Table 1

Summary of the key MIS 9 sites.

Site	Date	Archaeology	Context	Key references
Purfleet	MIS 10–9–8	Tripartite sequence (see SOM). 1) Non-handaxe from Little Thurrock Gravels. 2) Acheulean assemblage from Bluelands Gravels. 3) Proto-Levallois/Levallois from Bluelands/ Botany Gravels.	Long sequence through the Lynch Hill/Corbets Tey Formation of the Thames.	Schreve et al. (2002); Bridgland et al. (2013)
Globe Pit, Little Thurrock	Late MIS 10/Early MIS 9	Non-handaxe assemblage containing numerous flakes and cores.	Basal part of Lynch Hill/Corbets Tey Formation of the Thames. Lateral equivalent of overlying brickearth (Grays Brickearth) contains MIS 9 fauna.	Bridgland and Harding, (1993); Bridgland, (1994); White, (2000)
Stoke Newington	MIS 9	In situ 'floor' containing handaxes, débitage, scrapers and cores. Conjoins present. Rolled artifacts occurred lower down the sequence. Roe's Group I.	2–3 m of fine sand at the confluence of the Lea and Thames. Represents a part of MIS 9 that predates the organic deposits at the Nightingale Estate, Hackney, although the age difference is probably minor.	Green et al. (2004, 2006)
Wolvercote Channel	MIS 9	Acheulean assemblage with subgroup of plano-convex 'slipper-shaped' handaxes. Roe's Group III.	4.5 m deep sediment-filled channel cut into Wolvercote Terrace Gravel on the west bank of the Upper Thames, south of its confluence with the River Cherwell.	Tyldesley (1986); Bridgland (1994, 1996)
Cuxton	MIS 9–8	Two main assemblages: 1) Non-handaxe assemblage from lower gravel.	Remnant of Medway terrace gravel, situated on a chalk spur between the Medway and a tributary valley. Bridgland (2003) proposed an MIS 10–9–8 date for the Cuxton sequence, a suggestion supported by recent OSL dates that gave an absolute age	Tester (1965); Cruse (1987); Bridgland (2003); Wenban-Smith (2004)

		2) Acheulean assemblage from upper gravel, includes ficrons, cleavers and six disputed proto-Levallois artifacts. Roe's Group I.	compatible with an MIS 8 age for the Acheulean material; OSL determinations which indicate an MIS 7 age are considered too.	

Table 2

Technology of the MIS 9 assemblages included in this study.

Sites by predominant technology	Roe (1968) flake tools	Flake tools examined	Total flakes + flake tools examined	% flake tools to flakes	% flake tools examined with invasive retouch	Roe (1968a) handaxes	Roe group[b]	Prepared core technology examined	Locations of main collections
Core and flake assemblages									
Cuxton (Cruse, layers 1–6)	N/A	10	120	8.3	10	None	N/A	None	The British Museum, London
Globe Pit	3	4	555	0.7	0	None	N/A	None	The British Museum, London~~British Museum~~
Handaxe assemblages									
Thames									
Baker~~'~~'s Farm	101	47	307	15.3	28	387	I	3 cores, 1 flake	The British Museum, London; Oxford Natural History Museum, Oxford; Pitt Rivers Museum, Oxford

Cuxton (Tester)	70	32	461	7.2	16	212	I	4 Cores	The British Museum, London
Furze Platt	100+	39	363	10.7	26	1663	I	None	The British Museum, London; Oxford Natural History Museum, Oxford; Reading Museum, Reading; ~~Cambridge MAA~~ Museum of Archaeology and Anthropology, Cambridge
Grays Thurrock	56	13	137	9.5	8	12	?	None	The British Museum, London
Grovelands Pit	101	59	181	32.6	41	95	? (Roe (1981) attributed to Group VII)	None	Reading Museum, Reading; Oxford Natural History Museum, Oxford
Lent Rise	54	18	140	13	22	120	I	1 core, 2 flakes	The British Museum, London; Oxford Natural History Museum, Oxford

Lower Clapton	69	14[a]	33	42.4	43	159	I	None	The British Museum, London; Pitt Rivers Museum, Oxford
Purfleet	N/A	5[a]	102	4.9	0	15	?	Beds 6/8–5 cores, several flakes (Bridgland et al., 2013)	Royal Holloway-, University of London, Egham
Sonning Railway Cutting	7 (different pits)	6	33	18.2	17	13	?	2 cores, 4 flakes	Oxford Natural History Museum, Oxford; Reading Museum, Reading
Stoke Newington (Common, Geldeston Rd, Abney Park)	320	50 (all sites)	531	9.4	34	230 (Common) 63 (Geleston Rd) 26 (Abney Park)	I	None	The British Museum, London; Pitt Rivers Museum, Oxford
Sturry	71	26[a]	60	43.3	23	514	?	None	The British Museum, London; ~~Cambridge MAA~~ Museum of Archaeology and

									Anthropology, Cambridge
Wolvercote	10	2	15	13.3	50	75	III	None	Oxford Natural History Museum, Oxford
Eastern England									
Barnham Heath	Numerous	16	327	4.9	25	230	I	17 cores, 3 flakes	Pitt Rivers Museum, Oxford; Ipswich Museum, Ipswich
Biddenham	50+	47	578	8.1	28	304	I	13 cores, 14 flakes	The British Museum, London; Pitt Rivers Museums; The Higgins Art Gallery & Museum~~Higgins Bedford~~, Bedford; ~~, Cambridge MAA~~Museum of Archaeology and Anthropology, Cambridge
Kempston	54	27	157	17.2	37	445	I	3 cores, 5 flakes	The British Museum, London; Pitt Rivers Museum, Oxford;

									The Higgins Art Gallery & Museum, Bedford ~~Higgins Bedford;~~ Museum of Archaeology and Anthropology, Cambridge ~~Cambridge MAA;~~ Oxford Natural History Museum, Oxford
Keswick	49	1 [a]	1	n/a	n/a	175	I	None examined, but reported in Roe (1968a; Roe 1981)	The British Museum, London
Southacre	37	1 [a]	8	12.5	100	31	?	None examined, but reported in Roe (1968a; Roe 1981)	Museum of Archaeology and Anthropology, Cambridge~~Cambridge MAA~~

Station Pit Kennett/ Kentford	55	28	196	14.3	18	144	?	None	The British Museum, London; Sedgewick Museum, Cambridge; Museum of Archaeology and Anthropology, Cambridge~~Cambridge MAA~~; Pitt Rivers Museum, Oxford
Solent									
Dunbridge	16	15	132	11.4	20	953	Mixed; fresh material Group I	4 cores	Hampshire Cultural Trust, Winchester; Museum of Archaeology and Anthropology, Cambridge~~Cambridge MAA~~
East Howe	7	2	37	5.4	50	73	?	3 cores, 3 flakes	The British Museum, London
Romsey	5	2	17	11.8	50	169	Pointed tradition, no clear group	None	Hampshire Cultural Trust, Winchester

							attribution (Roe 1981)		
Warsash	30	28	122	23	54	366	I	5 cores, 7 flakes	Hampshire Cultural Trust, Winchester; Portsmouth Museum, Portsmouth; Cambridge MAA; The British Museum, London
Prepared core technology assemblage									
Botany Pit, Purfleet	1005	114	3455	3.3	6	12	?	134 cores, 5 flakes	The British Museum, London

[a] Small sample size due to lack of access to key museum collections.

[b] Roe groups based on Roe's (1968b) morphometric grouping of handaxes; ? = no Roe group attributed or unclear; N/A = no handaxes at site.

Table 3

Numbers (*n*) and percentage of flake tool types in British MIS 9 assemblages with ≥10 flake tools.

Site by predominant technology	*n*	Sidescraper	Endscraper	Convergent scraper	Double scraper	Convergent/ unifacial scraper	Notch	Denticulate	Bifacially worked	Miscellaneous
Core and flake assemblage										
Cuxton (Cruse)	10	60	10	10	—	—	—	20	—	—
Handaxe assemblages										
Baker's Farm	47	40.4	25.5	14.9	4.3	2.1	6.4	2.1	—	4.2
Barnham Heath	16	68.8	12.5	—	12.5	–	–	–	—	12.5
Biddenham	47	50	8.6	10.8	4.3	10.7	6.5	2.1	—	6.4
Cuxton (Tester)	32	53.1	12.5	3.1	6.3	—	12.5	9.4	—	3.1
Dunbridge	15	60	6.7	13.3	20	—	—	—	—	—
Furze Platt	39	46.2	17.9	12.8	7.7	2.6	10.3	2.6	—	—
Grays Thurrock	14	30.8	30.8	—	7.7	—	15.3	7.7	7.7	—
Grovelands Pit	59	40.7	22	5.1	8.5	6.8	6.8	6.8	1.7	1.7
Kempston	27	44.4	22.2	7.4	—	18.5	—	—	3.7	3.7
Lent Rise	18	55.6	11.1	11.1	5.6	11.1	—	5.6	—	—
Lower Clapton	14	21.4	28.6	21.4	14.3	7.1	—	7.1	—	—
Station Pit Kennett/Kentford	28	75	3.6	—	—	7.1	3.6	10.7	—	—
Stoke Newington	50	54	22	14	6	2	—	—	2	–
Sturry	26	65.4	—	23.1	3.8	—	7.7	—	—	—
Warsash	28	57.1	10.7	17.9	7.1	3.6	—	—	—	3.6

Prepared core technology assemblage										
Botany Pit	114	57	10.6	—	6.1	—	7	9.6	—	9.7

Table 4

Metrics of flake tools in British MIS 9 assemblages with ≥10 flake tools.

Site by predominant technology		Length (mm)		Width (mm)		Thickness (mm)		Elongation (width/length)		Retouch length (mm)		Retouch length/ length of flake	
Core and Flake assemblage	*n*	Mean ± sd	Range	Mean ± sd	Range	Mean ± sd	Range	Mean ± sd	Range	Mean ± sd	Range	Mean ± sd	Range
Cuxton (Cruse)	10	68.4 ± 21.1	41–106	60.2 ± 16.8	40–100	21.3 ± 10.7	9–43	0.91 ± 0.2	0.63–1.26	56.5 ± 21.5	29–94	0.88 ± 0.40	0.46–1.62
Handaxe assemblages													
Baker's Farm	47	84.3 ± 16.8	57–141	76.1 ± 14.7	45–105	24.7 ± 7.7	8–38	0.93 ± 0.24	0.5–1.43	70.8 ± 35.5	16–163	0.91 ± 0.47	0.25–2.49
Barnham Heath	16	88.6 ± 22.8	65–155	81.8 ± 24.3	49–127	32.5 ± 8.4	19–47	0.96 ± 0.32	0.41–1.59	84.3 ± 23.3	43–124	1.12 ± 0.33	0.51–1.64
Biddenham	46	77.2 ± 18.2	37–119	66.4 ± 25.1	22–143	21.7 ± 8.5	7–46	0.88 ± 0.37	0.51–1.87	85.7 ± 47.4	24–202	1.08 ± 0.49	0.18–2.11
Cuxton (Tester)	32	69.1 ± 22	31–143	67.8 ± 22.3	32–112	23.1 ± 10.6	9–54	1.05 ± 0.45	0.49–2.25	57.0 ± 31.4	14–146	0.88 ± 0.36	0.20–1.95
Dunbridge	15	88.6 ± 25.7	46–153	70.1 ± 17	55–114	26.2 ± 9.8	16–53	0.85 ± 0.35	0.4–1.92	93.6 ± 39.3	50–187	1.29 ± 0.35	0.71–1.19
Furze Platt	39	80.4 ± 17.2	50–114	74.1 ± 19.6	41–121	23.2 ± 6.3	8–34	0.98 ± 0.4	0.36–1.88	78.4 ± 36	35–170	1.08 ± 0.54	0.48–3.01
Grays Thurrock	13	52.8 ± 13	30–73	54.4 ± 14	36–85	18.5 ± 4.8	11–28	1.07 ± 0.28	0.59–1.64	48.1 ± 16.4	22–79	1.11 ± 0.40	0.31–1.67
Grovelands Pit	59	90.2 ± 24.4	47–202	86.5 ± 24.3	45–189	27.8 ± 9.7	14–71	1.00 ± 0.33	0.49–2.24	85.6 ± 45.1	30–251	1.16 ± 0.56	0.36–2.56
Kempston	27	71.3 ± 23.9	34–122	65.7 ± 16.4	22–96	21.4 ± 5	14–33	1.03 ± 0.44	0.21–2.03	83.9 ± 46.6	36–219	1.23 ± 0.50	0.59–2.10
Lent Rise	18	76.9 ± 21.4	38–120	60.1 ± 24	23–115	19.2 ± 8.4	5–38	0.83 ± 0.36	0.36–1.54	61.0 ± 31.2	22–136	0.90 ± 0.46	0.39–2.11
Lower Clapton	14	80.9 ± 17.9	52–120	76.8 ± 18.5	58–120	25.3 ± 6.4	17–37	1.00 ± 0.43	0.55–1.82	82.2 ± 35.9	26–181	1.26 ± 0.52	0.42–2.34
Station Pit Kennet/Kentford	28	90.6 ± 27.6	39–158	60.5 ± 15.9	34–95	23.2 ± 9.3	10–47	0.70 ± 0.29	0.36–1.44	82.0 ± 39.9	20–185	0.95 ± 0.53	0.33–2.90
Stoke Newington	50	70.4 ± 18.9	37–122	67.4 ± 17.7	35–106	22.3 ± 5.5	11–35	1.03 ± 0.42	0.42–2.33	77.2 ± 28.5	28–153	1.2 ± 0.43	0.50–2.10
Sturry	26	91.1 ± 23.2	50–146	61.9 ± 15.1	39–94	25.7 ± 20.9	9–41	0.70 ± 0.21	0.44–1.35	105.5 ± 50.4	16–249	1.15 ± 0.43	0.21–2.12
Warsash	28	90.2 ± 29.8	39–148	78.2 ± 29.8	22–139	25.5 ± 11	7.5–57.1	0.90 ± 0.33	0.3–1.62	102.3 ± 61.1	31–300	1.28 ± 0.52	0.67–2.49
Prepared core technology assemblage													
Botany Pit	114	76.5 ± 17.8	44–129	69.1 ± 17.3	37–134	24.3 ± 67.1	12–47	0.94 ± 0.29	0.41–1.89	60.4 ± 21.3	24–183	0.92 ± 0.45	0.29–2.82

Table 5

Metrics of unretouched and unprepared flakes in British MIS 9 assemblages with ≥10 flake tools.

Site by predominant technology		Length (mm)		Width (mm)		Thickness (mm)		Elongation (width/length)	
Core and flake assemblage	*N*	Mean ± sd	Range	Mean ± sd	Range	Mean ± sd	Range	Mean ± sd	Range
Cuxton (Cruse)	110	56.7 ± 20.0	16.3–123.4	53.0 ± 20.7	12.7–120.0	17.0 ± 8.2	3.5–44.6	0.98 ± 0.36	0.23–2.40
Handaxe assemblages									
Baker's Farm	307	76.8 ± 19.1	32.2–134.9	72.4 ± 21.1	21.9–140.3	19.1 ± 9.4	5.1–89.5	0.98 ± 0.33	0.36–2.22
Barnham Heath	308	95.4 ± 23.8	48.5–168.9	84.1 ± 25.6	20.7–205.1	26.1 ± 11.3	6.0–65.6	0.91 ± 0.29	0.24–1.95
Biddenham	517	69.4 ± 19.5	21.4–147.7	58.8 ± 19.9	9.2–149.4	16.3 ± 7.6	3.6–81	0.89 ± 0.32	0.21–2.20
Cuxton (Tester)	429	55.3 ± 21.7	13.1–138.8	53.9 ± 22.8	11.9–171.2	17.0 ± 10.3	2.8–80.0	1.01 ± 0.33	0.26–2.55
Dunbridge	117	76.6 ± 18.2	37.6–122.8	67.4 ± 18.0	17.8–119.6	23.0 ± 8.4	7.2–47.6	0.91 ± 0.25	0.16–1.99
Furze Platt	324	66.1 ± 28.9	14.0–157.0	59.9 ± 23.1	12.3–151.0	17.8 ± 9.7	3.1–82.4	0.97 ± 0.33	0.25–2.48
Grays Thurrock	124	47.2 ± 15.2	18.1–121.4	46.1 ± 15.2	11.1–94.3	14.2 ± 5.6	5.5–36.2	1.02 ± 0.32	0.33–2.41
Grovelands Pit	122	86.8 ± 22.5	32.7–182.4	77.8 ± 25.7	32.1–170.9	25.6 ± 8.9	12.2–74	0.93 ± 0.31	0.36–1.98
Kempston	125	74.8 ± 20.0	31.1–130.8	58.8 ± 18.5	24.6–134.8	18.6 ± 8.1	7.1–45.3	0.83 ± 0.30	0.29–2.24
Lent Rise	120	71.3 ± 22.7	19.3–154.1	62.1 ± 20.5	23.0–108.2	18.7 ± 8.6	3.7–43.8	0.92 ± 0.36	0.30–2.96
Lower Clapton	19	77.6 ± 19.2	45.4–115.7	76.3 ± 24.9	35.1–142.0	27.3 ± 8.5	14.5–44.2	1.01 ± 0.30	0.65–1.63
Station Pit Kennet/Kentford	168	78.5 ± 20.3	26.3–162.9	65.8 ± 19.9	12.7–126.3	20.1 ± 7.7	4.6–42.5	0.87 ± 0.29	0.34–1.80
Stoke Newington	481	61.6 ± 22.3	9.9–145.2	56.7 ± 21.3	7.6–125.0	17.0 ± 8.5	1.9–56.6	0.97 ± 0.33	0.09–2.43
Sturry	34	78.9 ± 25.9	35–147.2	70.8 ± 25.3	35.5–209.4	18.0 ± 7.0	8.8–36.8	0.96 ± 0.46	0.31–2.73
Warsash	87	74.5 ± 23.5	26.4–132.9	56.7 ± 21.0	21.3–129.5	16.4 ± 10.9	5.0–97.0	0.81 ± 0.37	0.36–2.78

Prepared core technology assemblage									
Botany Pit	458	68.8 ± 21.6	18.2–140.0	61.8 ± 20.6	8.5–129.2	20.8 ± 9.5	2.9–60.2	0.94 ± 0.32	0.25–2.61

Table 6

Numbers and percentages of retouch attributes of flake tools in British MIS 9 assemblages with ≥10 flake tools.

Site by predominant technology		**Extent of Retouch**			**Distribution**		**Position**			**Location**					**Form**						**Regularity**	
Core and flake assemblage	*n*	Min.	Sem.	Inv.	Cont.	Disc.	Dir.	Invr.	Bi.	Dist.	Left	Right	Mult.	Prox.	Cx.	Cv.	Rl.	Nc.	Dt.	Mu.	Reg.	Irr.
Cuxton (Cruse)	10	—	90.0	10.0	100.0	—	90.0	10.0	—	10.0	30.0	50.0	10.0	—	50.0	20.0	—	—	20.0	10.0	70.0	30.0
Handaxe assemblages																						
Baker's Farm	47	38.8	34	27.7	89.4	10.6	93.6	6.4	—	36.2	10.6	29.8	21.3	2.1	66.0	10.6	8.6	6.4	2.1	6.3	34.0	66.0
Barnham Heath	16	6.3	68.8	25.0	87.5	12.5	87.5	12.5	—	25.0	6.3	56.3	12.6	—	81.3	6.3	—	—	—	12.5	68.8	31.3
Biddenham	47	28.2	28.2	43.3	91.4	8.6	80.4	13.0	6.5	26.1	19.6	28.3	23.8	2.2	71.7	17.4	2.2	2.2	—	6.5	63	37
Cuxton (Tester)	32	15.6	68.8	15.6	84.4	15.6	84.4	12.5	3.1	18.8	25.0	43.8	9.4	3.1	68.8	15.6	12.5	—	—	3.1	75	25
Dunbridge	15	13.3	66.7	20.0	80.0	20.0	100.0	—	—	6.7	40.0	13.3	40.0	—	80.0	—	6.7	—	—	13.3	53.3	46.7
Furze Platt	39	17.9	56.4	25.6	94.9	5.1	92.3	5.1	2.6	30.8	25.6	20.6	23.0	—	76.9	12.8	5.1	—	—	5.1	84.6	15.4
Grays Thurrock	14	15.4	76.9	7.7	76.9	23.1	69.2	23.1	7.7	46.2	46.2	–	7.7	—	53.8	7.7	7.7	15.4	7.7	7.7	76.9	23.1
Grovelands Pit	59	18.6	40.7	40.7	74.6	25.4	89.9	5.0	5.0	28.8	33.9	13.6	27.3	—	61.0	18.6	5.1	6.8	3.4	5.1	52.5	47.5
Kempston	27	11.1	51.9	37.0	96.3	3.7	96.2	—	7.4	25.9	25.9	18.5	29.7	—	77.8	—	18.5	—	—	3.7	81.5	18.5
Lent Rise	18	27.8	50.0	22.2	88.9	11.1	94.4	5.6	—	27.8	22.3	33.3	16.6	—	77.8	5.6	11.1	—	5.6	—	83.3	16.7
Lower Clapton	14	7.1	50.0	42.9	85.7	14.3	85.7	14.3	—	28.6	7.1	21.4	42.9	—	92.9	7.1	—	—	—	—	92.9	7.1
Station Pit Kennett/Kentford	28	21.4	60.7	17.9	85.7	14.3	85.7	14.3	—	10.7	39.3	35.7	10.7	3.6	67.9	17.9	7.1	—	3.6	3.6	67.9	32.1
Stoke Newington	50	6.0	60.0	34.0	86.0	14.0	98.0	—	2.0	26.0	16.0	30.0	28.0	—	82.0	2.0	12.0	—	—	4.0	70.0	30.0

Sturry	26	—	76.9	23.1	92.3	7.7	96.2	3.8	—	—	30.7	42.3	26.9		88.5	3.8	—	7.7	—	—	76.9	23.1
Warsash	28	17.9	28.6	53.6	82.1	17.9	100.0	—	—	14.3	10.7	42.9	32.1	—	75.0	10.7	10.7	—	—	3.6	71.4	28.6
Prepared core technology assemblage																						
Botany Pit	114	42.1	51.8	6.1	87.7	12.3	88.0	12.0	—	29.0	34.2	23.7	12.2	0.9	57.8	13.2	8.8	6.1	9.6	3.9	51.8	48.2

Abbreviations: Min. = minimally invasive, Sem. = semi-invasive, Inv. = invasive; Cont. = continuous, Disc. = discontinuous; Dir. = direct, Invr. = inverse, Bi. = bifacial; Dist. = distal, Mult. = multiple, Prox. = proximal; Cx. = convex, Cv. = concave, Rl. = rectilinear, Nc. = notch, Dt. = denticulate, Mu. = multiple; Reg. = regular, Irr. = irregular.

Table 7

A comparison of scrapers from different assemblage types using measurements indicative of 'refined scrapers' and percentages.

Assemblage type	*n*	Average length (mm)	Average retouch length (mm)	Average retouch length/length	% complex forms[a]	% flakes tools with invasive retouch	% flake tools with regular retouch
Core and flake	11	64.12	60.61	0.99	18.90	9.09	54.55
Handaxe	432	81.82	91.55	1.14	26.16	31.48	71.76
Prepared core technology	95	75.69	71.27	0.96	10.50	3.20	50.50

[a] Double/convergent/bifacial forms.

Table 8

Metrics of possible prepared core technology products in British MIS 9 assemblages with ≥10 flake tools.

Site by predominant technology		**Length (mm)**		**Width (mm)**		**Thickness (mm)**		**Elongation (width/length)**	
	n	Mean ± -sd	Range	Mean ± –sd	Range	Mean ± –sd	Range	Mean ± –sd	Range
Handaxe assemblages									
Baker's Farm	1	135.7	—	59.1	—	16.1	—	0.44	—
Barnham Heath	3	90.8 ± 13.5	75.5–100.9	69.5 ± 17.9	58.4–90.1	18.3 ± 3.0	16.1–21.8	0.77 ±0.15	0.61–0.89
Biddenham	14	87.6 ± 23.9	60.3–137.7	61.8 ± 18.1	41.1–116.9	14 ± 6.3	7.9–33.2	0.71 ± 0.13	0.43–0.95
Kempston	3	91.2 ± 14.9	67.8–106.2	58.9 ± 3.4	53.2–62.3	12.3 ± 3.1	8.5–15.8	0.66 ± 0.15	0.56–0.92
Lent Rise	2	90.7 ± 41.3	61.5–119.9	54.7 ± 26.0	36.3–73.1	14.2 ± 5.3	10.4–17.9	0.60 ± 0.01	0.59–0.61
Warsash	7	94.7 ± 13.9	78.3–120.6	67.8 ± 11.2	56.9–86.1	15.5 ± 2.8	12.4–19.1	0.73 ± 0.17	0.61–1.10
Prepared core technology assemblage									
Botany Pit	5	81.7 ± 12.4	67.3–92.6	61.4 ± 17.4	39.5–81.2	15.4±5.4	9.9–23.6	0.75 ± 0.18	0.45–0.88

Table 9

Summary of flake tools at British sites between MIS 13–MIS 7.[a]

Site	Flake tools (*n*)	Proportion of retouched flakes to total number of flakes (%)	Invasive retouch common	Complex forms common	Handaxes	Levallois	Flake tools on Levallois flakes	Method	Reference
MIS 13									
Boxgrove Q1/B	262	1.8			Y			Excavated	Bergman and Roberts (1988); Roberts (1990); Roberts et al., (1997); Roberts and Parfitt, (1999); Pope (2002, 2020)
High Lodge Bed C	67	7.0	Y	Y				Excavated	Ashton (1992); Lewis (1992); Lewis et al. (2019, 2021)
High Lodge Bed E	15	3.9			Y			Excavated	Ashton (1992); Lewis (1992); Lewis et al. (2019, 2021)
MIS 11c									
Clacton (Golf Course)	87	7.5						Excavated	Singer et al. (1973)
Barnham Area I (unit 5)	46	4.3						Excavated	Ashton et al. (1998)
Barnham Area IV (unit 5/6)	7	1.2			Y			Excavated	Ashton et al. (1998)

Swanscombe Lower Gravels (Waechter)	70	7.0						Excavated	Ashton and McNabb (1996)
Swanscombe Lower Loam (Waechter)	17	7.2						Excavated	Ashton and McNabb (1996)
Swanscombe Lower Middle Gravels (Waechter)	7	5.4			Y			Excavated	Ashton and McNabb (1996)
Swanscombe Middle Gravels (Wymer)	199	2.4			Y			Excavated	Wymer (1964)
Beeches Pit	~40	<1			Y			Excavated	Gowlett et al. (2005)
Elveden (all areas)	15	0.8			Y			Excavated	Ashton et al. (2005)
MIS 11c?									
Foxhall Road (Layard)	14	8.9			Y			Excavated	White and Plunkett (2004)
Foxhall Road (Moir)	20	8.1			Y			Excavated	White and Plunkett 2004
MIS 11a									
Hoxne Lower Industry	17	2.3			Y			Excavated	Wymer (1993); Singer et al. (1993); Ashton et al. (2008)
Hoxne Upper Industry	95	11.9	Y	Y	Y			Excavated	Wymer (1993); Singer et al. (1993); Ashton et al. (2008)
MIS 8–7									
Creffield Road, St. Bernard's	7	3.4				Y	Y	Collected	Scott (2011)
Creffield Road, School site	8	6.8				Y	Y	Collected	Scott (2011)

Yiewsley, Eastwood Pit, Garroway Rice	2	2.1			(Y)	Y	?	Collected	Scott (2011)
Bakers Hole	19	12.4	Y	Y	(Y)	Y	Y	Collected	Smith (1911); Scott (2011)
Ebbsfleet	9	3.8				Y	?	Collected	Scott (2011)
Ebbsfleet (site B)	4	2.7				Y	?	Collected	Scott (2011)
Lion Pit Tramway Cutting	2	0.9				Y		Both	Scott (2011)
Pontnewydd Cave (Main)	70	13.7			Y	Y	Y	Excavated	Aldhouse–Green et al. (2012)
Pontnewydd Cave (New entrance)	17	18.8			Y	Y	Y	Excavated	Aldhouse–Green et al.(2012)

[a] (Y) = handaxes are present at the site but are not associated with prepared core technology.

Table 10

Summary of comparative sites from mainland Europe.

Site	Dating	Artifacts (*n*)	Flake tools (%)	Handaxes	PCT	Comments	References
France							
Cagny L'Epinette	MIS 10/9	3000	3.3	Yes	No	Open-air site with handaxes. Flake tools predominantly notches, denticulates and rare scrapers.	Moigne et al. (2016); Lamotte and Tuffreau (2016)
Menez-Dregan Layers 9–7	MIS 12–10	26,361	1.7–6.2	Rare	No	Multi-level cave site with rare handaxes in some levels. Flake tools vary between levels depending on site function. Denticulates and notches more dominant than scrapers. Discoidal cores evident at top in layer 4ab.	Ravon et al. (2016, submitted); Ravon (2019)
Menez-Dregan Layers 5–6	MIS 9	112,060	0.8–2.8	Rare	No		
Menez-Dregan Layers 4c–4ab	MIS8	14,856	1.6–2.6	Rare	No		
Orgnac, layers 7–5a	MIS 9	13,065	8.9–24.0	Yes	No	Multilevel cave site showing early development of PCT as handaxes decrease. Scrapers dominate over other flake tools, some with invasive retouch in lower levels. Layers 1–2 have fewer flake tools and marginal retouch.	Moncel et al. (2011, 2012, 2020)
Orgnac, layers 4b–3	MIS 9/8	9,510	10.3–17.4	Yes	Yes		
Orgnac, layers 2–1	MIS 9/8	60,798	6.2–8.0	Rare	Yes		
Soucy 6	MIS 9	182	14.2	No	No	Nine occupation sites within alluvial deposits of the Yonne. Although stratigraphically separate, the sites reflect different activity areas with variation in tool production and use. All sites have denticulates, notches and scrapers, with convergent forms at Soucy 3.	Lhomme (2007)
Soucy 5, Level II	MIS 9	1433	1.8	Yes	No		
Soucy 5, Level I	MIS 9	1595	N/A	Yes	No		
Soucy 3, P	MIS 9	6066	14.6	Yes	No		
Soucy 2	MIS 9	156	N/A	No	No		
Spain							

Gran Dolina Lower TD 10.1	MIS 9?	21,522	3.4	Yes	Yes	Highest levels in Gran Dolina cave with intense occupation in TD10.1. Handaxes decline through sequence and first PCT. Mainly ad hoc flake tools, but also convergent scrapers with Quina retouch in TD10.1.	Lombera–Hermida et al. (2020)
Gran Dolina Upper TD10.1–A and B	MIS 9?	967	5.7–6.9	Yes	Yes		
Belgium							
Kesselt-Op de Schans	MIS 9/8	2683	0.7	No	Yes	Terrace deposits with early PCT and Levallois. Simple scrapers and other flake tools.	Van Baelen (2017)
Mesvin IV	Early MIS 8	4970[a]	2.3	Rare	Yes	PCT and Levallois associated with rare handaxes. Scrapers with marginal retouch and other simple flake tools. Levallois flakes minimally retouched.	Ryssaert (2006)

Abbreviations: PCT = prepared core technology; N/A = figures not given.

[a] Not full assemblage, smaller sample analyzed by Ryssaert (2004).