Appendix 2 – Struck flint: methodology and overview

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Introduction

The assemblage of flintwork from the Eton Rowing Course and Maidenhead to Windsor flood alleviation scheme represents a substantial body of material, recovered from numerous contexts over a broad swath of the Middle Thames valley. In total some 59,000 artefacts were recovered from excavations along the routes of the two schemes (Tables App 2.2-3). The flintwork recovered includes artefacts and assemblages dating from the early Mesolithic through to the late Bronze Age, although the quantity and provenance of the material differs enormously between periods. The vast majority of the flintwork, nearly 53,000 flints, was recovered from the Eton Rowing Course, with approximately half of this total recovered from the early Neolithic landsurface and associated middens and tree-throw holes in Area 6. A further *c* 3,500 flints were recovered from the similar midden deposit in Area 10 and *c* 10,000 early and later Neolithic flints were recovered from *in situ* scatters on the floodplain of a former channel of the river Thames (Areas Ex1-3).

Table App 2.1 Flint categories

1.	Flake
2.	Blade
3.	Bladelet
4.	Blade-like
5.	Irregular waste
6.	Chip (flake <10 mm²)
7.	Micro burin
8.	Burin spall
9.	Rejuvenation flake core face/edge
10.	Rejuvenation flake tablet
11.	Rejuvenation flake other
12.	Levallois flake
13.	Janus flake
14.	Thinning flake
15.	Flake from ground implement
16.	Core single platform blade core
17.	Bipolar (opposed platform) blade core
18.	Other blade core
19.	Tested nodule/bashed lump
20.	Single platform flake core
21.	Multiplatform flake core
22.	Keeled non-discoidal flake core
23.	Levallois/other discoidal flake core
24.	Unclassifiable/fragmentary core
25.	Microlith
26.	Petit tranchet arrowhead
27.	Leaf arrowhead
28.	Chisel arrowhead
29.	Oblique arrowhead
30.	Barbed and tanged arrowhead
31.	Triangular arrowhead
32.	Hollow-based arrowhead
33.	Laurel leaf
34.	Unfinished arrowhead/blank
35.	Fragmentary/unclass/other arrowhead
36.	End scraper

Table App 2.1 (continued)

37.	Side scraper
38.	End and side scraper
39.	Disc scraper
40.	Thumbnail scraper
41.	Scraper on a non-flake blank
42.	Other scraper
43.	Awl
44.	Piercer
45.	Spurred piece
46.	Other borer
47.	Serrated flake
48.	Saw
49.	Denticulate
50.	Notch
51.	Backed knife
52.	Edge ground Knife
53.	Discoidal knife
54.	Scale flaked knife
55.	Plano-convex knife
56.	Other knife
57.	Retouched flake
58.	Single-piece sickle
59.	Fabricator
60.	Axe
61.	Other heavy implement
62.	Miscellaneous retouch
63.	Other (catchall for other artefact categories)
64.	Burnt unworked
65.	Hammerstone
66.	Natural (not retained)
67.	Core on a flake
68.	Gun flint
69.	Axe sharpening flake
70.	Sieved chips 10-4 mm
71.	Sieved chips 4-2 mm
72.	Sieved chips <1 mm

Table App 2.2 The flint assemblage from Eton Rowing Course by Area

CATEGORY TYPE	*Area* EX1	EX2	EX3	A1	A3	A4	A5	A6	A10	A11
Flake	4696	1004	994	16	1554	46	272	13574	3069	502
Blade	293	25	76	2	72	3	20	2038	155	15
Bladelet	43	1	73		8		4	413	22	5
Blade-like	307	98	113	1	111	1	66	1548	393	24
Irregular waste	172	70	63		63	1	13	395	113	11
Chip	115	44	329		35		71	1303	101	27
Sieved Chips 10-4 mm	1397	6	7		10		3	947	108	
Sieved Chips 4-2 mm								785	692	
Sieved Chips <2 mm								80		
Micro burin	1									
Burin spall	1							1		
Rejuvenation flake core face/edge	22	4	3		7		2	130	8	1
Rejuvenation flake tablet	11	3	2		2		1	93	16	
Rejuvenation flake other	67	2			4	1	3	9	5	
Levallois flake	2							1	2	
Janus flake (= thinning)	1	1			1			5		
Thinning flake	5	2					1	15	5	
Flake from ground implement	10							20	3	
Core single platform blade core	8	6		1	2		1	30	11	
Bipolar (opposed platform) blade core					1			8	3	
Other blade core	1	2			6		3	22	2	
Tested nodule/bashed lump	82	34	23		34	6	5	361	39	25
Single platform flake core	53	22	20		20	3	2	136	39	9
Multiplatform flake core	40	21	17	1	15		3	327	38	17
Keeled non-discoidal flake core	2	1			3			4	8	
Levallois/other discoidal flake core	8	2			2			7	6	1
Core on a flake	6		5	1	2			56	8	4
Unclassifiable/fragmentary core	64	12	10		24	2	6	160	24	2
Microlith	13		12		3		2	19	4	
Leaf arrowhead	1				1			12	4	
Petit tranchet arrowhead										
Chisel arrowhead	2							3	2	
Oblique arrowhead										
Barbed and tanged arrowhead	6	1	1		1	1		2	1	1
Laurel leaf	1						1	1		
Unfinished arrowhead/blank	37							23	3	
Fragmentary/unclass/other arrowhead		1						6	2	1
End scraper	23	8	4		1	3	1	65	50	
Side scraper	4	1	1		1		1	34	5	2
End and side scraper	3	1			2	1		34	8	1
Disc scraper									1	
Thumbnail scraper	1									
Scraper on a non-flake blank					1			5	2	
Other scraper	9		2		1		1	24	2	2
Awl	3				2			8	8	3
Piercer	8	1			7			24	8	3
Spurred piece	2	1			5		1	5	1	
Other borer								1		
Serrated flake	13	3			3			52	22	1
Saw								1	1	
Denticulate	4	1			1			3	4	
Notch	4	5	2		7		3	39	7	4
Backed knife	2	2			1			4		
Discoidal knife								1		
Other knife								3		1
Retouched flake	26	13	19	1	13		5	620	80	8

Appendix 2

A15	*A16*	*A18*	*A22*	*A20 and A24*	*Bridges*	*EV94*	*EV95*	*NAR*	*RC1*	*RC2*	*TP96*	*WB*	*Grand total*
226	1370	9	1	710	9	603	972	14	66	10	947		30664
7	178			64	2	168	50	2	5	3	20		3198
1	19			5		7	4				4		609
21	172	3		41	1	167	59	1	5	1	70	1	3204
13	26			73		29	27	2	5		1		1077
6	24			24		30	35		9		13		2166
16	314			180			8						2996
	162												1639
													80
				1									2
													2
	9			1		1					1		189
	7			4		10							149
						5	1				2		99
													5
													8
	2	1				11						1	43
	2												35
	8			3		13	4			1			88
	2					9							23
	2			2		4							44
3	42			59	1	17	41		1		9		782
6	14			10	1	14	13				4		366
3	28		1	35	2	4	26			1	5		584
				1			6						25
	3						7						36
	16			3		2					2		105
5	12			7		5	27				6		366
	3					8	2				2		68
	1												19
				1									1
	2			1									10
	1												1
1											1		16
													3
	2												65
													10
3	12			7		14	10				4		205
	6			2		1					1		59
1	6			3			3		1	1	3		68
	1			1									3
				1									2
1													9
	1			4			4				1		51
1							1				2		28
1	3			2		2					1		60
1	1			1									18
	1												2
3	9			5		1	5		1		1		119
													2
	1			1									15
1	16			2	1	4	2	1			1		99
				1			4		1				15
													1
				2									6
7	71	2		16		14	27		1	1	22		946

Table App 2.2 (continued)

CATEGORY TYPE	Area EX1	EX2	EX3	A1	A3	A4	A5	A6	A10	A11
Single-piece sickle								3		
Fabricator								3		
Axe	2							3	2	
Other heavy implement	1	2						4	1	
Misc retouch	2						1	34	2	1
Other					1			4	1	
Hammerstone	3				2	1		32	7	
Axe sharpening flake										
Unrecorded (mainly flake/core material)								2278		
Grand total	7577	1400	1776	23	2029	69	492	25818	5098	671
Burnt unworked flint (g)	73177	24942	15872		83822	540	69002	46629	256389	54711
Burnt no. (%)	732	26	151	1	84	1	43	967	137	9
	(13.7)	(2.3)	(12)		(4.8)		(11.9)	(4.7*)	(3.8)	(1.6)
Broken no. (%)	2375	413	340	2	531	8	147	7307	1464	86
	(44.5)	(36.6)	(27.1)		(30.4)		(40.6)	(35.8*)	(40.2)	(15.8)
Retouched no. (%)	167	40	41	1	50	5	16	1036	220	28
	(3.1)	(3.5)	(3.3)		(2.9)		(4.4)	(5.1*)	(6)	(5.1)

Percentages are calculated excluding chips. * Percentage excludes biased sample of unstratified material from which only the retouched element was recorded.

The flintwork recovered from the Maidenhead to Windsor flood alleviation scheme was generally recovered from negative archaeological features, such as pits and tree-throw holes, but was also found in general finds spreads, and *c* 900 flints were recovered from the early Neolithic 'midden-like' deposit at Lake End Road West. This Appendix provides an overview of the flint assemblages recovered from the two schemes, discusses their local and regional context, and outlines the methodology used in their analysis.

Methodology for the analysis and recording of struck flint

The lithic assemblage was quantified and characterised typologically. A total of 72 artefact categories were used in the typology (Table App 2.1). During the initial analysis, additional information on condition (rolled, abraded, fresh and degree of cortication), and the state of the artefact (burnt, broken, or visibly utilised) was recorded. Comments on the source of the raw material and dating were also made. Cores and hammerstones are the only artefacts that were weighed. Cores were classified by number of platforms and type of removal. Chips from sieving were recorded under separate categories from those recovered during hand excavation. This ensures the sieved samples do not bias the distribution of chips in the assemblage purely on the basis of the sampling strategy. It is, however, only possible to analyse chips and their distribution where sieving has occurred due to the limited number recovered by hand excavation. Retouched pieces were classified according to standard morphological descriptions (eg Bamford 1985, 72-7; Healy 1988, 48-9; Bradley 1999, 211-277).

Metrical and technological attribute analysis

Metrical and technological attribute analysis was undertaken on samples of complete unretouched flakes and a limited number of artefact types. Where metrical analysis was undertaken, standard methods of recording length, breadth and thickness were used (Saville 1980). Technological attributes recorded include butt type, extent of dorsal cortex, termination type, flake type, hammer mode (Ohnuma and Bergman 1982), platform abrasion and the presence of dorsal blade scars.

Butt type (Tixier et al. *1980, fig. 47; Bradley 1999, 212)*

1 Cortical – completely covered by cortex
2 Plain – formed by one removal
3 With more than one removal – more than one truncated flake scar on striking platform.
4 Faceted – a series of negative bulbs along the dorsal edge, forming part of flake scars truncated at the ventral edge by detachment of the flake
5 Linear – long slender butt
6 Punctiform – negligible butt
7 Other – any other butt type

A15	*A16*	*A18*	*A22*	*A20 and A24*	*Bridges*	*EV94*	*EV95*	*NAR*	*RC1*	*RC2*	*TP96*	*WB*	*Grand total*
													3
1						1	1						6
	2			2		2					1		14
							1				1		10
	1										1		42
	1			1		6							14
	2			4									51
						4							4
													2278
328	2555	15	2	1280	17	1156	1340	20	95	18	1126	2	52907
54312	193550			46553			43211	545	180		56924		1020359
7	99	1		85	2	64	37	1	4		30		2481
(2.7)	(5.7)			(10.4)		(6.8)	(3.4)		(5.3)		(2.9)		(6.6)
87	514	2		202	3	459	299	2	18	4	479		14742
(34.1)	(29.6)			(24.6)		(48.6)	(27.6)		(23.7)		(46)		(39.1)
21	140	2		52	1	47	60	1	4	2	42		1976
(8.2)	(8.1)			(6.3)		(5)	(5.5)		(5.3)		(4)		(5.2)

Flake type (Harding 1990)

A brief description is given below of the flake types. The 'blanks' category is the only one to have been adapted from the original classification. In the following report the blanks category is used as an 'other' category for non-cortical flakes. No assumptions are made as to further modifications that it may have been possible to undertake on a flake, and utilisation (modified or unmodified) has been determined solely by use-wear.

1 Preparation flake – dorsal surface is covered by in excess of 75% cortex.
2 Side trimming flake – cortex remaining on one side of the flake.
3 Distal trimming flake – cortex present on the distal end of the flake.
4 Miscellaneous trimming flake – some cortex remaining but in none of the above positions.
5 'Blanks' – All remaining non-cortical flakes.
6 Rejuvenations – core, face/edge, tablets, crests.
7 Thinning flakes.

Dating of assemblages

The lithic assemblages were dated using a combination of diagnostic tool types and technological attributes, assisted by stratigraphic relationships where present, and by dating of associated artefact groups or by radiocarbon dating. In the absence of independent dating, the dating of lithic assemblages by technological attributes is only possible in broad terms (ie late Upper Palaeolithic/early Mesolithic, later Mesolithic/early Neolithic, later Neolithic/Bronze Age). Given large enough assemblages it is sometimes possible to differentiate the early from the later Bronze Age.

In the absence of clear indications, assemblages of a Bronze Age character on the Eton Rowing Course have been attributed to the early Bronze Age rather than to the later Bronze Age, and have been described and discussed in this volume (rather than Volume 2). Since relatively little of the flintwork from the Eton Rowing Course was of later Bronze Age date, residual flintwork (in other words flintwork found either unstratified or in Iron Age or later features) is also discussed with the Mesolithic, Neolithic and early Bronze Age material in this volume. Where later Bronze Age flintwork includes residual earlier diagnostic types, these are included in Volume 2.

Refitting exercises

The contexts targeted for refitting were generally identified during first stage analysis as a result of either refits being found (which was relatively uncommon as finds were individually bagged), or through the identification of similar raw materials. Distinct clusters and scatters of flintwork were identified in Gsys and were on occasions targeted for refitting with no prior evidence from the first stage analysis. The contexts targeted may, therefore, be considered those that had a good potential for refits. This of particular interest in light of the variable success of the exercise.

The size and nature of the assemblages often hampered the refitting exercises. Many of the

Table App 2.3 The flint assemblage from the Maidenhead to Windsor Flood Alleviation Scheme by site

CATEGORY TYPE	*Area ALE97*	*CWC99*	*DLH96*	*DLOTH99*	*DOLER96*	*ENVAWB'99*	*ETAGP99*
Flake	12	25	416	16	161	70	69
Blade		1	6	2	4	13	3
Bladelet			1				
Blade-like	1	3	27		5	3	1
Irregular waste	2	3	7	1	5	2	15
Chip			15		10		
Sieved chips10-4 mm							11
Sieved chips 4-2 mm							4
Rejuvenation flake core face/edge							2
Rejuvenation flake tablet						1	1
Rejuvenation flake other						1	
Levallois flake			1				
Thinning flake							
Flake from ground implement							
Core single platform blade core						2	
Bipolar (opposed platform) blade core							
Other blade core						1	
Tested nodule/bashed lump		1	7	4	5		8
Single platform flake core		1	1				1
Multiplatform flake core		2	6	1		1	3
Keeled non-discoidal flake core							
Levallois/ other discoidal flake core							
Core on a flake		1	1	1	1		1
Unclassifiable/fragmentary core			5	1	5	2	1
Microlith							
Leaf arrowhead							
Chisel arrowhead							
Barbed and tanged arrowhead							
Laurel leaf							
Unfinished arrowhead/blank						1	
Fragmentary/unclass/other arrowhead							
End scraper			2		3		
Side scraper							
End and side scraper			3				
Disc scraper							
Scraper on a non-flake blank							
Other scraper			1		1		
Awl			1				
Piercer		1					
Spurred piece							
Serrated flake		2	1		2		
Denticulate			1				1
Notch		1	2		1		1
Backed knife							
Other knife			1				
Retouched flake	1		22	1	8	1	2
Fabricator			1				
Axe							
Misc retouch							
Other			1				
Hammerstone		1					
Grand total	16	42	529	27	211	98	124
Burnt unworked flint (g)	13	29	450	18	170	86	73
Burnt no. (%)		2	35 (7.8)	2	14 (8.2)	2 (2.3)	3 (4.1)
Broken no. (%)	2	5	127 (28.2)	3	55(32.4)	13 (15.1)	26 (35.6)
Retouched no. (%)	1	4	36 (8)	1	15(8.8)	2 (2.3)	4 (5.5)

Percentages are calculated excluding chips

ALE97: Amerden Lane East; CWC99: Widbrook Common; DLH96: Lot's Hole; DLOTH99: Lot's Hole Gravel Storage Area; DOLER96: Lake End Road East; ENVAWB99: Watching briefs; ETAG99: Agar's Plough; LERW97: Lake End Road West; MWEFAS A3: Evaluation; RMD96: Roundmoor Ditch;

LERW97	*MWEFAS A3*	*RMD96*	*TAD96*	*TALN96*	*TAMIL96*	*TAMLE96*	*TAPMI96*	*TMOD97*	*Grand Total*
1201	12	222	291	93	1044	334	141	408	4515
62	6	12	11	1	71	4	5	31	232
10			4		2	4	1		22
160		26	37	8	139	18	19	88	535
45		3	10	8	32	9	3	12	157
136		7	10	9	89	66	21	64	427
							9		20
									4
5		1	2		4	3		2	19
7		1	2		4	1	1	2	20
1		1	1	2	3	1		4	14
									1
		2				1		1	4
3									3
2		4			4			1	13
		1							1
					1				2
32		3	4	3	5	14	2	13	101
18			4	1	3	8		1	38
19		5	4	2	19	8		2	72
						1	1		2
3									3
5					1				11
10		6	8	3	15	7		5	68
			1		4			1	6
1		1						1	3
							4	1	5
	1	1							2
								1	1
									1
1									1
17	1	3	8	2	1	5		4	46
1		4	1			3		2	11
11		1	2					1	18
		1							1
						1			1
4		3				6		1	16
1			1		1			1	5
									1
						1			1
22		9	6		3		1	9	55
				2		3			7
6		1	2		2	1	1	1	19
1			1						2
		1							2
51		5	6	3	10	9	2	19	140
									1
3									3
1								1	2
						2			3
3						2		1	7
1842	20	324	416	137	1457	512	211	678	6644
1433	18	260	343	102	1256	360	166	527	5304
69 (4.8)	1 (5.6)	7 (2.7)	16 (4.7)	2 (2)	626 (49.8)	21 (5.8)	5(3)	58(11)	863 (16.3)
494 (34.5)	3 (16.7)	82 (31.5)	113 (32.9)	24 (23.5)	488 (38.9)	99 (27.5)	43(25.9)	225(42.7)	1802(34)
120 (8.4)	2 (11.1)	30 (11.5)	28 (8.2)	7 (6.9)	21 (1.7)	31 (8.6)	8(4.8)	43 (8.2)	353(6.7)

TAD96: Amerden Lane West; TALN96: Marsh Lane East Site 2; TAMIL96: Taplow Mill Site 1; TAMLE96: Marsh Lane East Site 1; TAPMI96: Taplow Mill Site 2; TMOD97: split between Marsh Lane East Sites 1 and 2, and Marsh Lane West

assemblages analysed came from extensive midden deposits rather than small *in situ* knapping scatters. The sheer size of some of the contexts meant that only a sample could be examined – immediately limiting chances of success. It is therefore likely that the number of refits is under-represented in the middens compared to the knapping scatters.

Analysis was also undertaken where there was a likelihood of cross-context refits, such as with individually contexted spits or closely related scatters. The numbers of cross context refits are likely to be under-represented as it was not possible to lay larger contexts alongside each other.

Low-power use-wear analysis

The methodology for low-power use-wear analysis draws on experimental work on the use of flint published by Tringham *et al.* (1974), Cotterell and Kamminga (1979), Mallouf (1982) and Akoshima (1987), and personal communications with Dr Andrew Brown on the identification of use-wear. The assessment was carried out using a binocular microscope at 10x magnification for the identification of use-damage patterns, and 20x magnification for the categorisation of the hardness of contact materials.

The data produced was integrated into the data set. This allowed the use-wear data to be examined visually in Gsys, allowing the possibility of the identification of distinct spatial patterning. The data was also subjected to a number of queries in order to establish if there was any pattern to the use or deposition of the flint, such as might be reflected in the presence of straight edges, retouch, artefact type and various technological traits.

Mesolithic to early Bronze Age struck flint: an overview

Raw materials

A variety of raw materials were identified in the struck flint assemblage. These include the local gravel flint, chalk flint, Bullhead Bed flint and a couple of pieces of chert. Flint from the local river gravels was by far the most commonly worked raw material in all periods. Where quantified in the early Neolithic deposits on Eton Rowing Course, Area 6, river gravel flint accounted for over 99% of the raw material. The local gravels are relatively poorly sorted (Holroyd 1995), but whilst on occasion large nodules may be found, the majority of the nodules are fist-sized or smaller. In addition, many of the nodules are thermally damaged and many faults are encountered when knapping. The size and quality of the material makes it suitable for the production of flakes and flake-based tools, but is far less suitable for the production of larger core tools, a point I shall consider in relation to the exploitation of other raw materials below. The use of the local gravels as the primary raw material directly influenced the products of the local industries. For example, the average early Neolithic blade was relatively short, measuring only 60mm in length, and the typical core to flake ratio of 1:16 is rather low. Furthermore, as a readily available resource, production was prolific, as is readily demonstrated by the substantial size of the assemblages and the limited effort that was taken to conserve resources, as is indicated by the large size of many abandoned cores and the comparatively limited use evidenced on the tools and flakes. This pattern contrasts with lithic assemblages from areas without readily available lithic resource (for example sites in the Upper Thames Valley, such as Yarnton (Bradley and Cramp in prep.) and Horcott Pit (Lamdin-Whymark *et al.* 2009)), which produced much smaller assemblages, often with higher proportions of retouch. At Yarnton in particular, many of the cores were worked down to extremely small sizes, and even flake tools such as scrapers were re-used as cores (K Cramp pers. comm.).

The majority of the flints originating directly from the Chalk were polished flint axes; these were usually manufactured of white/grey cherty flint, although a couple of flakes from grey/black axes were also found. The origin of the flint is unclear, but the white/grey flint is reminiscent of products from the South Downs, although it is possible that the closest mine is located at High Wycombe only 14km away (Barber 1999). In all cases these axes were broken, and most were reworked as cores. In addition, a small number of flints possibly collected directly from the Chalk were identified by a thick unabraded cortex with fresh black or grey flint within.

Flint from the Bullhead Bed at the base of the Reading Beds was available within a few kilometres of most of the sites, but it has not been possible to identify easily exploitable outcrops, although they should exist at Windsor (Sumbler 1996, 93: figs 26 and 97. The majority of the Bullhead Bed flint was recovered from Neolithic contexts, with few pieces identified in Bronze Age assemblages and none from Mesolithic contexts. Furthermore, it is noteworthy that an early Neolithic pick from Area 6 was manufactured from Bullhead Bed flint, perhaps reflecting the exploitation of the source for large higher quality nodules.

The two pieces of black chert are similar to chert from Portland (M Tingle pers. comm.) One flake was recovered from an early Neolithic context in Area 6, whilst the other piece, a large early Neolithic arrowhead, was found on the floodplain of Area Ex1. The recovery of only two pieces, one as a finished artefact, indicates that these items probably reached the site in a finished state and should be considered imports rather than raw materials. A fragmentary knife of black chert, possibly from Portland, was recorded at Staines causewayed enclosure (Healey and Robertson-Mackay in Roberston-Mackay 1987, 3). The leaf arrowhead and context of all three items suggest that exchange of this black chert was occurring in the early Neolithic.

Mesolithic

Flintwork and assemblages dating from both the early and late Mesolithic were recovered across both schemes. The vast majority of the Mesolithic flints recovered were stray, residual finds. Stray finds were recovered from most of the Eton Rowing Course excavations and a few of the Jubilee River sites, particularly those close to the Thames, such as Taplow Mill Site 2.

A substantial early Mesolithic site, situated on the edge of a palaeochannel, was identified during the evaluation of the Eton Rowing Course, but was not subsequently excavated as the area was deliberately preserved *in situ*. Three 30m by 2m evaluation trenches were excavated across the Mesolithic site recovering a total of 1040 flints. The flintwork was in pristine condition indicating that the assemblage was recovered from *in situ* deposits. The microliths were dominated by simple obliquely blunted forms, with one possible rhombic form. Other retouched forms included burins, scrapers, simple edge-retouched flakes and two tranchet-axe fragments, with one possible serrated flake and one fabricator. The presence of a number of thinning flakes and axe sharpening flakes indicated the production of axes on-site. The microliths were all of earlier Mesolithic date and a radiocarbon sample on an associated piece of animal bone provided a date of 9150-8730 cal BC (OxA-14088: 9540±45 BP). The number of flints recovered from the limited evaluation of this area indicates the presence of a substantial early Mesolithic site. A further small scatter of early Mesolithic flintwork was recovered from the surface of a palaeochannel on Area 20, to the east, and finds of Mesolithic flintwork have also been made on the other side of the river to the south-east (Wymer 1977).

Few significant later Mesolithic assemblages were recovered, although a substantial number of microliths were recovered during excavations on the floodplain (Areas Ex1-3), indicating the exploitation of resources in this landscape zone. In the adjacent area of gravel terrace (Area Ex1) small assemblages of flintwork were recovered from a few tree-throw holes. Tree-throw hole 566 was particularly notable as it produced a debris from the production of rod microliths. The recovery of groups of Mesolithic flintwork deposited in tree-throw holes is particularly significant as it indicates that the early Neolithic phenomenon of deposition in tree-throw holes may have had its origins in the Mesolithic, perhaps indicating a shift in the Mesolithic economy towards the exploitation of resources associated with small clearances created by tree-fall.

A small number of *in situ* scatters by the former Thames channel in Area 5, and tree-throw hole 40212 at Lake End Road West, have been broadly dated to the late Mesolithic/early Neolithic due to a lack of diagnostic artefacts and the presence of only the broad technological traits of a blade-based industry. These scatters clearly demonstrate the similarity of blade production in the late Mesolithic and early Neolithic, and highlight the difficulty in dating and distinguishing assemblages of this period when diagnostic artefacts are not present.

Neolithic

The flint assemblages from both the Eton Rowing Course and the Jubilee River are dominated by Neolithic flintwork. Flintwork of early, middle and late Neolithic date was recovered and will be discussed chronologically below.

Early Neolithic

The early Neolithic flint assemblage accounted for around two thirds of the total flint assemblage. The flint was recovered from a variety of contexts including *in situ* knapping scatters, middens, tree-throw holes and pits. The variety of depositional contexts and scale of assemblages spread over a reasonably extensive area, allows for assemblage variability to be considered, with possible implications for the interpretation of the scale, duration and function of events at various locations.

The gravels islands on the Eton Rowing Course were situated between two branches of the river Thames, one of which is now fully silted. These gravel islands represented a focus for Neolithic activity, particularly Areas 6 and 10. The flint assemblage recovered from Area 6 was in the region of 25,000 flints, the majority dating to the early Neolithic. The assemblage was recovered primarily from a preserved landsurface, surface middens and tree-throw holes. The assemblages from these three main contexts were remarkably similar in their characteristics. The retouched component formed between 4 % and 4.6 % of the assemblages (although more variation was present in individual contexts). In general, a broad range of tool types were represented, with tools such as simple edge retouched flakes, serrated flakes and scrapers clearly dominating the assemblage. Evidence of production was also noted in the form of numerous cores, chips and pieces of irregular waste. Products appear to have included arrowheads (as demonstrated by a number of misshapes and roughouts) and scrapers (with the identification of refits); little evidence was noted for the production of core tools. The assemblages were clearly not *in situ* knapping scatters as very few refits were located and use-wear analysis demonstrated high levels of use ranging between 48% and 64% of the assemblages analysed. Some subtle variations in the assemblages suggest a movement of material from the landsurface into the middens, with material ultimately deposited within the tree-throw holes. The core to flake ratio is very low on the landsurface (1:17.2), but successively higher in the midden deposits (1:21.4) and the tree-throw holes (1:28.4), indicating a movement of usable (or used) flakes from production areas into temporary midden deposits, which are presumably subject to reworking, prior to final deposition in the

tree-throw holes. Likewise the proportion of burnt worked flints increases from 4.1% on the landsurface to 5.1% in the middens and 5.5% in the tree-throw holes, perhaps indicating the increased exposure of the assemblages to fire, presumably as a cumulative increase over a number of events. Levels of breakage also marginally increase from the landsurface to the tree-throw holes. Conversely, the proportion of retouched artefacts falls from 4.6% of the assemblage on the landsurface to 4% in the tree-throw holes. This observation may indicate that the movement of tools from the landsurface, to the midden and into tree-throw holes is selective. It is noteworthy that scrapers form a larger proportion of the retouched assemblage on the landsurface, whilst simple edge retouched flakes are more frequent in tree-throw holes.

The substantial size and reworked character of the deposits in Area 6 indicate that they accumulated over an extensive period of time, a point supported by the broad range of early Neolithic radiocarbon dates and associated pottery. Due to the reworking and mixing of the flint assemblages, the flintwork can add little to any discussion of the duration of settlement, as individual episodes cannot be observed. However, the overall assemblage, due to either the extended duration of settlement or number of repeated visits, can be taken to represent a broad range of tasks performed within the realm of an early Neolithic domestic site. As such, this assemblage may be considered as a baseline for comparison with other early Neolithic assemblages.

A similar early Neolithic midden from which *c* 3500 flints were excavated lay in a hollow in Area 10, and *c* 900 flints were found in similar deposits in a palaeochannel at Lake End Road West. These deposits are perhaps best paralleled with midden deposits located beneath the long barrows at Hazleton North (Saville 1990) and Ascott-under-Wychwood (Benson and Clegg 1978; Benson and Whittle 2007), although the scale of the Area 6 assemblage is more comparable to flintwork from Staines causewayed enclosure (Robertson-Mackay 1987), Abingdon causewayed enclosure (Avery 1982) or the pits at Hurst Fen (Clark *et al.* 1960). A comparison of selected assemblages from the project and other sites is presented in Tables App 2.4-5.

The proportions of tools in the deposits on Area 6, Area 10 and at Lake End Road West differ only slightly, but the midden in Area 10 contains a higher

Table App 2.4 The composition of selected flint assemblages from the schemes and local comparisons

Site/feature	*Date*	*Total no. flints*	*Tools (% excluding chips)*	*No. flakes per core*	*Burnt (%)*	*Broken (%)*	*Burnt unworked (g)*
DBC Eval Tr 166, 173 & 180	EM	1111	53 (4.8)	13.9	64 (5.8)	454 (41.4)	1000
DBC A10 Midden (hollow)	EN	3568	122 (4.6)	22.7	69 (2.6)	957 (35.4)	61,528
DBC A6 Landsurface 11201	EN	6280	258 (4.6)	17.2	228 (4.1)	2034 (36.6)	7951
DBC A6 Middens	EN	4596	160 (4.1)	21.4	199 (5.1)	1469 (37.8)	1425
DBC A6 Tree-throw holes (with 'middens')	EN	5021	164 (4.0)	26.9	229 (5.5)	1605 (38.8)	1235
LERW Finds scatter 2	EN	804	24 (3.3)	22.3	23 (3.2)	2.9 (35.4)	1126
DBC EX3 Scatter 10010	EN	1364	28 (2.5)	19.7	141 (12.6)	270 (24.1)	5481
DBC EX1 Scatter 678	EN	2341	24 (1.8)	72.2	146 (10.9)	659 (49.4)	109
DBC EX1 Scatter 720	EN	733	22 (3)	18.1	128 (17.5)	328 (44.9)	216
DBC EX1 Spreads 677, 722 and 724	EN	616	15 (2.7)	43.5	107 (17.8)	300 (50)	125
LERW Peterborough Ware Pit Groups 1 and 2	MN	222	16 (8.3)	20	24 (12.5)	60 (31.3)	800
DBC A24 and A16 Grooved Ware Pits	LN	751	32 (8.1)	22.5	81 (20.5)	110 (27.8)	4129
DBC EX1 LN/EBA 'activity area' scatters	LN/EBA	622	7 (1.2)	21	4 (0.7)	196 (34.2)	35
DBC EX1 Finds Scatter 131	LN/EBA	825	40 (4.9)	10.8	30 (l3.7)	197 (24.1)	2735
TAMIL LN/EBA features	LN/EBA	598	7 (1.4)	25.8	78 (15.5)	170 (33.7)	1460
TAMIL LN/EBA layers 100003/4	LN/EBA	391	2 (0.6)	63.4	66 (19.5)	151 (44.5)	825
DBC A6 Ring ditches and segmented ditch	M/LBA	648	54 (8.3)	7.2	13 (2)	137 (21.5)	1467
South Stoke Pit Group (Cramp forthcoming)	EN	697	54 (8)	26.9	96 (14.2)	181 (26.8)	987
Staines Causewayed enclosure (ditches) (Healey *et al* 1983)	EN	7764	535 (6.8)	8	*	*	*
Abingdon Causewayed Enclosure (Avery 1982)	EN	5142	536 (10.4)	34	*	*	*
Whiteleaf Barrow (Childe 1954)	MN	582	43 (7.4)	218	*	*	*
Hazelton North Midden (Saville 1990)	EN	1981	31 (3.3**)	159**	*	*	280

* Present but not quantified. ** Percentage and core to flake proportion have been calculated on an extrapolated total of 951 flakes above 10 mm^2. This is based on the metrical analysis demonstrating 44% of the assemblage was chips below 10 mm^2.

Percentages are calculated from the total assemblage excluding chip. The number of flakes per core is calculated by total number of flakes, blades, bladelets and bladelike flakes vs. all core types and tested nodules.

DBC: Eton Rowing Course; LERW: Lake End Road West; TAMIL: Taplow Mill Site 1

proportion of scrapers, whilst the Lake End Road West assemblage contains a high proportion of serrated flakes (accounting for 42% of the retouched tools). The pattern is, however, far more significant when compared to other flint assemblages on the scheme and to assemblages further afield. The proportion of serrated flakes in the midden deposits is particularly low (with the exception of the Lake End Road West assemblage), particularly in comparison with the assemblages from the Staines and Abingdon causewayed enclosures and the pit groups at South Stoke and Lake End Road West (Table App 2.5). It is, however, noteworthy that serrated flakes are entirely absent from earlier Neolithic scatters in Areas Ex1-3, but occur in reasonable proportions in the late Neolithic/early Bronze scatter 131 in the same area. It therefore appears that serrated flakes were not used for any of the tasks performed in Areas Ex1-3 in the early Neolithic and were not commonly used for tasks in the larger domestic sites in the area, but do form a significant proportion of the tools used and deposited at causewayed enclosures and in formal pit deposits.

The proportion of simple edge retouched flakes found at these locations is, however, reversed. It is possible that some of the simple edge retouched flakes are worn serrated flakes, in which case it may be that the proportions of these serrated tools occur in similar proportions in the middens, pit deposits and causewayed enclosure assemblages, but those in the midden have been used for longer, and the teeth have been worn down.

Another distinct pattern is marked by the elevated proportions of scrapers in Peterborough Ware- and particularly Grooved Ware-associated pits, especially if one considers the occurrence of these tools per 1000 flints (Table App 2.5). It is perhaps noteworthy that among earlier Neolithic assemblages the higher proportions of scrapers are present at causewayed enclosures.

Arrowheads formed a similar proportion of the retouched assemblage in the middens and at Staines causewayed enclosure, but represent a lower proportion of the total assemblage from the midden. The assemblage at Abingdon causewayed enclosure contained a significantly higher proportion of arrowheads. The production of arrowheads was clearly a significant task in some of the early Neolithic scatters of the floodplain, but judging from the proportion of misshapen and unfinished arrowheads in Areas 6 and 10, arrowheads were also produced in significant numbers at these locations.

In addition to the five tree-throw holes containing flintwork in Area 6, a further 25 were dated to the earlier Neolithic elsewhere on the two schemes, and six pits were also recorded. The majority of these tree-throw holes and pits were isolated examples, and contained between a few and four hundred flints, notably smaller assemblages than were recorded in the tree-throw holes in Area 6. The distribution of these features was relatively dispersed with examples spread across the Rowing Course and Flood Alleviation Scheme. At Marsh Lane West tree-throw hole 61010 produced a small but noteworthy assemblage of 50 flints which include two complete arrowheads, one leaf-shaped and the other a chisel form. In addition, intentionally broken flints probably resulting from the manufacture of chisel arrowheads were also recovered. Excavations at Cippenham, to the north-east of the schemes (Ford *et al.* 2003), identified a similar pattern of isolated early Neolithic deposits in tree-throw holes and pits.

In Areas Ex1-3, 15 earlier Neolithic scatters were recorded in alluvium on the floodplain of a former channel of the river Thames. These scatters were all *in situ*, having been rapidly sealed by the alluvium. The scatters included five small clusters of between 9 and 29 flints that did not contain refits and appeared to be composed of utilised flakes and tools, presumably abandoned at or close to their location of use. A further three small scatters of 34-198 flints appeared to represent brief knapping episodes with no evidence of use, while the remaining seven scatters contained evidence of knapping and the use of tools, and as such may be considered activity areas. Two of these areas were relatively small containing 48 and 65 flints, but the other scatters were significantly larger, each containing between 495 and 2342 flints. Two of the main scatters, 678 and 720, were located close together in a more general spread of flintwork. The scatters contained a large quantity of knapping debris, including 36 fragments of misshapen leaf arrowheads. The scatters, are however, not *in situ* knapping scatters as the debris appears to have been scooped together into two piles (678 and 720) and a number of utilised tools, such as scrapers, (some also produced on site), indicate that various other tasks were also performed. The scatters also contained several hearths, one of which was positioned over part of the flint scatter; a similar substantial scatter (10010), also contained evidence of at least one hearth.

The duration of the activity associated with the substantial scatters was probably relatively short, measured in days or weeks. A considerable amount of flint knapping was undertaken to produce arrowheads and other tools such as scrapers, many of which were used and abandoned on the site. The proportion of retouch, at between 1% and 3% of the assemblages, is therefore relatively low. Likewise, low power use-wear analysis indicated that around 20% of the flints were utilised. The characteristics of these sites are therefore distinctly different to the midden deposits, not only in scale, but in the intensity of use and reuse, the midden deposits containing roughly three times the proportion of retouched artefacts and utilised flakes.

This observation is significant not only in relation to the substantial midden deposits, but also has implications for the character and duration of

Table App 2.5 Composition of retouched assemblage component from selected contexts on the scheme and comparative sites

Site/feature	Date	Total number of retouched tools	Edge retouch	Serrated flakes	Scrapers	Knives	Piercers	Laurel leaf
DBC Eval Tr 166, 173 & 180	EM	53	14	1	14		2	
DBC A10 Midden (hollow)	EN	122	47	11	36		7	
DBC A6 Landsurface 11201	EN	258	143	9	47	1	13	
DBC A6 Middens	EN	160	96	12	22	1	9	1
DBC A6 Tree-throw holes (with 'middens')	EN	164	111	8	22		5	
LERW early Neolithic hollow	EN	24	8	10	5			
Hazelton North Midden (Saville 1990)	EN	31	11		2		1	
Staines Causewayed enclosure (ditches) (Healey et al 1983)	EN	535	*	195	153	42	32	29
Abingdon Causewayed Enclosure (Avery 1982)	EN	536	326	272	166	12	5	5
South Stoke Pit Group (Cramp forthcoming)	EN	54	24	22	3		2	
DBC EX3 Scatter 10010	EN	28	13		2			
DBC EX1 Scatter 678	EN	24	2		4			
DBC EX1 Scatter 720	EN	22	3		6		1	
DBC EX1 Spreads 677, 722 and 724	EN	15	3		4		1	
Whiteleaf Barrow (Childe 1954)	MN	43	2	32	3		1	
LERW Peterborough Ware Pit Groups 1 and 2	MN	16	1	6	5			
DBC A24 and A16 Grooved Ware Pits	LN	32	9	4	15		2	
DBC EX1 LN/EBA 'activity area' scatters	LN/EBA	7		1	2		1	
DBC EX1 Finds Scatter 131	LN/EBA	40	5	7	10	2	3	
TAMIL LN/EBA features	LN/EBA	7	3		1			
TAMIL LN/EBA layers 100003/4	LN/EBA	2	1					
DBC A6 Ring ditches and segmented ditch	M/LBA	54	36	6	6		2	

* Numerous, but quantified in different manner
DBC: Eton Rowing Course; LERW: Lake End Road West; TAMIL: Taplow Mill Site 1

activity surrounding the smaller assemblages deposited in tree-throw holes and pits, which also often have high levels of use and retouch.

Middle Neolithic

Middle Neolithic flint assemblages are invariably associated with Peterborough Ware, as without a ceramic association, the technology of the flintwork would allow only a broad later Neolithic date to be suggested. In total fifteen pits and two tree-throw holes were associated with Peterborough Ware. The pits were all revealed on the Flood Alleviation Scheme and in many cases formed groups or pairs. At Taplow Mill Site 1 a group of four pits was found, whilst at Lake End Road West, two groups of paired pits were revealed. The remaining pits include isolated pits at Lake End Road West, Marsh Lane East Site 1 and Taplow Mill Site 2. Flint was recovered from 13 of the pits. The tree-throw holes are located on the Eton Rowing Course, Area 6 and at Lot's Hole and represent a continuation of the early Neolithic practice of deposition in tree-throw holes, although this practice was clearly declining in frequency.

The flint assemblages from the Peterborough Ware pits were generally of limited size, ranging from 6 to 196 flints, and in all but one case containing less than 100 flints (an average of 48 flints per pit, or a median of 29). The pits also contained relatively high proportions of retouch. At Lake End Road West a total of 8.3% of the flints were retouched, and low-power use-wear analysis indicated that up to 80% of the flints were utilised; it is also notable that a high proportion of the assemblage was burnt (12.5%). At Taplow Mill Site 1 the four pits contained a lower proportion of retouched artefacts at 4.4%, but almost all of the retouched flints were recovered from a single pit (110018: 7.1%). The retouched flints from Taplow Mill Site 1 include four misshaped chisel arrowheads and associated manufacturing debris from pit 110018. The only other retouched flints from the four pits were a serrated flake and a notched piece. The pits at Lake End Road West contained a broader range of artefacts including scrapers, serrated flakes and retouched flakes. A reworked fragment of a polished adze was recovered from pit 41050; this pit also contained a large pottery assemblage including

Leaf arrow-head	*Unfinished arrow-head*	*Transverse arrow-head*	*Barbed and arrow-head*	*Polished axe fragments (flakes)*	*Denti-culate*	*Notch*	*Micro-liths*	*Burin*	*Fabricator*	*Other*
						4	8	6	1	2 tranchet axe fragments
2	1	1	1	1 (1)	3	5	3			1 Fragmentary arrowhead, 1 tranchent axe frag, 1 pick, 1 Misc.
3	5			(9)	1	14	2		3	1 fragmentary arrowhead, 1 single piece sickle fragment? 12 misc., 2 other, 1 other heavy implement
3	4			(3)		2	1			2 fragmentary arrowheads, 6 misc.
2	8			(4)		3				1 saw, 1 single piece sickle?, 3 misc.
				1 (1)						
				(31)			6			1 microburin, 1 piece esquille, 9 misc.
7		3		7		36		1	3	19 misc + 8 compound tools
17				11			1		2	1 Single piece sickle
						2				1 Misc.
						1	12			
	17			(4)						
	13			(2)						
	6				1					
1	1					1				2 minimally retouched 'arrowheads'
				1						
		1								1 misc.
						2				
	1	1	2	(2)	3	3				2 misc.
						1	2			
							1			
						3	1			

a largely reconstructible Mortlake Ware vessel. A strong association exists in the middle Thames valley between polished implements and Peterborough Ware pits, particularly those rich in pottery. At Heathrow, Grimes recovered a nearly complete Mortlake Ware vessel and a reworked fragment of polished implement, probably an adze (Grimes 1960). Similarly, at Wall Garden Farm, Sipson, in a group of four Mortlake Ware pits, pit 1 produced a fragment of a polished axe and a second piece reworked as a core, whilst pit 4 contained three flakes from polished implements (Richardson 1982; Holgate 1988, 272).

The assemblages from the middle Neolithic pits may be characterised as generally of limited size, but containing predominately utilised flakes and retouched tools. Moreover, the incorporation of artefacts such as the fragment of a polished implement and chisel arrowheads appear to indicate some degree of selection of artefacts for inclusion. This selection process may relate to the selective incorporation of artefacts used or related to specific tasks, activities or areas within a habitation. Alternatively, the generally high proportion of retouched artefacts and levels of burning in pits may reflect the selection of artefacts from a larger deposit, such as a midden, resulting in elevated levels of retouch (as seen in the tree-throw holes deposits resulting from the reworking of the earlier Neolithic surface middens).

Late Neolithic

In total four pits containing Grooved Ware were located, all on the Eton Rowing Course; a further pit located close to a Grooved Ware pit is also thought likely to date from the late Neolithic. Grooved Ware associated pits 14066 and 14373 were located *c* 50m apart in Area 20, with late Neolithic pit 14070 located a few metres from pit 14066. The other two Grooved Ware associated pits (13650 and 16023) were found *c* 50m apart in Area 16.

The flint assemblages recovered from the late Neolithic pits were substantially larger than those associated with Peterborough Ware, ranging between 24 and 267 flints (average 150 flints). The character of the flint assemblages recovered from the Grooved Ware associated pits was also very distinctive, with high levels of retouch and burning. Retouched artefacts formed between 4.7% and 16.7% of the assemblage (average 6.9 %), a total largely dominated by scrapers. The proportion of burnt artefacts varied from 4.2% to 53% of the

assemblage, averaging 10.8% (excluding chips). A high proportion of chips, and a number of refits in pits 16023, 14070 and 14373 indicate the presence of significant quantities of knapping debris. A refitting knapping sequence from pit 14070 contained a burnt and utilised flake, perhaps indicating that the knapping, use and burning occurred in a brief period prior to deposition. A small number of tools also appeared to have been intentionally broken. A scraper from pit 13650 had been broken twice, leaving a quarter of the artefact, after the artefact had been burnt. The burnt and broken halves of a thumbnail scraper were found in pit 14070 and burnt and broken halves of three scrapers were found in pit 14373, whilst a knife/scraper and a retouched flake in pit 13650 bore the signs of intentional breakage.

The treatment of the flintwork in the Grooved Ware-associated pits, particularly the high levels of burning and intentional breakage, clearly suggest a specific depositional practice intended to transform the artefacts and remove them from circulation. Such a practice may reflect the fact that these artefacts were perceived as polluted, or in some way contaminated, so requiring the complex sequence of burning and breakage that can be observed in the pit deposits.

Late Neolithic/early Bronze Age

Late Neolithic/early Bronze Age flintwork is comparatively scarce on both schemes, perhaps due to the decline of deposition within cut features. The majority of the artefacts of this date were recovered as residual or unstratified finds spread widely over both schemes. On the Eton Rowing Course, in Area Ex1, a total of 825 flints was recovered from preserved surface scatter 131, which was associated with a spread of Beaker pottery. The flint scatter included a significant number of retouched artefacts (4.9% of the assemblage) representing a broad range of tools, including scrapers, piercing tools, serrated flakes, knifes, two barbed and tanged arrowheads and a chisel arrowhead. Within and around this spread eleven discrete *in situ* scatters were found, all of which broadly dated to the late Neolithic/early Bronze Age. The scatters were considerably smaller than many of the earlier Neolithic scatters on the floodplain, the largest only just exceeding 250 flints. The scatters included four knapping scatters, one cluster of utilised tools and six activity areas with a combination of knapping and use. It is of interest that whilst the earlier Neolithic scatters are clustered within 40m of the former river channel, the later Neolithic/early Bronze Age scatters lie further away. It is unclear if this pattern reflects changes in the local environment or the exploitation of different resources.

The lithic assemblage recovered from a late Neolithic/early Bronze Age surface scatter at Taplow Mill Site 2 was comparable in scale to the scatter from Area Ex1, but differed markedly in composition. The scatter was almost entirely devoid of retouched artefacts, which represent less than 1% of the assemblage; a total which would be lower if residual Mesolithic flints were excluded. The assemblage does not, therefore, appear to result from domestic activity and, although there appears to have been considerable knapping, the assemblage does not contain a high proportion of cortical flints, suggesting the preparation of cores, or any indication of the products one might expect from a workshop. The scatter is comparable in composition to two broadly contemporary examples at Maidenhead Thicket (Boismier 1995). The significance of these scatters in unclear, but they clearly indicate a change in lithic procurement and reduction strategies in the later Neolithic/early Bronze Age.