contrast to Brumm & McLaren's (2011: 186) observation that it is only the unifacially retouched scrapers that suggest preferred forms (contra "most other non-bifacial tools in Lower Palaeolithic assemblages"). It is suggested that these generally comparable levels of variability reflect hominin decision-making, most probably at the individual level, concerning the deliberate and repeated selection of blanks of particular sizes and shapes for transformation through retouching or bifacial flaking into flake tools and handaxes. Such selectivity might also have extended to the acquisition of the raw materials and/or to core reduction sequences, although such issues are beyond the scope of this short paper. These patterns would therefore seem to suggest that Lower Palaeolithic flake tool production was not necessarily a more casual or "unthinking" process than handaxe manufacture, although it would almost always have involved fewer removals: however it would clearly be appropriate for these preliminary conclusions to be tested on other assemblages.

However it is also critical to consider whether the primary metrics and ratios discussed above are a representative descriptor of artefact shape. The High Lodge illustrations (Figure 3) reveal variability in form, e.g. edge irregularities, which may be masked by the primary dimensions, and a comparable point about the potential of central tendency statistics to mask subtle but important variations in blank form between different High Lodge scraper classes was also made by Brumm & McLaren (2011: 199). Yet are such subtle variations significant when the artefact is held in the hand and its functional edge (the notch in the case of Figure 3) is utilised? Primary dimensions (and the dimensions of the hominin palm and fingers), the relative position and character (e.g. angle) of the functional edge, and perhaps also the position of any remnant cortex, may instead be the critical factors driving the repeated blank selections proposed above. This is perhaps also supported by the various combinations of edge angles, edge shapes and uses suggested by Keeley (1993: tables 5.1 & 5.2): in short, once a flake tool fits in the hand, its edges, retouched or not, can be put to a range of purposes. The omission of edge properties in the primary metrics presented here is therefore a limitation in this approach and can be contrasted with the emphasis on the micro-scale properties of the functional edge, over and above the macro-scale form of the artefact, previously made by Keeley (1993), Machin *et al*. (2007) for handaxes, and Brumm & McLaren (2011: 202) with specific reference to the High Lodge scrapers. However the patterning in metrical variability presented here does also suggest that factors beyond the character of the functional edge were also significant to hominins when it came to blank selection.

The comparability in primary metric and shape proxy variations between the flake tools and the handaxes might also raise the question of whether our archaeological understanding of form and standardisation does, or does not, fit with the hominin experience. As Brumm & McLaren note (2011: 185; and see their paper for various other examples), handaxes studies have often been directed towards the issues of repetitive plan outlines, standardisation, bilateral symmetry, and, by inference, intentional or conscious design, while the majority of Lower Palaeolithic flake tools are often dismissed as casually made and unstandardised. Deliberate intent is also implied in some of the descriptors used by various previous authors for the High Lodge scrapers: "beautifully formed", "striking", and "magnificent" (*ibid*: 186). Yet if the primary concern was a functional edge on a flake or bifacial platform whose size and shape fell within a range of (handling-related?) parameters, then perhaps it is a reminder that repetitive forms, standardisation and bilateral symmetry at the level of artefact outlines may well mean more to us than to them. A related point was made by Brumm & McLaren, who concluded that the High Lodge convergent scrapers, and perhaps even some handaxes, can be seen as "not purposely fashioned tools but rather the unintended outcome of progressive re-sharpening" (*ibid*: 202).

Interestingly, a comparison of the High Lodge flake tools with samples of scrapers, notches/denticulates and Upper Palaeolithic forms (originating from all units) from the

Middle Palaeolithic site of Combe Capelle (Dibble *et al*. 2002) suggests broadly comparable but slightly greater metrical variability in the Middle Palaeolithic assemblage, and not only in comparison with the renowned High Lodge scrapers. While context-specific factors (e.g. raw material variations) are undoubtedly significant, this brief comparison suggests a degree of similarity, rather than difference, between the size and shape variability of Lower and Middle Palaeolithic flake tools: typological industries may have changed rather more than hominin hands.

Type	***n***	***Length (mm)***		***Width (mm)***		***Thickness (mm)***		***W/L[1]***	***Th/W[1]***
		Mean	***CV***	***Mean***	***CV***	***Mean***	***CV***	***Mean***	***Mean***
Scrapers	277	64.88	.32	52.44	.35	15.85	.44	.808	.302
Notches & denticulates	293	59.30	.35	48.87	.36	15.64	.49	.824	.320
Upper Palaeolithic types	51	59.28	.37	46.85	.46	14.74	.55	.790	.315

Table 8: Primary metrics and mean shape proxies (W/L and Th/W) for tool types from the French Middle Palaeolithic site of Combe Capelle (data from Dibble et al. 2002). [1]Means were calculated for W/L and Th/W using the mean values for the primary metrics (due to the nature of the available data), so C.V. values are absent for these categories.

While this paper has focused primarily upon metrical data, it is of course clear from previous studies (e.g. Rolland & Dibble 1990; Kuhn 1992; Hiscock & Clarkson 2007; Brumm & McLaren 2011) that flake tool (and handaxe) size and shape is a by-product of the combined effects of raw material size and shape, flaking strategies and skill, functional needs, user preferences, and retouch intensity. Moreover it is also acknowledged that retouched flake tools only represent a portion of the flake tool component, as many tasks appear to have been completed with unretouched edges (Keeley 1993; Pettitt & White 2012: 166). Nonetheless, it is tentatively suggested that, at High Lodge at least, while tools certainly vary in their sizes and shapes, within tool categories there is a degree of modality (after Gowlett 2006) which applies whether dealing with handaxes or flake tools and which may relate to general prehensile requirements of Lower Palaeolithic technology.

ACKNOWLEDGEMENTS

With thanks to two anonymous reviewers for their comments. Thanks also to the British Museum for permission to reproduce parts of plates 29 & 30 from Ashton *et al*. (1992) in Figure 3.

REFERENCES

Ashton, N.M. 1992. The High Lodge flint industries. In N.M. Ashton, J. Cook, S.G. Lewis & J. Rose (eds) *High Lodge: Excavations by G. de G. Sieveking 1962–1968 and J. Cook 1988*: 124–163. British Museum Press, London.

Ashton, N.M. & Cook, J. 1992. Catalogue of the Old Collections. In N.M. Ashton, J. Cook, S.G. Lewis & J. Rose (eds) *High Lodge: Excavations by G. de G. Sieveking 1962–1968 and J. Cook 1988*: 191–191 & Plates 1–73. British Museum Press, London.

Ashton, N.M., Cook, J., Lewis, S.G. & Rose, J. (eds). 1992. *High Lodge: Excavations by G. de G. Sieveking 1962–1968 and J. Cook 1988*. British Museum Press, London.

Bordes, F. 1961. *Typologie du Paléolithique ancien et moyen*. Delmas, Bordeaux.

Brumm, A. & McLaren, A. 2011. Scraper reduction and “imposed form” at the Lower Palaeolithic site of High Lodge, England. *Journal of Human Evolution* 60: 185–204.

Dibble, H.L., McPherron, S.P. & Roth, B.J. 2002. *Virtual Dig: A Simulated Archaeological Excavation of a Middle Palaeolithic Site in France* (2nd edition). McGraw-Hill, California.

Gibbard, P.L., Pasanen, A.H., West, R.G., Lunkka, J.P., Boreham, S., Cohen, K.M. & Rolfe, C. 2009. Late Middle Pleistocene glaciation in East Anglia, England. *Boreas* 38: 504–528.

Gowlett, J.A.J. 2006. The elements of design form in Acheulean bifaces: modes, modalities, rules and language. In N. Goren-Inbar & G. Sharon (eds) *Axe Age: Acheulian Toolmaking from Quarry to Discard*: 203–21. Equinox Publishing Ltd, London.

Hiscock, P. & Clarkson, C. 2007. Retouched notches at Combe Grenal (France) and the reduction hypothesis. *American Antiquity* 72(1): 176–190.

Keeley, L. 1993. Microwear analysis of lithics. In R. Singer, B.G. Gladfelter & J.J. Wymer (eds) *The Lower Palaeolithic Site at Hoxne, England*: 129–138. University of Chicago Press, Chicago.

Kuhn, S. 1992. Blank morphology and reduction as determinants of Mousterian scraper morphology. *American Antiquity* 57: 115–128.

McNabb, J. 2007. *The British Lower Palaeolithic: Stones in Contention*. Routledge, Abingdon.

Pettitt, P. & White, M. 2012. *The British Palaeolithic: Human Societies at the Edge of the Pleistocene World*. Routledge, Abingdon.

Roe, D.A. 1968a. *Gazetteer for British Lower and Middle Palaeolithic Sites*. Council for British Archaeology, London.

Roe, D.A. 1968b. British Lower and Middle Palaeolithic handaxe groups. *Proceedings of the Prehistoric Society* 34: 1–82.

Rolland, N. & Dibble, H. 1990. A new synthesis of Middle Palaeolithic variability. *American Antiquity* 55: 480–499.

White, M.J. 2000. The Clactonian Question: On the Interpretation of Core-and-Flake Assemblages in the British Lower Palaeolithic. *Journal of World Prehistory* 14(1): 1–63

Wymer, J.J. 1968. *Lower Palaeolithic Archaeology in Britain, as Represented by the Thames Valley*. John Baker, London.