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Volume 2

Archaeological Collections:

Background and the Early Acheulean Assemblages

Edited by

Yonas Beyene, Berhane Asfaw, Katsuhiko Sano, and Gen Suwa



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APPENDIX 1

**Coding System of Artifact Attributes:
Large Cutting Tools + Heavy Duty Tools**

1. RAW MATERIAL

- 1: Basalt
- 2: Quartzite
- 3: Quartz
- 4: Limestone
- 5: Metamorphic Indet.
- 6: Ignimbrite
- 7: Sandstone
- 8: Rhyolite
- 9: Siliceous rocks (e.g., chert)

2. PHYSICAL CONDITION

- 1: Fresh
- 2: Moderately weathered
- 3: Weathered
- 4: Eolised
- 5: Patina

3. SPECIFIC TOOL TYPE (Large Cutting Tools / Heavy Duty Tools)

- 0: Discoid
- 1: Pointed handaxe
- 2: Elongate ovate handaxe
- 3: Ovate handaxe
- 4: Double pointed handaxe
- 5: Acuminate ovate handaxe
- 6: Pointed handaxe
- 7: Triangular handaxe
 - a. Triangular
 - b. Elongate
 - c. Sub triangular
- 8: Unifacial handaxe
- 9: Limande
- 10: Biseau-bitted handaxe
- 11: Ultra convergent cleaver
- 12: Convergent cleaver
- 13: Parallel sided cleaver
- 14: Divergent cleaver
- 15: Side cleaver
- 16: Double ended cleaver
- 17: Splayed cleaver
- 18: Asymmetric convergent cleaver

- 19: Atypical cleaver (accidental/opportunistic)
- 20: Pick
 - a. Trihedral
 - b. Bifacial
 - c. Roughly trimmed butt
 - d. High backed
 - e. Spindle
 - f. Untrimmed butt
 - g. Beaked
 - h. Cobble
 - i. Block
 - j. Core
 - k. Double pointed
 - l. Irregular
 - k. Quadrilateral
- 21: Knife
- 22: Large scraper
- 23: Cleaver biface
- 24: Core axe
- 25: Blank/modified flake
(25 or 25a: part bifaces, unfinished handaxe, 25b: blank/modified flake)
- 26: Levallois cleaver
- 99: Broken LCTs/HDTs
- 4. PRESENCE OF CORTEX
 - 0: None
 - 1: Small amount (<25% of the surface)
 - 2: Modest (25-50% of the surface)
 - 3: Much (>50 % of the surface)
 - 8: Weathering surface (non cortical)
 - 9: Indeterminate
- 5. PRIMARY FORM
 - 1: Flake
 - 2: Cobble
 - 3: Indeterminate
 - 4: Block
- 6 FLAKE TYPE
 - 1: End struck
 - 2: Side struck
 - 3: Kombewa
 - 4: Indeterminate
- 7. UNIFACIAL/BIFACIAL
 - 1: Unifacial
 - 2: Partly bifacial
 - 3: Mostly/fully bifacial
 - 4: Trihedral
 - 5: Quadrilateral

(Note: trihedral and quadrilateral are taken for mostly fully flaked pieces)

8. DIMENSION

- 1: LENGTH
- 2: BREADTH maximum
- 3: BREADTH 2 cm from tip
- 4: BREADTH distal mid
- 5: BREADTH proximal mid
- 6: THICKNESS
- 7: THICKNESS 2 cm from tip

9. CROSS-SECTION

- 1: Double convex
- 2: Plano-convex
- 3: Lenticular
- 4: Biconical
- 5: Parallelogram
- 6: Trapezoidal
- 7: Triangular
- 8: Irregular

10. SINUOSITY

- 1: Wavy
- 2: Sinuous
- 3: Straight

11. EDGE ANGLE

12. BIFACE BUTT PLAN

- 1: U-shaped
- 2: V-shaped
- 3: Straight
- 4: Cortex
- 5: Irregular
- 6: Square
- 7: Tools
- 9: Indeterminate

13. INVASIVENESS

- 1: Marginal
- 2: Semi-invasive
- 3: Invasive

14. FLAKE SCARS (Dorsal or "A" or "main")

15. FLAKE SCARS (Ventral or "B" or "secondary")

16. MAXIMUM DIMENSION OF FLAKE SCAR

17. CLEAVER EDGE PLAN

- 1: Straight
- 2: Convex
- 3: Oblique/end
- 4: Oblique/side
- 5: Concave
- 6: Irregular

18. CLEAVER BIT ANGLE

19. CLEAVER BIT DIMENSION

This coding system was developed by Y.B., the senior author of this volume, in conjunction with the late J. Desmond Clarke through collaborative work during the early to middle 1990s. The attribute coding system is based on terminology and definitions outlined in Clark and Schick (2000) and Kleindeinst (1962).

Clark JD, Schick KD (2000) Acheulean archaeology of the western Middle Awash. In: de Heinzelin J, Clark JD, Schick K, Gilbert W (eds.) *The Acheulean and the Plio-Pleistocene Deposits of the Middle Awash Valley Ethiopia* (Geological Science Annals 104, Musée Royal de l'Afrique Centrale, Tervuren) pp: 123–137.

Kleindienst MR (1962) Components of the East African Acheulian assemblages: An analytical approach. In: Mortelmans G, Nenquin J (eds.) *Actes du IVe Congrès Panafricain de Préhistoire et l'Etude du Quaternaire Leopoldville 1959 Vol. III*, (Musée Royal de l'Afrique Centrale, Tervuren) pp: 81–111.

APPENDIX 2

Tables of attribute analysis

Appendix 2 includes the following listings of Konso Acheulean lithic artifacts.

Table A2.1. Lithic categories of all collected pieces.

Table A2.2. Lithic raw materials of all collected pieces.

Table A2.3. Lithic physical condition of all collected pieces.

Table A2.4. Typological categories of LCTs/HDTs.

Table A2.5. Raw materials of LCTs/HDTs.

Table A2.6. Physical condition of LCTs/HDTs.

Table A2.7. Cortex ratio on the surfaces of LCTs/HDTs.

Table A2.8. Primary forms of LCTs/HDTs.

Table A2.9. Flake types: detaching methods of flake blanks.

Table A2.10. Ratios of unifacial, partly bifacial, mostly/fully bifacial, trihedral, and quadrilateral tools.

Table A2.11. Dimension of handaxes, cleavers, picks, and all LCTs/HDTs.

Table A2.12. Cross-section types of LCTs/HDTs.

Table A2.13. Sinuosity of lateral edges of LCTs/HDTs.

Table A2.14. Lateral edge angle of LCTs/HDTs.

Table A2.15. Biface butt plan of LCTs/HDTs.

Table A2.16. Invasiveness of flake scars on LCTs/HDTs.

Table A2.17. Summary of flake scar numbers of handaxes, cleavers, picks and all LCTs/HDTs.

Table A2.18. Summary of maximum dimension of flake scars on handaxes, cleavers, picks and all LCTs/HDTs.

Table A2.19. Cleaver edge plan.

Table A2.20. Summary of cleaver bit angle.

Table A2.21. Summary of cleaver bit dimension.

Table A2.11. Dimension of handaxes, cleavers, picks, and all LCTs/HDTs. Mean length, breadth, and thickness by site. LCT = large cutting tool, HDT = heavy duty tool.

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Ave.
Handaxe mean length	139.3	153.6	169.3	146.5	130.5	172.5	168.0	174.4	154.0	153.0	156.1
Handaxe mean breadth	93.0	92.4	104.7	77.0	79.7	97.3	98.5	104.1	83.0	94.4	92.4
Handaxe mean thickness	41.5	46.8	52.6	48.0	44.3	50.3	51.9	58.1	39.4	45.5	47.8
Cleaver mean length	156.0	163.5	185.1	-	154.8	161.9	167.5	156.5	171.2	205.8	169.1
Cleaver mean breadth	110.0	96.5	114.9	-	90.0	100.1	104.5	101.3	96.3	112.6	102.9
Cleaver mean thickness	50.8	52.9	47.6	-	57.5	46.6	48.4	47.6	39.4	46.0	48.5
Pick mean length	175.7	180.2	149.1	163.6	136.7	-	167.1	166.1	-	147.8	160.8
Pick mean breadth	93.1	87.4	91.6	67.7	78.1	-	88.0	88.4	-	92.5	85.8
Pick mean thickness	60.0	59.5	61.7	59.2	57.4	-	58.1	65.8	-	50.3	59.0
All LCT/HDT mean length	146.5	166.1	164.7	156.8	132.4	149.2	160.2	160.3	155.8	167.3	155.9
All LCT/HDT mean breadth	97.9	92.5	100.2	68.8	78.6	95.7	97.4	97.3	85.7	99.4	91.3
All LCT/HDT mean thickness	48.8	52.3	54.2	58.9	52.2	46.5	48.5	54.9	38.2	46.3	50.1

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Ave.
Handaxe length/breadth	1.50	1.66	1.62	1.90	1.64	1.77	1.71	1.68	1.85	1.62	1.69
Handaxe thickness/breadth	0.45	0.51	0.50	0.62	0.56	0.52	0.53	0.56	0.48	0.48	0.52
Cleaver length/breadth	1.42	1.69	1.61	-	1.72	1.62	1.60	1.54	1.78	1.83	1.65
Cleaver thickness/breadth	0.46	0.55	0.41	-	0.64	0.47	0.46	0.47	0.41	0.41	0.48
Pick length/breadth	1.89	2.06	1.63	2.42	1.75	-	1.90	1.88	-	1.60	1.89
Pick thickness/breadth	0.64	0.68	0.67	0.87	0.73	-	0.66	0.74	-	0.54	0.69
All LCT/HDT length/breadth	1.50	1.80	1.64	2.28	1.69	1.56	1.65	1.65	1.82	1.68	1.73
All LCT/HDT thickness/breadth	0.50	0.57	0.54	0.86	0.66	0.49	0.50	0.56	0.45	0.47	0.56

Table A2.13. Sinuosity of lateral edges of LCTs/HDTs. Numbers and percentages by site. LCT = large cutting tool, HDT = heavy duty tool.

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Total
Wavy	5	35	20	0	17	1	6	31	1	3	119
Sinuous	12	21	21	16	34	2	55	40	16	9	226
Straight	35	16	7	0	6	10	68	41	32	16	231
Total	52	72	48	16	57	13	129	112	49	28	576
	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Total
Wavy	9.6%	48.6%	41.7%	0.0%	29.8%	7.7%	4.7%	27.7%	2.0%	10.7%	20.7%
Sinuous	23.1%	29.2%	43.8%	100.0%	59.6%	15.4%	42.6%	35.7%	32.7%	32.1%	39.2%
Straight	67.3%	22.2%	14.6%	0.0%	10.5%	76.9%	52.7%	36.6%	65.3%	57.1%	40.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A2.14. Lateral edge angle of LCTs/HDTs. Numbers and percentages by site. LCT = large cutting tool, HDT = heavy duty tool.

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Ave.
Handaxe Mean	56.3	60.8	59.7	71.0	67.1	53.3	66.0	66.1	61.0	59.6	62.1
Handaxe Max.	68	75	75	72	93	68	100	95	82	80	100
Handaxe Min.	45	40	42	70	43	41	40	25	30	45	25
Handaxe SD	8.0	11.3	8.7	1.4	12.9	12.9	13.7	13.5	13.6	8.6	3.9
Cleaver Mean	67.8	62.5	55.6	-	63.0	48.1	58.0	61.1	52.1	53.8	58.0
Cleaver Max.	84	80	75	-	70	60	78	85	65	80	85
Cleaver Min.	45	45	31	-	48	34	35	37	40	40	31
Cleaver SD	16.7	10.0	15.7	-	10.4	8.7	10.7	12.1	9.0	14.1	2.9
Pick Mean	67.4	72.5	73.3	84.1	81.6	-	81.1	68.2	-	74.0	75.3
Pick Max.	88	110	92	95	100	-	105	96	-	95	110
Pick Min.	43	54	57	71	55	-	60	40	-	55	40
Pick SD	12.7	11.7	10.4	7.7	11.4	-	10.7	15.6	-	17.6	3.1
ALL LCT/HDT Mean	61.2	64.4	61.6	82.5	75.3	49.5	64.4	63.6	59.3	60.0	64.2
ALL LCT/HDT Max.	88	110	92	95	100	68	105	96	82	95	110
ALL LCT/HDT Min.	35	40	31	70	43	34	35	25	30	40	25
ALL LCT/HDT SD	12.3	12.4	13.0	8.2	13.8	9.7	14.1	13.6	13.3	12.9	1.9

Table A2.16. Invasiveness of flake scars on LCTs/HDTs. Numbers and percentages by site. LCT = large cutting tool, HDT = heavy duty tool.

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Total
Marginal	3	10	0	1	4	3	8	7	2	2	40
Semi-invasive	11	13	8	1	7	1	13	16	4	4	78
Invasive	37	49	39	15	48	9	106	87	42	22	454
Total	51	72	47	17	59	13	127	110	48	28	572

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Total
Marginal	5.9%	13.9%	0.0%	5.9%	6.8%	23.1%	6.3%	6.4%	4.2%	7.1%	7.0%
Semi-invasive	21.6%	18.1%	17.0%	5.9%	11.9%	7.7%	10.2%	14.5%	8.3%	14.3%	13.6%
Invasive	72.5%	68.1%	83.0%	88.2%	81.4%	69.2%	83.5%	79.1%	87.5%	78.6%	79.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table A2.17. Summary of flake scar numbers of handaxes, cleavers, picks and all LCTs/HDTs. LCT = large cutting tool, HDT = heavy duty tool.

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Ave.
Handaxe Mean	10.5	11.9	10.8	14.5	19.0	14.8	13.7	19.0	18.8	30.0	16.3
Handaxe Max.	20	34	27	15	30	22	30	34	28	60	60
Handaxe Min.	7	3	4	14	9	12	5	7	8	16	3
Handaxe SD	4.4	7.4	5.6	0.7	5.7	4.9	5.4	7.2	4.9	10.5	2.5
Cleaver Mean	7.8	10.4	9.3	-	18.3	8.1	8.8	10.4	16.0	24.1	12.6
Cleaver Max.	14	18	12	-	28	14	18	20	31	48	48
Cleaver Min.	3	6	7	-	9	3	2	2	8	5	2
Cleaver SD	4.1	4.1	2.0	-	7.9	3.9	4.2	4.9	7.2	13.2	3.3
Pick Mean	10.4	16.5	13.3	16.2	17.6	-	14.5	16.6	-	16.3	15.2
Pic Max.	18	33	20	26	37	-	23	32	-	21	37
Pick Min.	5	7	7	7	8	-	10	8	-	11	5
Pick SD	3.5	6.3	4.0	4.9	7.1	-	4.4	5.6	-	4.6	1.2
ALL LCT/HDT Mean	7.9	12.7	11.3	15.9	17.3	9.9	12.0	15.3	18.3	26.4	14.7
ALL LCT/HDT Max.	20	34	27	26	37	22	30	34	31	60	60
ALL LCT/HDT Min.	2	3	4	7	6	3	2	2	8	5	2
ALL LCT/HDT SD	4.2	6.8	4.8	4.5	6.7	5.2	5.4	7.1	5.4	11.5	2.1

Table A2.18. Summary of maximum dimension of flake scars on handaxes, cleavers, picks and all LCTs/HDTs. LCT = large cutting tool, HDT = heavy duty tool.

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Ave.
Handaxe Mean	50.6	52.4	54.5	44.5	42.5	51.5	49.3	55.4	45.1	48.9	49.5
Handaxe Max.	76	81	86	55	61	61	108	85	86	65	108
Handaxe Min.	24	30	38	34	25	42	20	28	20	28	20
Handaxe SD	21.6	14.5	14.5	14.9	10.2	9.4	15.2	13.9	14.5	9.5	3.6
Cleaver Mean	63.8	57.8	63.9	-	47.3	52.8	56.0	54.7	50.9	58.3	56.2
Cleaver Max.	100	95	92	-	64	74	99	94	67	83	100
Cleaver Min.	38	32	33	-	40	37	5	20	41	35	5
Cleaver SD	24.9	19.1	22.1	-	11.4	13.1	18.1	20.2	8.3	17.7	5.3
Pick Mean	55.3	53.3	56.1	49.9	45.9	-	46.8	58.7	-	46.3	51.5
Pick Max.	80	91	104	88	77	-	71	80	-	55	104
Pick Min.	37	21	28	32	20	-	28	30	-	35	20
Pick SD	13.2	15.5	18.4	14.4	12.4	-	12.0	15.4	-	9.8	2.6
ALL LCT/HDT Mean	51.9	55.3	57.0	49.4	44.2	52.3	51.4	55.6	46.2	51.2	51.5
ALL LCT/HDT Max.	100	122	104	88	77	74	108	94	86	83	122
ALL LCT/HDT Min.	13	21	18	32	20	37	5	20	20	28	5
ALL LCT/HDT SD	19.6	17.5	17.8	13.6	11.7	11.6	16.3	16.0	13.7	12.8	2.8

Table A2.20. Summary of cleaver bit angle

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Ave.
Cleaver bit angle mean	47.6	43.2	38.0	-	35.8	44.9	44.2	44.4	38.2	30.4	40.7
Cleaver bit angle Max.	54	58	50	-	50	50	65	93	55	38	93
Cleaver bit angle Min.	42	32	25	-	25	38	28	25	25	20	20
Cleaver bit angle SD	5.9	9.8	9.5	-	10.5	4.8	7.9	12.3	8.7	6.8	2.4

Table A2.21. Summary of cleaver bit dimension

	6-A1	4-A2	10-A11	10-A6	7-A1, A3	7-A2	8-A1	12-A1	18-A1	20-A1, A2	Ave.
Cleaver bit dimension mean	81.0	65.8	83.4	-	52.3	73.5	67.1	61.8	52.9	45.3	64.8
Cleaver bit dimension Max.	108	112	125	-	93	108	110	101	69	73	125
Cleaver bit dimension Min.	55	42	52	-	28	41	30	28	38	32	28
Cleaver bit dimension SD	20.9	23.9	23.6	-	35.4	24.8	17.9	18.2	11.5	12.7	7.2