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Chokurcha I Unit IV: Artifacts

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This chapter describes the artifacts recovered from twenty levels of Unit IV during the 1996 and 2000 field seasons. These descriptions follow the variant of Gladilin's (1976) classification adopted for our other Crimean Middle Paleolithic studies (Chabai and Demidenko 1998). All twenty artifact assemblages exhibit pronounced typological and technological features of the Crimean Micoquian. Yet, there are some differences among their typological structures that might have resulted from either statistical variations within the Crimean Micoquian or dissimilar processes of flint reduction.

Structure of the Artifact Assemblage

A total of 9,089 artifacts were found in Unit IV. The artifacts have been subdivided into three main groups: artifacts made on flint, pebble artifacts, and bone artifacts (Table 24-1). The most numerous and variable are the flint artifacts. They include 9,008 items which are subdivided into seven categories, the dominant category being chips (< 3 cm), followed by tools, flakes, chunks, blades, cores, and preforms (Table 24-1). In the essential count, excluding chunks and chips, tools are most numerous, accounting for more than half of all artifacts (Table 24-1). This predominance of tools is characteristic of all levels. Flakes are not quite as frequent, while blades, cores, and preforms are even less common.

A total of 38 pebble artifacts were recovered from Unit IV. They are subdivided into four categories: pebble retouchers (most numerous), hammerstones, choppers, and chopping tools (Table 24-1).

The bone artifacts consist only of retouchers on bones (Table 24-1). Combined, bone and pebble instruments for flintknapping account for 9.5% of the essential artifact count.

The main features of the Unit IV artifact structure are a dominance of tools among the flint artifacts, a proportionately large number of instruments for flaking, and a paucity of cores and preforms. While the high percentage of tools and the low percentage of cores is not a rare event in the Crimean Middle Paleolithic, the number of flaking instruments is striking. In fact, the ratio of retouchers to flint tools (1 : 5) is unexpectedly high in comparison to other sites' assemblages.

Chunks

Chunks were found in nine of twenty levels (Table 24-1). These are small pieces of flint, with maximum dimensions no more than 3.5 cm, without pronounced traces of flaking. Thus, there are no chunks

in Unit IV that might be interpreted as a raw material supply. It is most likely that all chunks present in the assemblages were produced during the process of raw material reduction.

Preforms

The only preform in Unit IV was found in Level IV-O. Most likely, it is the preform of a backed bifacial scraper (Figure 24-1). The back was shaped before the edges were retouched. Alternatively, it could be a backed bifacial scraper in a stage of edge reshaping. Whichever the case, this piece does not exhibit continuous edge retouch and therefore could not be classified as a tool.

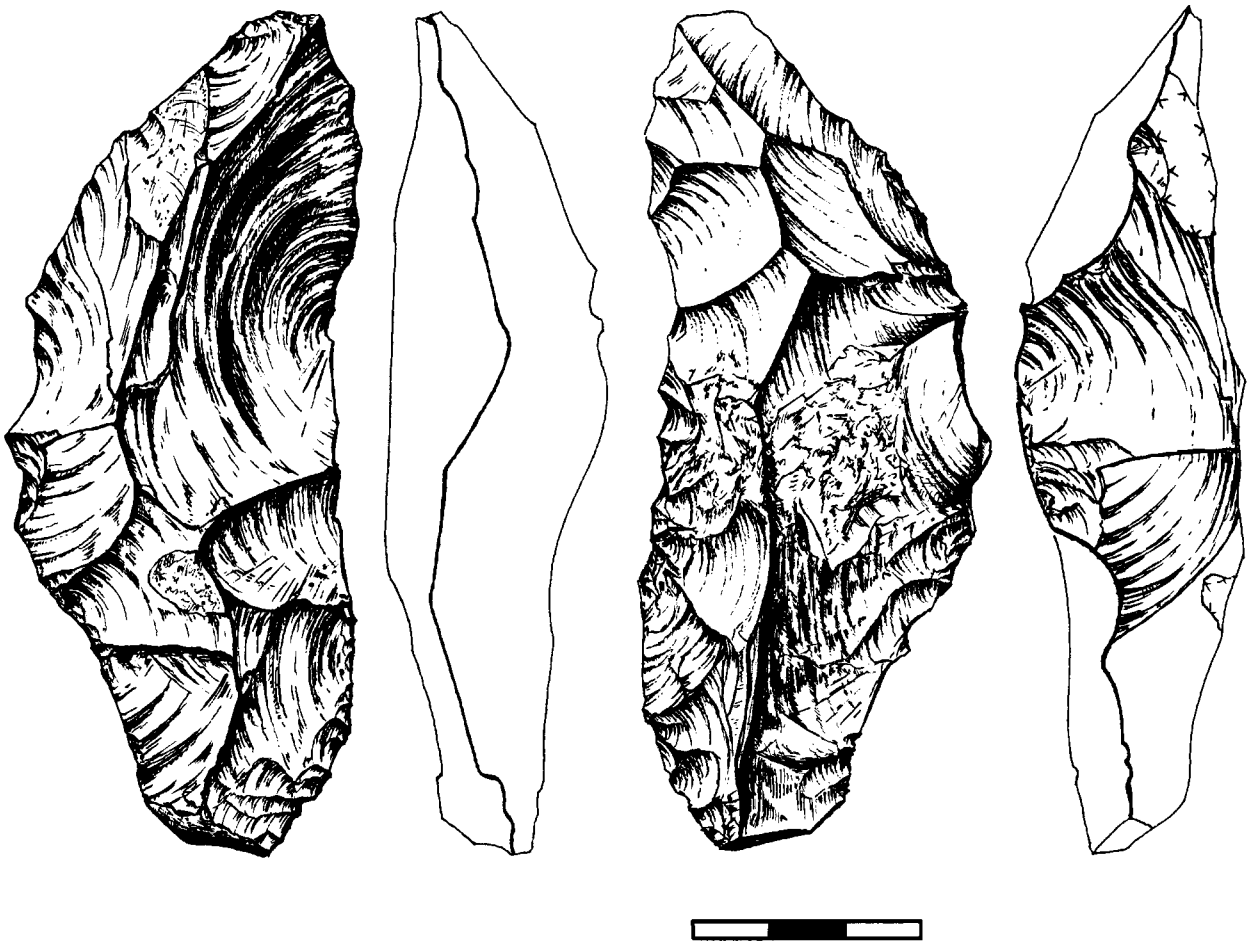

Figure 24-1—Chokurcha I Level IV-O: preform of bifacial tool.

Cores

Cores were found in only three of the twenty levels (Table 24-1). Five of the 7 cores come from Level IV-O. Typologically, these 5 cores are radial (Levels IV-F and IV-O), 1 is unidirectional transverse (Level IV-I2), and 1 is unidentifiable (IV-O). Typological definitions are futile, however, as all of the cores found in Unit IV are exhausted. The biggest radial core (Figure 24-2: *3*) is only 4.7 cm in length, 4.3 cm in width, and 2.2 cm in thickness. No other core is more than 3.5 cm in greatest dimension. In fact, the early reduction stages of these cores are not clear. Pieces classified as cores in the Unit IV assemblages might, in fact, be reduced fragments of both bifacial and unifacial tools.

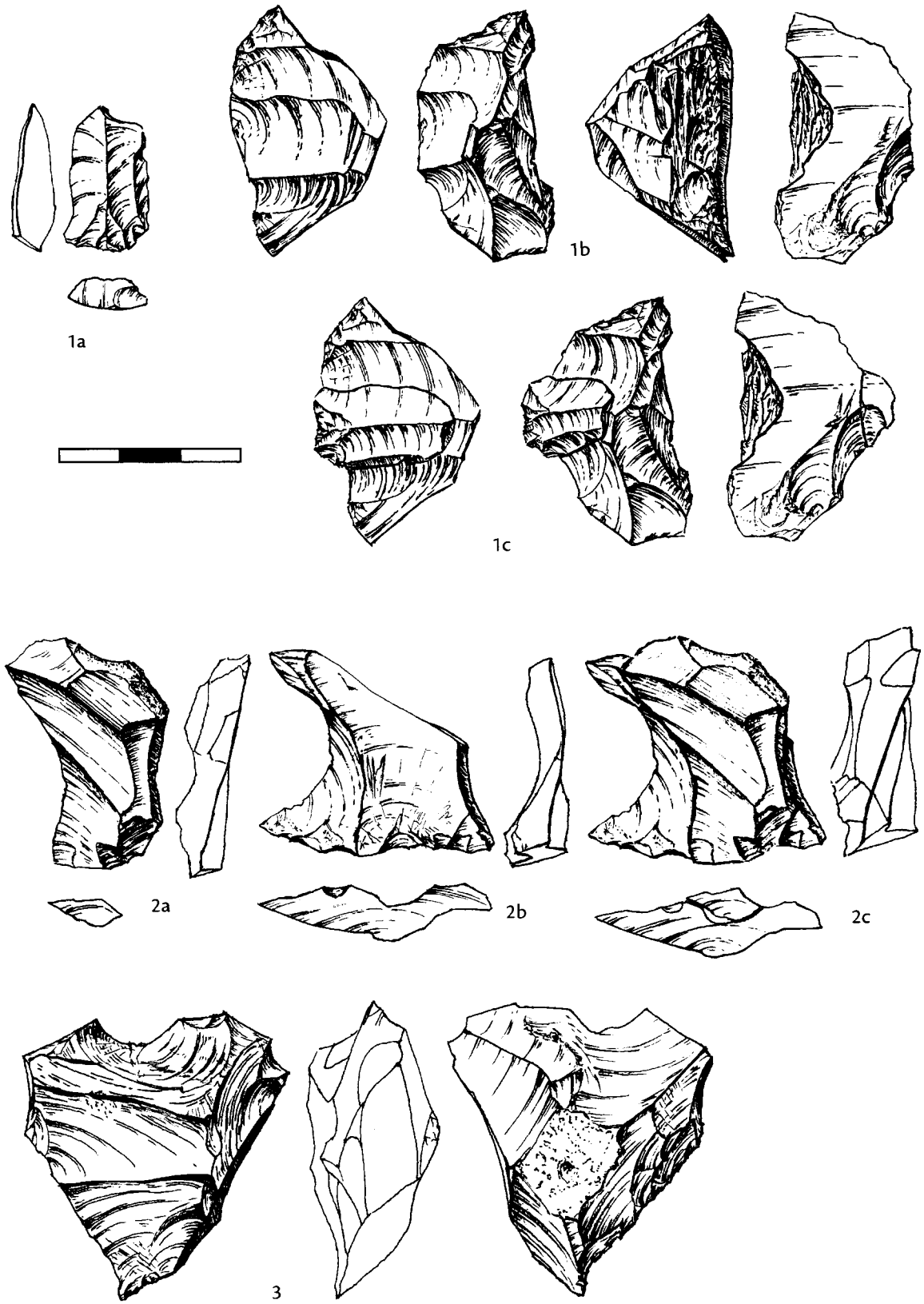

Figure 24-2—Chokurcha I Level IV-O: *1a, 1b, 1c*–conjoined chip and core-like scraper; *2a, 2b, 2c*–conjoined flakes from core-like scraper; *3*–radial core.

TABLE 24-1
Chokurcha I Unit IV: artifact totals

Flint Artifacts	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2
Chunks	·	2	1	·	6	·	7	3	·	1	·
Preforms	·	·	·	·	·	·	·	·	·	·	·
Cores	·	·	·	·	1	·	·	1	·	·	·
Chips	62	69	393	42	822	243	1,964	226	80	80	154
Flakes	8	8	22	5	20	15	65	10	·	2	3
Blades	·	·	2	·	1	·	7	2	·	·	2
Tools	6	2	20	5	42	6	79	17	7	4	6
Total	76	81	438	52	892	264	2,122	259	87	87	165

Pebble & Bone Artifacts	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I2	IV-K	IV-L	IV-L_2
Retouchers on pebbles	1	1	1	·	5	·	9	2	·	·	·
Hammerstones	·	·	·	·	·	·	·	·	·	1	1
Hammerstones, retouchers	·	·	·	·	·	·	·	·	1	·	·
Choppers	·	·	·	·	·	·	1	·	·	·	·
Choppings	·	·	·	·	·	·	·	·	·	·	·
Retouchers on bones	2	·	3	·	11	·	12	3	1	·	·
Total	3	1	4	·	16	·	22	5	2	1	1

There may also be some primary flaking evident on the Chokurcha core-like scrapers (Figure 24-2: 1a-1c) found in Levels IV-M (1) and IV-O (3). These scrapers are made on thick flakes with dorsal retouch. The ventral surface of these core-like scrapers served as the striking platform, not only for obverse retouch, but also for short flakes. Some of the flakes removed from these core-like scrapers possess the thick, plain platforms that were previously part of the ventral surface of the core-like scrapers (Figure 24-2: 2a–2c). To some extent, the core-like scrapers could be interpreted as pyramidal cores made on flakes.

Blank Variability

The majority of blanks are chips, follows by bifacial thinning chips (Figure 24-3: *1, 4, 7, 9, 12*), flakes, bifacial thinning flakes (Figure 24-3: *5, 11*), blades, and bifacial thinning blades (Figure 24-*3: 6*) (Table 24-2). Among the blanks with identifiable butts, bifacial thinning blanks account for more than 20%. One-third of these blanks are flakes, while the other two-thirds are blade-proportioned (Figure 24-4).

Chips

Chips have been subdivided into four major groups: "regular," bifacial thinning chips, rejuvenation chips, and chips with broken butts (Table 24-3). Broken, "regular," and bifacial thinning chips were found in each of the twenty levels of Unit IV. The bifacial thinning chips exhibit obtuse, faceted or plain platforms, lipped butts, and, in most cases, numerous proximal dorsal scars. Rejuvenation chips (Figure 24-3: *3, 10*) were recovered from six levels. Rejuvenation chips are subdivided into two types: reshaping chips of bifacial tool tips (21) and Prondnik para-burin spalls (3). The Prondnik para-burin spalls were found in Levels IV-M (2) and IV-O (1). Overall, rejuvenation chips comprise 3.1% of the total number of bifacial thinning and rejuvenation chips.

Flakes and Blades

The blade index is 7.79. This low number, however, does not accurately reflect the status of blades in the Unit IV assemblages. The majority of complete blades were the result of bifacial tool reduction (Figures 24-3: *6*; 24-4). Thus, taking into account the absence of blade cores, there is no reason to suggest the presence of any purposeful blade technology in the Unit IV assemblages.

Bifacial thinning and rejuvenation flakes are prominent elements within the flake assemblage (Figures 24-3: *2, 5, 8, 11*; 24-4). These pieces were found in fourteen of the twenty Unit IV levels. About one-third of the bifacial thinning and rejuvenation flakes came from Level IV-I (Table 24-2). Rejuvenation flakes are relatively rare—comprising only 5 (7.2%) of the total

TABLE 24-1 CONTINUED
Chokurcha I Unit IV: artifact totals

IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	Total	%	*ess %*
12	2	17	·	·	·	·	·	·	51	0.6	
·	·	1	·	·	·	·	·	·	1	0.0	0.1
·	·	5	·	·	·	·	·	·	7	0.1	1.0
1,818	83	1,845	13	109	93	5	121	35	8,257	91.7	
35	3	69	1	4	2	1	5	6	284	3.2	40.6
5	·	2	·	3	·	·	·	·	24	0.3	3.4
72	7	91	1	7	8	2	2	·	384	4.3	54.9
1,942	95	2,030	15	123	103	8	128	41	9,008	100.0	100.0

IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	Total
6	·	6	·	·	·	·	·	·	32
·	·	2	·	·	·	·	·	·	4
·	·	·	·	·	·	·	·	·	
·	·	·	·	·	·	·	·	·	1
1	·	·	·	·	·	·	·	·	1
10	·	·	·	·	1	·	·	·	43
17	·	8	·	·	1	·	·	·	81

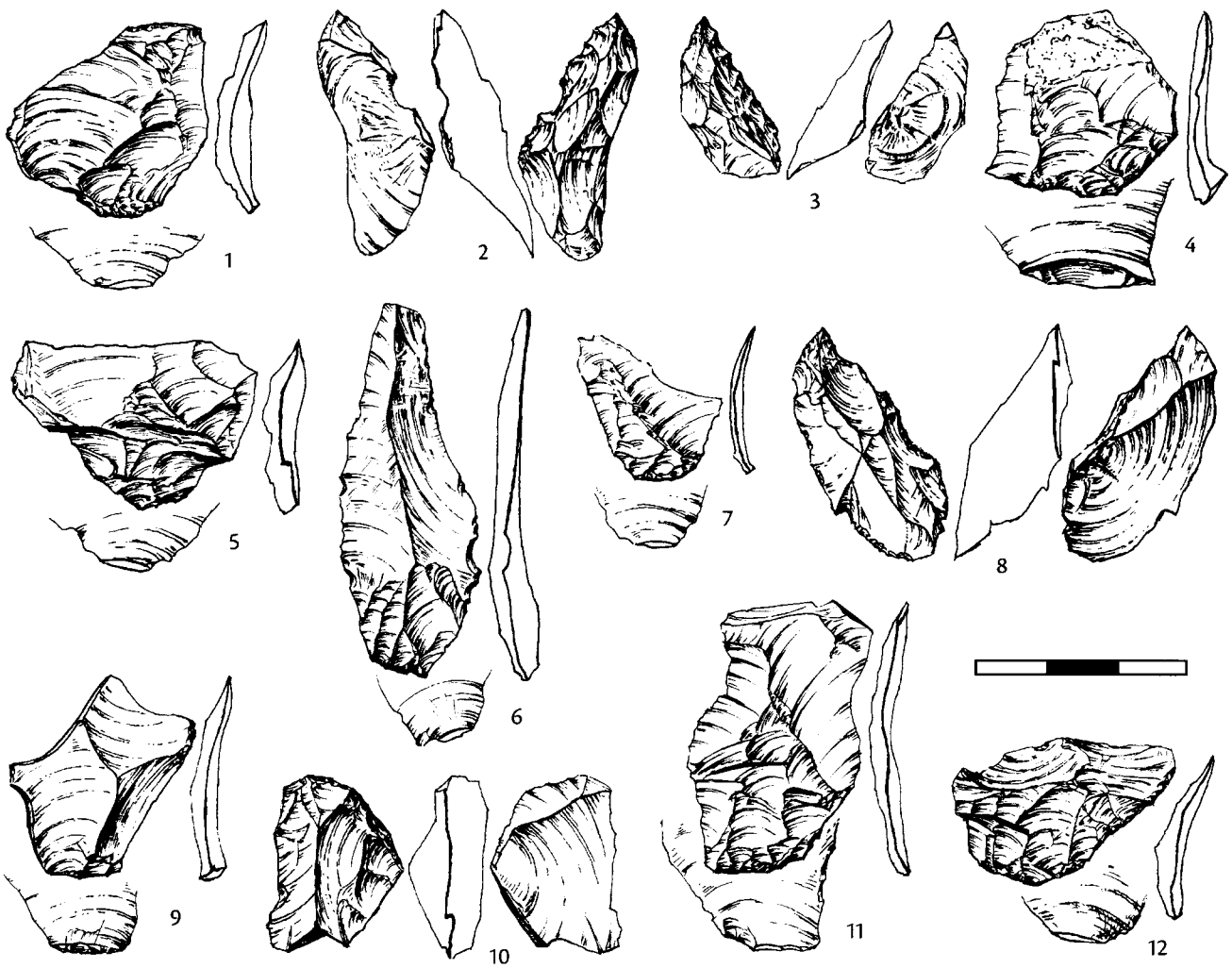

Figure 24-3—Chokurcha I Levels IV-A2 (7, 9), IV-B (11), IV-I (1, 4, 5, 6, 10, 12), IV-M (2, 3, 8) bifacial thinning and rejuvenation blanks: *1, 4, 7, 9, 12*–bifacial thinning chips; *5, 11*–bifacial thinning flakes; *6*–bifacial thinning blade; *3, 10*–rejuvenation chips; *2, 8*–rejuvenation flakes.

TABLE 24-2
Chokurcha I Unit IV: blank variability as numbers and percentages of each type†

LEVEL	IV-A	IV-A2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I2	IV-K	IV-L	IV-L2
Chip‡	59	57	359	41	782	224	1,781	195	58	75	151
Bifacial thinning & rejuvenation chip	3	12	34	1	47	20	190	34	23	5	5
Flake‡	10	10	27	6	37	16	79	11	1	4	5
Bifacial thinning & rejuvenation flake	·	·	6	·	6	3	24	5	2	2	
Blade‡	·	·	5	·	4	·	6	3	1	·	3
Bifacial thinning blade	·	·	·	·	1	·	4	1	·	·	
Total	72	79	431	48	877	263	2,084	249	85	86	164

LEVEL	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	%
Chip‡	1,647	70	1,722	7	91	72	2	102	30	7,525	85.2
Bifacial thinning & rejuvenation chip	183	13	135	6	18	22	3	19	5	778	8.8
Flake‡	61	9	111	2	10	4	3	5	5	416	4.7
Bifacial thinning & rejuvenation flake	5	1	8	·	1	4	·	1	1	69	0.8
Blade‡	6	·	3	·	3	·	·	·	·	34	0.4
Bifacial thinning blade	1	·	·	·	·	·	·	·	·	7	0.1
Total	1,903	93	1,979	15	123	102	8	127	41	8,829	100.0

†including tools; ‡including pieces with broken butts.

TABLE 24-3
Chokurcha I Unit IV: grouped maximum dimensions for different kinds of chips

	LEVEL	IV-A	IV-A2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I2	IV-K	IV-L	IV-L2
"Regular"	0.1–1.9 cm	25	20	135	8	183	77	424	49	18	20	32
	2.0–2.9 cm	8	6	31	6	58	16	96	12	3	4	7
"Bifacial"	0.1–1.9 cm	3	10	24	·	26	17	144	23	14	1	2
	2.0–2.9 cm	·	2	9	1	18	3	38	10	9	3	3
"Rejuvenation"	0.1–1.9 cm	·	·	·	·	1	·	4	·	·	1	·
	2.0–2.9 cm	·	·	1	·	1	·	4	·	·	·	·
Broken		26	31	193	27	535	130	1,254	132	36	51	110
Total		62	69	393	42	822	243	1,964	226	80	80	154

	LEVEL	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess%*
"Regular"	0.1–1.9 cm	561	25	735	1	27	28	1	31	7	2,407	64.7
	2.0–2.9 cm	133	9	127	·	3	10	1	3	4	537	14.4
"Bifacial"	0.1–1.9 cm	147	12	104	4	16	18	1	15	3	584	15.7
	2.0–2.9 cm	29	1	25	2	2	4	2	4	2	167	4.5
"Rejuvenation"	0.1–1.9 cm	3	·	4	·	·	·	·	·	·	13	0.4
	2.0–2.9 cm	4	·	1	·	·	·	·	·	·	11	0.3
Broken		941	36	849	6	61	33	·	68	19	4,538	·
Total		1,818	83	1,845	13	109	93	5	121	35	8,257	100.0

TABLE 24-4
Chokurcha I Unit IV: average size of debitage (mm)

	X̄ Length	*X̄ Width*	*X̄ Thickness*
Flake	3.0	2.9	0.7
Bifacial thinning flake	2.8	3.2	0.5
Blade	3.8	1.7	0.5
Bifacial thinning blade	4.2	1.6	0.4
All blanks	3.0	2.8	0.6

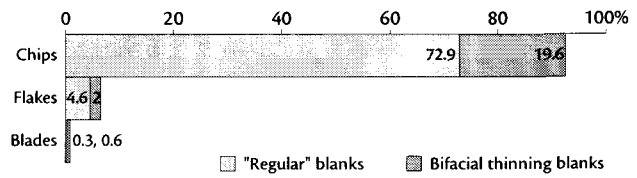

Figure 24-4—Chokurcha I Unit IV: blank variability.

number of bifacial thinning and rejuvenation flakes. All of them are reshaping flakes of bifacial tool tips.

Dimensions

The different categories of blanks have about the same length/width pattern (Figure 24-5). Most blanks are neither longer nor wider than 3.9 cm; only 3% of blanks are longer than 4.9 cm. There are only 5 blanks that are either longer or wider than 5.9 cm (Figure 24-5). The means of blank dimensions show that regular flakes are a little longer and a little thicker than bifacial thinning flakes, while bifacial thinning flakes are a little wider than regular flakes (Table 24-4). "Regular" blades are wider and thicker than bifacial thinning blades, while the latter are a little longer than "regular" blades. In sum, the average dimensions of all blanks are quite small (Table 24-4).

Surface Cortex

Flakes have more dorsal cortex than other blank types (Table 24-5). Flakes without dorsal cortex comprise less than one-half of all flakes, while for both bifacial thinning flakes and blades those without traces of dorsal cortex dominate. Heavily corticated (more

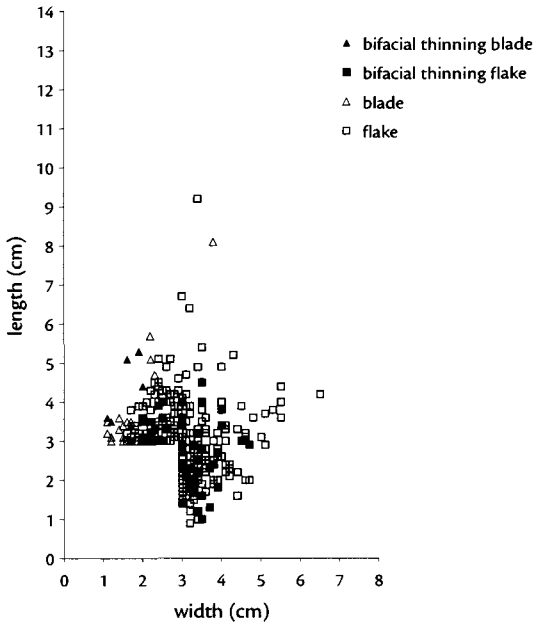

Figure 24-5—Chokurcha I Unit IV: length/width scatterplot for different kinds of flakes and blades, including tools on different kinds of flakes and blades.

TABLE 24-5
Chokurcha I Unit IV: flake and blade percentage of dorsal cortical coverage

LEVEL	IV-A	IV-A2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I2	IV-K	IV-L	IV-L2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	%
Flakes & tools on flake																						
0%	6	6	14	5	24	5	25	5	1	2	2	23	4	44	1	4	2	1	1	·	175	42.1
<25 %	2	3	7	1	6	4	23	3	·	2	1	20	3	41	1	2	1	1	1	1	123	29.6
25–50 %	·	·	2	·	2	3	11	1	·	·	1	11	1	16	·	1	·	·	1	1	51	12.3
50–75 %	·	·	1	·	3	·	5	·	·	·	·	1	1	3	·	1	·	1	2	2	20	4.8
>75 %	1	1	·	·	·	·	1	1	·	·	·	3	·	1	·	2	·	·	·	·	10	2.4
100%	1	·	3	·	2	4	14	1	·	·	1	3	·	6	·	·	1	·	·	1	37	8.9
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flake																						
0%	·	·	5	·	6	3	17	4	1	2	·	2	1	6	·	1	2	·	1	1	52	75.4
<25 %	·	·	1	·	·	·	6	1	1	·	·	2	·	1	·	·	1	·	·	·	13	18.8
25–50 %	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	1	·	·	·	2	2.9
50–75 %	·	·	·	·	·	·	·	·	·	·	·	1	·	1	·	·	·	·	·	·	2	2.9
Total	·	·	6	·	6	3	24	5	2	2	·	5	1	8	·	1	4	·	1	1	69	100.0
Blades & tools on blade																						
0%	·	·	4	·	2	·	3	2	1	·	2	5	·	2	·	2	·	·	·	·	23	
<25 %	·	·	·	·	1	·	2	1	·	·	1	·	·	1	·	·	·	·	·	·	6	
25–50 %	·	·	1	·	·	·	1	·	·	·	·	1	·	·	·	·	·	·	·	·	3	
50–75 %	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	1	
100%	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
0%	·	·	·	·	·	·	4	·	·	·	·	·	·	·	·	·	·	·	·	·	4	
<25 %	·	·	·	·	1	·	·	1	·	·	·	1	·	·	·	·	·	·	·	·	3	
Total	·	·	·	·	1	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	7	

than 50% of surface cortex) bifacial thinning pieces and blades are very rare or absent in most assemblages, while about 15% of regular flakes have extensively corticated dorsal surfaces. Primary flakes comprise 8.9% of regular flakes. Primary elements are represented by a single blade (Table 24-5). There is no direct relationship between the blank size and surface cortex amount. The "small" blanks are covered by cortex to the same extent as the "large" blanks. This is characteristic for flint plaquette reduction, because the amount of cortex in relation to flint volume is always greater on plaquettes than on nodules. There were no differences in surface cortex patterning between the levels.

Dorsal Scar Patterns

Blanks with unidirectional and unidirectional-crossed scar patterns occurred on more than half of all flake and blade assemblages (Table 24-6). These two types of dorsal scar patterns were found in all levels of Unit IV. Bifacial treatment blanks display less variety in their dorsal scar patterns than do regular blanks. Dorsal scar patterns of cortex, lateral, bilateral, radial, and crested do not appear on bifacial thinning and rejuvenation blanks. On the other hand, unidirectional and unidirectional-crossed types are equally characteristic for both "regular" and bifacial thinning blanks.

TABLE 24-6
Chokurcha I Unit IV: flake and blade dorsal scar patterns

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess* %
Flakes & tools on flake																						
Cortex	2	·	2	·	3	4	15	2	·	·	1	3	·	7	·	·	1	·	·	1	41	11.5
Lateral	·	·	1	1	4	1	2	·	·	2	·	6	1	7	·	·	·	1	·	2	28	7.9
Bilateral	·	·	·	·	·	·	3	·	·	·	·	·	·	2	·	·	1	·	·	·	6	1.7
Radial	·	·	3	·	·	·	4	1	·	·	·	·	·	3	·	·	·	·	·	·	11	3.1
Converging	·	·	1	·	1	·	3	·	·	·	·	4	·	1	·	·	·	·	·	1	11	3.1
Unidirectional	3	2	7	2	10	4	25	3	1	1	1	18	2	28	2	3	1	2	3	·	118	33.1
Unidirect.-crossed	1	1	4	·	7	5	6	2	·	·	3	10	2	31	·	3	·	·	1	1	77	21.6
Bidirectional	·	1	1	·	·	1	6	·	·	·	·	5	·	7	·	·	1	·	1	·	23	6.4
Bidirect.-crossed	3	5	4	·	3	·	8	·	·	1	·	5	1	6	·	·	·	·	·	·	36	10.1
Crested	·	·	·	·	·	·	3	1	·	·	·	1	·	1	·	·	·	·	·	·	6	1.7
Unidentifiable	1	1	4	3	9	1	4	2	·	·	·	9	3	18	·	4	·	·	·	·	59	·
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flake																						
Converging	·	·	1	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	2	3.3
Unidirectional	·	·	1	·	1	3	15	1	1	2	·	2	·	2	·	1	2	·	1	·	32	52.5
Unidirect.-crossed	·	·	2	·	1	·	3	1	·	·	·	1	1	3	·	·	·	·	·	·	12	19.7
Bidirectional	·	·	1	·	·	·	5	·	1	·	·	·	·	2	·	·	1	·	·	·	10	16.4
Bidirect.-crossed	·	·	1	·	1	·	·	1	·	·	·	·	·	·	·	·	1	·	·	1	5	8.2
Unidentifiable	·	·	·	·	3	·	·	2	·	·	·	2	·	1	·	·	·	·	·	·	8	·
Total	·	·	6	·	6	3	24	5	2	2	·	5	1	8	·	1	4	·	1	1	69	100.0
Blades & tools on blade																						
Cortex	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Lateral	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	1	
Bilateral	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Radial	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	1	
Unidirectional	·	·	1	·	·	·	1	·	·	·	1	2	·	1	·	3	·	·	·	·	9	
Unidirect.-crossed	·	·	1	·	·	·	1	2	·	·	·	4	·	1	·	·	·	·	·	·	9	
Bidirectional	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Bidirect.-crossed	·	·	1	·	2	·	·	1	·	·	·	·	·	1	·	·	·	·	·	·	5	
Crested	·	·	1	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	2	
Unidentifiable	·	·	·	·	1	·	3	·	·	·	·	·	·	·	·	·	·	·	·	·	4	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
Unidirect.-crossed	·	·	·	·	·	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	6	
Unidentifiable	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	·	1	4	·	1	·	·	·	1	·	·	·	·	·	·	·	·	·	7	

TABLE 24-7
Chokurcha I Unit IV: flake and blade axes

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess %*
Flakes & tools on flake																						
On-axis	7	6	11	1	22	5	33	7	1	2	2	22	3	41	1	5	1	·	3	2	175	52.9
Off-axis	1	4	10	·	6	9	31	3	·	2	3	28	3	48	·	2	3	2	1	·	156	47.1
Unident.	2	·	6	5	9	2	15	1	·	·	·	11	3	22	1	3	·	1	1	3	85	
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flakes																						
On-axis	·	·	3	·	1	·	9	1	2	2	·	1	1	6	·	1	·	·	1	·	28	43.8
Off-axis	·	·	3	·	4	3	15	3	·	·	·	2	·	1	·	·	4	·	·	1	36	56.3
Unident.	·	·	·	·	1	·	·	1	·	·	·	2	·	1	·	·	·	·	·	·	5	
Total	·	·	6	·	6	3	24	5	2	2	·	5	1	8	·	1	4	·	1	1	69	100.0
Blades & tools on blade																						
On-axis	·	·	4	·	3	·	4	2	1	·	·	1	·	2	·	2	·	·	·	·	19	
Off-axis	·	·	1	·	1	·	2	1	·	·	3	5	·	1	·	1	·	·	·	·	15	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
On-axis	·	·	·	·	·	·	1	1	·	·	·	·	·	·	·	·	·	·	·	·	2	
Off-axis	·	·	·	·	1	·	3	·	·	·	·	1	·	·	·	·	·	·	·	·	5	
Total	·	·	·	·	1	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	7	

Axis

The proportion of on- and off-axis blanks for "regular" and bifacial thinning blanks is different, but not dramatically. On-axis pieces predominate among the "regular" flakes and blades, while the majority of bifacial thinning flakes and blades are off-axis (Table 24-7).

Shapes

Trapezoidal pieces account for ca. 33% to 40% of both "regular" and bifacial thinning flakes (Table 24-8). The second most common shape is irregular, comprising about a quarter of both "regular" and bifacial thinning pieces. Rectangular and expanding shapes follow, while all other shapes are infrequent. Among the blades, rectangular and triangular shapes comprise about half of the assemblage. In other words, there is no difference in shape between "regular" and bifacial thinning blanks, while the flake and blade assemblages are quite different. This disparity, to a large extent, is caused by blade and flake definitions. Blades, the longer pieces, tend to be rectangular or triangular, rather than trapezoidal.

Lateral Profiles

Flat lateral profiles account for about a quarter of "regular" flakes and only about 10% of bifacial thinning flakes (Table 24-9). On the other hand, incurvate medial, incurvate distal, and twisted profiles are common among both bifacial thinning blanks and "regular" blades; hence, the lateral profiles of "regular" blades are closest to the lateral profiles of bifacial thinning pieces. In sum, incurvate and twisted lateral profiles are dominant for both "regular" and bifacial thinning blanks, though this is reflected in different proportions. Incurvate and twisted lateral profiles comprise 56.1% of "regular" blanks, while these profiles account for 86.1% of bifacial thinning blanks.

Distal Profiles

Feathering distal profiles are most common among bifacial thinning blanks (Table 24-10), while hinged and blunt terminations are more common among "regular" blanks.

TABLE 24-8
Chokurcha I Unit IV: flake and blade shapes

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess %*
Flakes & tools on flake																						
Rectangular	·	·	1	·	3	2	8	2	·	1	·	4	·	7	1	1	·	·	·	1	31	11.7
Triangular	·	·	·	·	·	·	2	2	·	·	·	7	·	9	·	1	·	·	·	·	21	7.9
Trapezoidal	1	1	7	·	4	3	19	2	1	·	2	19	4	23	·	3	·	1	·	·	90	33.8
Trap. elongated	1	1	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	3	1.1
Ovoid	·	·	1	·	1	·	3	·	·	·	·	1	·	4	·	·	·	·	·	·	10	3.8
Leaf shaped	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	0.4
Crescent	·	·	2	·	1	·	2	·	·	·	·	1	·	6	·	·	1	·	1	·	14	5.3
Expanding	3	4	2	·	·	·	3	3	·	1	·	1	·	6	·	·	1	·	1	·	25	9.4
Irregular	1	4	1	·	8	5	10	2	·	2	1	8	·	23	·	1	2	·	2	1	71	26.7
Unidentifiable	4	·	12	6	20	6	31	·	·	·	2	20	5	33	1	4	·	2	1	3	150	
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flake																						
Rectangular	·	·	3	·	1	1	3	·	1	1	·	·	·	2	·	·	·	·	·	·	12	20.0
Triangular	·	·	·	·	·	·	1	1	·	·	·	·	·	·	·	·	·	·	·	·	2	3.3
Trapezoidal	·	·	1	·	·	2	13	·	1	·	·	2	·	3	·	1	·	·	·	1	24	40.0
Crescent	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	1	1.7
Expanding	·	·	1	·	3	·	·	·	·	·	·	·	·	·	·	·	1	·	1	·	6	10.0
Irregular	·	·	1	·	1	·	6	3	·	·	·	·	·	2	·	·	2	·	·	·	15	25.0
Unidentifiable	·	·	·	·	1	·	1	1	·	1	·	3	1	1	·	·	·	·	·	·	9	
Total	·	·	6	·	6	3	24	5	2	2	·	5	1	8	·	1	4	·	1	1	69	100.0
Blades & tools on blade																						
Rectangular	·	·	·	·	1	·	1	1	·	·	1	4	·	1	·	2	·	·	·	·	11	
Triangular	·	·	2	·	2	·	1	1	·	·	·	1	·	·	·	·	·	·	·	·	7	
Trap. elongated	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	1	
Ovoid	·	·	1	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	2	
Expanding	·	·	1	·	·	·	1	1	·	·	·	·	·	·	·	1	·	·	·	·	4	
Irregular	·	·	·	·	1	·	1	·	·	·	·	1	·	1	·	·	·	·	·	·	4	
Unidentifiable	·	·	1	·	·	·	1	·	1	·	2	·	·	·	·	·	·	·	·	·	5	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
Rectangular	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Triangular	·	·	·	·	·	·	1	·	·	·	·	1	·	·	·	·	·	·	·	·	2	
Crescent	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Expanding	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	
Irregular	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Unidentifiable	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	·	·	1	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	7	

TABLE 24-9
Chokurcha I Unit IV: flake and blade lateral profiles

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess %*
Flakes & tools on flake																						
Flat	3	1	10	2	12	5	19	2	1	1	2	13	2	20	1	2	·	·	·	1	97	26.4
Incurvate medial	2	2	4	·	5	2	18	1	·	·	·	9	·	15	·	3	·	2	·	2	65	17.7
Incurvate distal	·	·	2	·	1	2	11	3	·	1	1	11	1	15	·	1	3	·	2	·	54	14.7
Twisted	3	7	5	1	9	5	15	2	·	·	·	5	·	22	·	·	1	·	1	1	77	20.9
Convex	1	·	1	·	3	1	8	2	·	2	2	14	5	31	·	1	·	1	2	1	75	20.4
Unidentifiable	1	·	5	3	7	1	8	1	·	·	·	9	1	8	1	3	·	·	·	·	48	
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flake																						
Flat	·	·	1	·	·	1	2	·	·	1	·	·	·	1	·	·	·	·	1		7	10.8
Incurvate medial	·	·	4	·	3	1	6	·	·	1	·	·	1	2	·	1	·	·	·	1	20	30.8
Incurvate distal	·	·	·	·	·	·	8	2	1	·	·	1	·	1	·	·	·	·	·	·	13	20.0
Twisted	·	·	1	·	3	1	7	1	1	·	·	1	·	3	·	·	4	·	·	·	22	33.9
Convex	·	·	·	·	·	·	1	·	·	·	·	1	·	1	·	·	·	·	·	·	3	4.6
Unidentifiable	·	·	·	·	·	·	·	2	·	·	·	2	·	·	·	·	·	·	·	·	4	
Total	·	·	6	·	6	3	24	5	2	2	·	5	1	8	·	1	4	·	1	1	69	100.0
Blades & tools on blade																						
Flat	·	·	1	·	·	·	1	·	·	·	1	·	·	·	·	·	·	·	·	·	3	
Incurvate medial	·	·	1	·	·	·	1	1	1	·	·	1	·	1	·	·	·	·	·	·	6	
Incurvate distal	·	·	·	·	·	·	·	1	·	·	·	2	·	1	·	·	·	·	·	·	4	
Twisted	·	·	3	·	4	·	2	1	·	·	2	3	·	1	·	3	·	·	·	·	19	
Convex	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Unidentifiable	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
Flat	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Twisted	·	·	·	·	1	·	3	1	·	·	·	1	·	·	·	·	·	·	·	·	6	
Total	·	·	·	·	1	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	7	

TABLE 24-10
Chokurcha I Unit IV: flake and blade distal profiles

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess%*
Flakes & tools on flake																						
Feathering	3	7	11	1	9	6	20	4	·	1	·	11	·	25	·	2	1	2	·	2	105	39.3
Hinged	3	1	3	·	8	2	11	2	1	1	2	19	4	40	·	2	2	·	4	1	106	39.7
Overpassed	·	·	·	·	·	·	·	·	·	·	·	·	·	5	·	·	·	·	·	·	5	1.9
Blunt	1	1	3	·	2	3	15	2	·	·	1	2	2	16	1	1	·	·	1	·	51	19.1
Missing	3	1	10	5	18	5	33	3	·	2	2	29	3	25	1	5	1	1	·	2	149	
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flake																						
Feathering	·	·	6	·	5	2	11	·	·	1	·	1	·	4	·	·	1	·	·	1	32	68.1
Hinged	·	·	·	·	·	1	2	1	1	·	·	·	1	2	·	1	2	·	·	·	11	23.4
Blunt	·	·	·	·	·	·	2	1	·	·	·	·	·	·	·	·	1	·	·	·	4	8.5
Missing	·	·	·	·	1	·	9	3	1	1	·	4	·	2	·	·	·	·	1	·	22	
Total	·	·	6	·	6	3	24	5	2	2	·	5	1	8	·	1	4	·	1	1	69	100.0
Blades & tools on blade																						
Feathering	·	·	1	·	1	·	1	1	·	·	·	3	·	1	·	1	·	·	·	·	9	
Hinged	·	·	1	·	1	·	3	·	·	·	·	3	·	1	·	1	·	·	·	·	10	
Blunt	·	·	·	·	·	·	1	·	·	·	1	·	·	·	·	1	·	·	·	·	3	
Missing	·	·	3	·	2	·	1	2	1	·	2	·	·	1	·	·	·	·	·	·	12	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
Feathering	·	·	·	·	·	·	3	1	·	·	·	·	·	·	·	·	·	·	·	·	4	
Hinged	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	1	
Overpassed	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Missing	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	·	·	1	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	7	

TABLE 24-11
Chokurcha I Unit IV: flake and blade cross-sections

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess %*
Flakes & tools on flake																						
Flat	1	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	3	0.9
Triangular	3	3	6	·	6	2	19	·	·	·	4	13	1	23	1	1	·	·	·	2	84	24.8
Lateral steep	·	·	2	·	4	2	12	2	1	2	·	2	1	14	·	·	·	·	2	·	44	13.0
Trapezoidal	1	5	8	1	7	5	14	2	·	·	1	16	2	26	·	5	·	·	2	1	96	28.3
Polyhedral	·	·	·	·	3	4	15	4	·	2	·	8	2	18	·	1	2	·	·	·	59	17.4
Convex	·	·	·	·	3	1	4	1	·	·	·	5		7	·	1	·	1	1	2	26	7.7
Irregular	1	2	4	·	1	·	3	·	·	·	·	7	1	7	·	·	1	·	·	·	27	8.0
Unidentifiable	4	·	7	5	12	2	12	2	·	·	·	10	2	16	1	2	·	2	·	·	77	
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flake																						
Flat	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	1	1.5
Triangular	·	·	2	·	2	1	5	·	·	·	·	·	·	1	·	1	·	·	·	1	13	19.7
Lateral steep	·	·	·	·	·	1	3	1	·	·	·	·	·	·	·	·	·	·	·	·	5	7.6
Trapezoidal	·	·	4	·	2	·	4	·	·	2	·	·	·	2	·	·	·	·	1	·	15	22.7
Polyhedral	·	·	·	·	·	1	10	3	1	·	·	2	1	4	·	·	1	·	·	·	23	34.8
Convex	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	1	1.5
Irregular	·	·	·	·	1	·	2	1	1	·	·	·	·	1	·	·	2	·	·	·	8	12.1
Unidentifiable	·	·	·	·	1	·	·	·	·	·	·	2	·	·	·	·	·	·	·	·	3	
Total	·	·	6	·	6	3	24	5	2	2		5	1	8		1	4		1	1	69	100.0
Blades & tools on blade																						
Triangular	·	·	1	·	·	·	3	3	·	·	1	3	·	·	·	2	·	·	·	·	13	
Lateral steep	·	·	1	·	1	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	3	
Trapezoidal	·	·	3	·	1	·	1	·	1	·	2	3	·	1	·	1	·	·	·	·	13	
Polyhedral	·	·	·	·	2	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	3	
Convex	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Unidentifiable	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
Triangular	·	·	·	·	·	·	2	·	·	·	·	·	·	·	·	·	·	·	·	·	2	
Trapezoidal	·	·	·	·	·	·	2	1	·	·	·	1	·	·	·	·	·	·	·	·	4	
Polyhedral	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	·	·	1	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	7	

Cross-Sections at Midpoint

The major difference between the cross-sections of "regular" pieces and bifacial thinning pieces is most apparent in the polyhedral cross-sections (Table 24-11), where they are proportionately twice more common among bifacial thinning blanks than among "regular" flakes. The other cross-section types do not demonstrate any significant differences between "regular" and bifacial thinning blanks.

Platform Preparation

Plain platforms are most common on "regular" blanks, while polyhedral and faceted platforms are most common on bifacial thinning blanks (Table 24-12). Cortical platforms comprise ca. 10% of all identifiable "regular" blank butts, while there is none among bifacial thinning blanks. Thus, for "regular" blanks, the IFl = 31.8 and the IFs = 10.1; for bifacial thinning blanks the IFl = 49.3 and the IFs = 15.1; for total blanks the IFl = 36.6 and IFs = 11.5. Taking into account the absence of evidence for primary flaking, these indices do not mean much. At the same time, it is clear that the platforms of bifacial thinning blanks were more often "faceted" than were the platforms of "regular" blanks. Thus, the amount of platform preparation in Micoquian industries is reflected by "regular" blanks only.

Platform Lipping

Platform lipping frequencies for "regular" and bifacial thinning blanks are quite different (Table 24-13), because "platform lipping" is a basic attribute for recognizing bifacial thinning blanks. Lipped and semi-lipped platforms comprise more than 90% of bifacial thinning blank platforms. Among "regular" pieces, lipped and semi-lipped butts comprise slightly more than 33%. On bifacial thinning blanks, unlipped platforms are found only on bifacial tool tip rejuvenation flakes.

TABLE 24-12
Chokurcha I Unit IV: flake and blade platform types

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess %*
Flakes & tools on flake																						
Cortex	·	·	·	·	·	·	4	·	·	·	1	2	1	8	·	1	1	1	·	·	19	10.7
Plain	2	1	3	1	10	2	19	3	·	1	2	16	2	40	2	3	·	·	·	·	107	60.1
Dihedral	1	·	1	·	·	1	1	1	·	·	1	8	·	7	·	1	·	·	·	·	22	12.4
Multihedral	·	·	·	·	·	1	1	1	·	·	·	4	1	5	·	·	·	·	·	·	13	7.3
Faceted	1	3	5	·	·	4	2	1	·	·	·	·	·	1	·	·	·	·	·	·	17	9.6
Crushed	2	3	6	·	5	·	16	·	·	3	·	8	·	10	·	2	3	1	2	·	61	
Miss. by retouch	·	·	·	·	1	·	1	1	·	·	·	3	1	8	·	2	·	·	·	·	17	
Missing	4	3	12	5	21	8	35	4	1	·	1	20	4	32	·	1	·	1	3	5	160	
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flake																						
Plain	·	·	2	·	2	1	14	2	2	1	·	·	·	2	·	1	4	·	1	1	33	48.5
Dihedral	·	·	2	·	1	·	2	·	·	·	·	·	·	1	·	·	·	·	·	·	6	8.8
Multihedral	·	·	·	·	1	·	4	3	·	1	·	5	1	4	·	·	·	·	·	·	19	27.9
Faceted	·	·	2	·	1	2	4	·	·	·	·	·	·	1	·	·	·	·	·	·	10	14.7
Crushed	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	6	·	6	3	24	5	2	2	·	5	1	8	·	1	4	·	1	1	69	100.0
Blades & tools on blade																						
Plain	·	·	·	·	1	·	·	1	·	·	2	2	·	1	·	1	·	·	·	·	8	
Dihedral	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Faceted	·	·	1	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	2	
Crushed	·	·	2	·	·	·	1	·	·	·	·	2	·	1	·	1	·	·	·	·	7	
Missing	·	·	2	·	2	·	5	2	·	·	1	2	·	1	·	1	·	·	·	·	16	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
Plain	·	·	·	·	·	·	3	·	·	·	·	1	·	·	·	·	·	·	·	·	4	
Faceted	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Crushed	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Missing	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	·	·	1	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	7	

TABLE 24-13
Chokurcha I Unit IV: flake and blade platform lipping

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess %*
Flakes & tools on flake																						
Unlipped	6	5	7	1	11	5	17	4	·	·	1	16	2	45	2	2	1	·	·	·	125	61.3
Semi-lipped	·	1	8	·	1	2	15	3	·	·	2	12	2	18	·	2	2	1	·	·	69	33.8
Lipped	·	·	·	·	1	1	1	·	·	1	1	1	·	4	·	·	·	·	·	·	10	4.9
Unknown	4	4	12	5	24	8	46	4	1	3	1	32	5	44	·	6	1	2	5	5	212	
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flake																						
Unlipped	·	·	·	·	2	·	1	1	1	·	·	1	·	·	·	·	·	·	·	·	6	8.8
Semi-lipped	·	·	3	·	·	·	1	1	·	·	·	1	·	2	·	·	2	·	·	·	10	14.7
Lipped	·	·	3	·	4	3	22	2	1	2	·	3	1	6	·	1	2	·	1	1	52	76.5
Unknown	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	6	·	6	3	24	5	2	2	·	5	1	8	·	1	4	·	1	1	69	100.0
Blades & tools on blade																						
Unlipped	·	·	2	·	1	·	·	·	·	·	·	1	·	2	·	·	·	·	·	·	6	
Semi-lipped	·	·	1	·	·	·	·	·	1	·	2	1	·	·	·	·	·	·	·	·	5	
Lipped	·	·	·	·	1	·	·	1	·	·	·	1	·	·	·	1	·	·	·	·	4	
Unknown	·	·	2	·	2	·	6	2	·	·	1	3	·	1	·	2	·	·	·	·	19	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
Semi-lipped	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	
Lipped	·	·	·	·	·	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	6	
Total	·	·	·	·	1	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	7	

TABLE 24-14
Chokurcha I Unit IV: flake platform angles

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	IV-V	*N*	*ess %*
Flakes & tools on flake																						
Right, 90°	4	4	10	·	6	2	14	5	·	·	2	14	2	26	2	4	1	1	·	·	97	51.0
Semi-obtuse, 90–110°	·	·	·	·	·	1	·	·	·	·	·	·	·	3	·	·	·	·	·	·	4	2.1
Obtuse, >110°	1	2	5	1	5	4	15	1	·	1	2	17	2	33	·	·	·	·	·	·	89	46.8
Unknown	5	4	12	5	26	9	50	5	1	3	1	30	5	49	·	6	3	2	5	5	226	
Total	10	10	27	6	37	16	79	11	1	4	5	61	9	111	2	10	4	3	5	5	416	100.0
Bifacial thinning and rejuvenation flakes & tools on bifacial thinning and rejuvenation flake																						
Right, 90°	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	1	1.5
Obtuse, >110°	·	·	6	·	5	3	24	4	2	2	·	4	1	8	·	1	4	·	1	1	66	98.5
Unknown	·	·	·	·	1	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	2	
Total	·	·	6	·	6	3	24	5	2	2	·	5	1	8	·	1	4	·	1	1	69	100.0
Blades & tools on blade																						
Right, 90°	·	·	2	·	·	·	·	·	1	·	2	1	·	·	·	·	·	·	·	·	6	
Obtuse, >110°	·	·	1	·	2	·	·	1	·	·	·	1	·	1	·	1	·	·	·	·	7	
Unknown	·	·	2	·	2	·	6	2	·	·	1	4	·	2	·	2	·	·	·	·	21	
Total	·	·	5	·	4	·	6	3	1	·	3	6	·	3	·	3	·	·	·	·	34	
Bifacial thinning blades & tools on bifacial thinning blade																						
Obtuse, >110°	·	·	·	·	1	·	4	·	·	·	·	1	·	·	·	·	·	·	·	·	6	
Unknown	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	
Total	·	·	·	·	1	·	4	1	·	·	·	1	·	·	·	·	·	·	·	·	7	

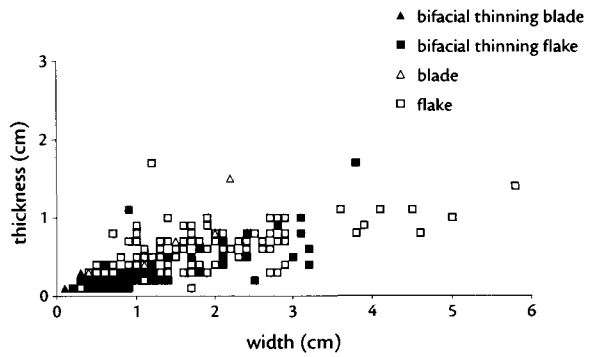

Figure 24-6—Chokurcha I Unit IV: blank platform sizes.

TABLE 24-15
Chokurcha I Unit IV: average blank platform sizes (mm)

	$\bar{X}$ *Width*	$\bar{X}$ *Thickness*
Flake	1.4	0.5
Bifacial thinning flake	1.2	0.3
Blade	1.1	0.5
Bifacial thinning blade	0.5	0.2
All blanks	1.3	0.4

Platform Angles

As with lipping, a markedly obtuse platform angle is characteristic of bifacial thinning flakes (Table 24-14). All but one of the bifacial thinning blanks has an obtuse platform angle. At the same time, about half of the "regular" blank platforms have right angles.

Platform Dimensions

The dimensions of platforms (Figure 24-6) exhibit some differences among flakes, bifacial thinning flakes, blades, and bifacial thinning blades (Table 24-15). The widest and thickest are the flake platforms, while the narrowest and thinnest are the bifacial thinning blade platforms. In general, the "regular" blank platforms are wider and thicker than the bifacial thinning blanks. At the same time, the majority of both bifacial thinning and "regular" blanks have similar maximum dimensions: width = 3.0 cm, thickness = 1.0 cm. Outside this cluster, there were only 5 bifacial thinning blanks and 10 "regular" blanks.

Tools

Tools were found in nineteen of the twenty levels of Unit IV. Not one tool was discovered in Level IV-V. The majority of tools were made on flakes (Table 24-16), while more than 30% were produced on chips (blanks < 3 cm in greatest dimension) and bifacial thinning blanks. The patterns of size distribution for

TABLE 24-16
Chokurcha I Unit IV: blank types used for tool production

LEVEL	IV-A	IV-A_2	IV-B	IV-D	IV-F	IV-G	IV-I	IV-I_2	IV-K	IV-L	IV-L_2
Tool on chip	·	·	·	·	6	1	7	2	1	·	2
Tool on flake	2	2	11	1	18	3	25	4	1	2	2
Tool on blade	·	·	3	·	3	·	3	2	1	·	1
Tool on bifacial thinning chip	·	·	·	·	·	·	·	1	·	·	·
Tool on bifacial thinning flake	·	·	·	·	3	1	13	2	1	2	·
Tool on bifacial thinning blade	·	·	·	·	1	·	·	·	·	·	·
Tool on rejuvenation chip	·	·	·	·	1	·	·	·	·	·	·
Tool on rejuvenation flake	·	·	·	·	2	·	·	·	1	·	·
Total	2	2	14	1	34	5	48	11	5	4	5

LEVEL	IV-M	IV-N	IV-O	IV-P	IV-Q	IV-S	IV-T	IV-U	*N*	%
Tool on chip	12	·	11	·	·	1	·	·	43	16.3
Tool on flake	30	7	47	1	7	3	2	1	169	64.0
Tool on blade	1	·	1	·	·	·	·	·	15	5.7
Tool on bifacial thinning chip	·	·	1	·	·	·	·	·	2	0.8
Tool on bifacial thinning flake	1	·	3	·	·	3	·	·	29	11.0
Tool on bifacial thinning blade	1	·	·	·	·	·	·	·	2	0.8
Tool on rejuvenation chip	·	·	·	·	·	·	·	·	1	0.4
Tool on rejuvenation flake	·	·	·	·	·	·	·	·	3	1.1
Total	45	7	63	1	7	7	2	1	264	100.0

unretouched blanks and tool blanks are about the same, although some bifacial tools show a broad range of metric distributions (Figure 24-7). That is, about 25% of bifacial tools are longer than the majority of other artifacts. Most unifacial tools and unretouched blanks are no longer than 4 cm. The majority of bifacial tools are larger than 5 cm. The average size of tools on blanks (length = 3.3 cm, width = 2.9 cm, thickness = 0.7 cm) is similar to that of unretouched blanks (length = 2.9 cm, width = 3.0 cm, thickness = 0.5 cm), while the average size of bifacial tools is much larger (length = 5.5 cm, width = 3.2 cm, thickness = 1.4 cm).

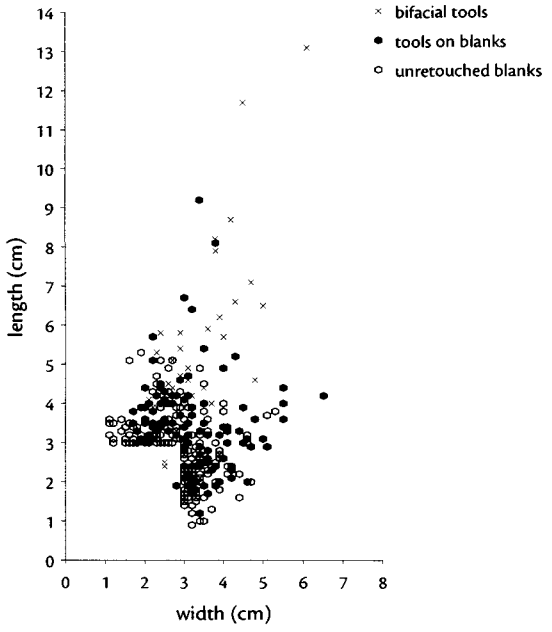

Figure 24-7—Chokurcha I Unit IV: length/width scatterplot for unretouched blanks, tool blanks, and bifacial tools.

There are twelve typological groups present among the tools: points, scrapers, endscrapers, denticulates, composite tools, bifacial points, bifacial scrapers, bifacial heavily exhausted tools, reutilized bifacial tools fragments, retouched pieces, thinned pieces, and unidentifiable retouched fragments. Unifacial scrapers are most numerous, accounting for about two-thirds of the essential tool count (Table 24-17). These are followed by bifacial scrapers and bifacial points, the latter comprising ca. 7% of the essential tool count (Table 24-17). Other tool groups do not exceed 4% for each category. Bifacial tools represent 25.7% of all tools. This basic tool assemblage structure is characteristic for the Ak-Kaya facies of the Crimean Micoquian.

Points

Points were found in five of nineteen levels containing tools (Table 24-17). More than half of the points in Unit IV came from Level IV-M. Points were made on flakes (6), blades (2), and chips (5). Six of these 13 are sub-triangular (Figure 24-8: *1, 3, 6, 10*) and triangular (Figure 24-8: *4*). Another 4 points are semi-trapezoidal (Figure 24-8: *5, 7, 8, 9*). The majority of sub-triangular and triangular points (Figure 24-8: *1, 3, 4, 10*) were made on off-axis blanks, making them morphologically close to semi-trapezoidal pieces. The only sub-leaf point (Figure 24-8: *2*), from Level IV-I, was made on a relatively large primary blade. Blanks longer or wider than 5 cm were used for points in Levels IV-B, IV-I, and IV-S (Figure 24-8: *1, 2, 9, 10*). On the other hand, points from Level IV-M were produced on triangular and/or trapezoidal chips and small flakes (Figure 24-8: *3, 4, 5, 6, 8*), making their morphology very close to Kiik-Koba facies points. Points were produced by combinations of non-invasive, marginal, scalar, flat, and/or semi-steep retouch.

Scrapers

The scrapers came from ten of the nineteen tool-bearing levels (Table 24-17). They have been subdivided into forty types, comprising five main typological groups: transverse and diagonal (31), simple (41), double (14), convergent (34), and core-like (4). Altogether, scrapers with one retouched edge account for 58.1%, bilateral for 11.3%, and converging scrapers for 30.65%. Four types account for half of the scraper assemblage: straight, transverse convex, semi-trapezoidal, and diagonal.

The main typological problem for scraper classification at Chokurcha I Unit IV is their small size. A large majority, ca. 80%, was made either on chips or flakes with maximum dimensions less than 4 cm. At the same time, all of these have scalar flat/semi-steep/steep continuous retouch. Thus, if the chosen blanks (chips or small flakes) do not fit "normal" expectations for scraper blank size, the kinds of retouch are quite typical for scrapers.

Transverse and Diagonal Scrapers

Transverse and diagonal scrapers were found in nine of the ten levels where scrapers were recovered (Table 24-17). Almost all of these scrapers belong to three types: transverse-straight (Figure 24-9: *2, 3*), transverse-convex (Figure 24-9: *4, 6, 8*), and diagonal (Figure 24-9: *1, 9*). One of each type was found, including: transverse-straight, alternating (Figure 24-9: *7*), transverse-wavy, and transverse-wavy with thinned back. The transverse and diagonal scrapers were made on chips (4), flakes (23), bifacial thinning chips (1), and bifacial thinning flakes (3). All but 1 scraper (Figure 24-9: *4*) in this group are smaller than 4 cm in both length and width.

TABLE 24-17
Chokurcha I Unit IV: tool classification

LEVEL IV-	A	A_2	B	D	F	G	I	I_2	K	L	L_2	M	N	O	P	Q	S	T	U	*N*	%	*ess %*
Points																				*13*		*6.8*
Sub-leaf, dorsal	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Sub-triangular, dorsal	·	·	1	·	·	·	·	·	·	·	·	3	·	·	·	1	·	·	·	5	1.3	2.6
Triangular, dorsal	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	1	0.3	0.5
Semi-trapezoidal, dorsal	·	1	1	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·	·	4	1.0	2.1
Unidentifiable, dorsal	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·	·	2	0.5	1.1
Scrapers																				*124*		*64.9*
Transverse-straight, dorsal	·	·	·	·	1	·	2	1	·	·	·	1	·	·	·	1	1	·	·	7	1.8	3.7
Transverse-straight, alternating	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Transverse-convex, dorsal	·	·	1	·	3	·	2	1	·	1	·	2	·	1	·	1	1	·	·	13	3.4	6.8
Transverse-wavy, dorsal	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	1	0.3	0.5
Transverse-wavy, dorsal, thinned back	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Diagonal, dorsal	·	·	·	·	1	·	·	·	·	·	·	2	·	5	·	·	·	·	·	8	2.1	4.2
Straight, dorsal	·	·	·	·	1	·	9	2	1	·	·	·	·	5	·	·	1	·	·	19	5.0	10.0
Straight, dorsal, thinned base	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	2	0.5	1.1
Straight, dorsal, truncated-faceted base	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Straight, alternating	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Convex, dorsal	·	·	1	·	1	·	2	·	·	·	·	1	·	·	·	·	·	·	·	5	1.3	2.6
Convex, alternating	·	·	·	·	·	·	1	·	1	·	·	·	·	·	·	·	·	·	·	2	0.5	1.1
Convex, dorsal, naturally backed	·	·	1	·	·	·	1	·	·	·	·	·	·	2	·	·	·	·	·	4	1.0	2.1
Convex, dorsal, thinned back	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Concave, dorsal	·	·	·	·	1	·	1	·	·	·	·	1	·	2	·	·	·	·	·	5	1.3	2.6
Wavy, dorsal, naturally backed	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Double straight, dorsal	·	·	1	·	·	·	·	·	·	·	·	·	·	3	·	·	·	·	·	4	1.0	2.1
Double straight, alternate, dist. trunc.	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Double straight-convex, dorsal	·	·	·	·	·	·	1	·	1	·	·	·	·	1	·	·	·	·	·	3	0.8	1.6
Double convex, dorsal	·	·	·	·	1	·	1	·	·	·	·	·	·	·	·	·	·	·	·	2	0.5	1.1
Double convex, dorsal, distally thinned	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	1	0.3	0.5
Double convex-wavy, dorsal	·	·	·	·	1	·	·	·	·	·	·	1	·	·	·	·	·	·	·	2	0.5	1.1
Double wavy, dorsal	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	1	0.3	0.5
Semi-leaf, dorsal	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Sub-leaf, dorsal	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Sub-triangular, dorsal	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Triangular, dorsal	·	·	·	·	·	·	·	1	·	·	·	1	·	·	·	·	·	·	·	2	0.5	1.1
Triangular, dorsal, distally thinned	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Semi-trapezoidal, dorsal	·	·	1	·	1	·	4	·	·	·	·	2	·	3	·	·	·	·	·	11	2.9	5.8
Semi-trapezoidal, bi-terminally thinned	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Sub-trapezoidal, dorsal	·	·	·	·	2	·	1	·	·	·	·	·	·	·	·	·	·	·	·	3	0.8	1.6
Sub-trapezoidal, dorsal, thinned back	·	·	·	·	·	·	1	·	·	·	·	1	·	·	·	·	·	·	·	2	0.5	1.1
Semi-rectangular, dorsal	·	·	1	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	2	0.5	1.1
Sub-rectangular, dorsal	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Semi-crescent, dorsal	·	·	1	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	3	0.8	1.6
Semi-crescent, dorsal, thinned back	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Crescent, dorsal, thinned back	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	1	0.3	0.5
Unidentifiable-convergent, dorsal	·	·	2	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	3	0.8	1.6
Core-like, dorsal	·	·	·	·	·	·	·	·	·	·	·	1	·	3	·	·	·	·	·	4	1.0	2.1
Endscrapers																				*1*		*0.5*
Wavy, dorsal	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	1	0.3	0.5
Denticulates																				*1*		*1.6*
Straight, dorsal	·	·	·	·	·	1	·	·	·	·	·	·	·	2	·	·	·	·	·	3	0.8	1.6
Composite tools																				*1*		*0.5*
Denticulate-notch, dorsal	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	1	0.3	0.5

TABLE 24-17 CONTINUED
Chokurcha I Unit IV: tool classification

LEVEL IV-	A	A_2	B	D	F	G	I	I_2	K	L	L_2	M	N	O	P	Q	S	T	U	*N*	%	*ess %*
Bifacial points																				*6*		*3.1*
Sub-leaf	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Sub-leaf, thinned base	1	·	·	·	·	·	1	·	1	·	·	·	·	·	·	·	·	·	·	3	0.8	1.6
Sub-triangular	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Unidentifiable	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	1	0.3	0.5
Bifacial scrapers																				*34*		*17.8*
Convex	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	0.5
Convex, thinned back	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Convex, naturally backed	·	·	·	·	1	·	2	1	·	·	·	2	·	2	·	·	·	·	·	8	2.1	4.2
Sub-leaf	·	·	·	·	·	·	1	·	·	·	·	1	·	·	·	·	·	·	·	2	0.5	1.1
Sub-leaf, thinned base	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Leaf, thinned base	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Sub-triangular	·	·	·	·	1	·	·	·	·	·	·	·	·	1	·	·	·	·	·	2	0.5	1.1
Sub-triangular, backed	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	·	1	0.3	0.5
Triangular, "Chokurcha" type	·	·	·	·	·	·	1	1	·	·	·	·	·	·	·	·	·	·	·	2	0.5	1.1
Sub-cordiform	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Semi-trapezoidal, naturally backed	·	·	·	·	·	·	·	·	·	·	1	1	·	·	·	·	·	·	·	2	0.5	1.1
Semi-crescent	·	·	·	·	·	·	2	·	·	·	·	2	·	·	·	·	·	·	·	4	1.0	2.1
Semi-crescent, naturally backed	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	1	0.3	0.5
Sub-crescent, thinned base	·	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	0.5
Crescent	·	·	·	·	·	1	·	·	·	·	·	2	·	·	·	·	·	·	·	3	0.8	2.6
Convergent unidentifiable	·	·	·	·	·	·	2	·	·	·	·	·	·	1	·	·	·	·	·	3	0.8	1.6
Bifacial heavily exhausted tools																				*4*		*2.1*
	1	·	2	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	4	1.0	2.1
Bifacial tool reutilized fragments																				*5*		*2.6*
	·	·	·	·	1	·	3	·	·	·	·	·	·	1	·	·	·	·	·	5	1.3	2.6
Retouched pieces																				*112*		
On chip, lateral, dorsal	·	·	·	·	2	1	4	1	·	·	2	5	·	5	·	·	·	·	·	20	5.2	
On chip, bilateral, dorsal	·	·	·	·	·	·	·	·	·	·	·	1	·	2	·	·	·	·	·	3	0.8	
On chip, distal, dorsal	·	·	·	·	·	·	·	·	2	·	·	1	·	1	·	·	·	·	·	4	1.0	
On flake, lateral, dorsal	1	1	2	·	8	1	7	3	·	·	1	7	·	10	1	·	3	1	1	47	12.2	
On flake, lateral, ventral	·	·	·	·	·	·	·	·	·	1	1	1	·	·	·	·	·	·	·	3	0.8	
On flake, bilateral, dorsal	·	·	·	·	1	·	1	·	·	·	·	·	·	1	·	·	·	·	·	3	0.8	
On flake, bilateral, alternate	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	
On flake, distal, dorsal	·	·	·	·	·	1	3	·	·	1	·	4	3	3	·	·	·	·	·	15	3.9	
On flake, proximal, dorsal	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	1	0.3	
On blade, lateral, dorsal	·	·	·	·	3	·	1	1	·	·	1	1	·	·	·	·	·	·	·	7	1.8	
On chunk	·	·	·	·	2	·	2	·	·	·	·	3	·	1	·	·	·	·	·	8	2.1	
Thinned pieces																				*2*		
On flake, distal, ventral	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	1	0.3	
On flake, proximal, ventral	·	·	·	·	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	1	0.3	
Unidentifiable																				*79*		
Unifacial tools fragments	1	·	1	1	5	1	6	3	·	1	·	5	1	18	·	2	·	1	1	47	12.2	
Bifacial tool fragments	1	·	2	4	3	·	7	1	1	·	·	8	·	3	·	·	·	·	·	30	7.8	
Heavily burnt	·	·	1	·	·	·	·	·	·	·	·	·	1	·	·	·	·	·	·	2	0.5	
Total	6	2	20	5	42	6	79	17	7	4	6	72	7	91	1	7	8	2	2	384	100.0	100.0

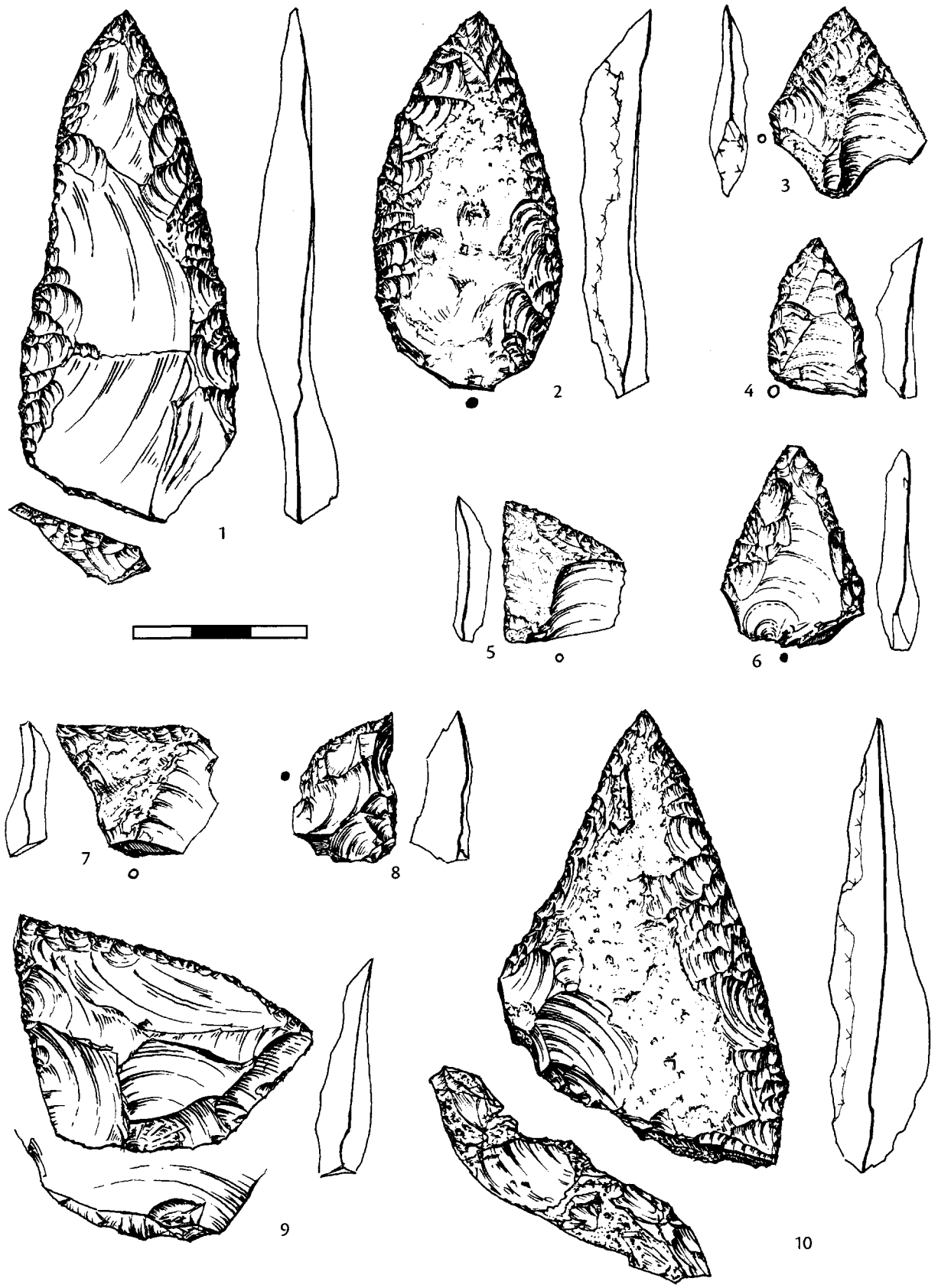

Figure 24-8—Chokurcha I Levels IV-A2 (7), IV-B (1, 9), IV-I (2), IV-M (3, 4, 5, 6, 8), IV-Q (10) points: 4–triangular; 1, 3, 6, 10–sub-triangular; 2–sub-leaf; 5, 7, 8, 9–semi-trapezoidal. Tools made on: 1, 2–blade; 3, 6, 9, 10–flake; 4, 5, 7, 8–chip.

Simple Scrapers

The simple scrapers were found in all ten levels containing scrapers (Table 24-17). According to the shape of the single retouched edge, the simple scrapers are subdivided into straight (23), convex (12), concave (5), and wavy (1).

Most straight scrapers (19) have obverse retouch (Figure 24-10: *1, 2, 12, 14*) and exhibit no ventral thinning. Two straight scrapers have thinned bases (Figure 24-10: *5*), 1 has a truncated-faceted base, and one has alternating retouch. Five of 12 convex scrapers have obverse retouch and no additional typological elements (Figure 24-10: *10*). Four convex scrapers are naturally backed (Figure 24-10: *9*), 1 piece has basal thinning, and 2 have alternating retouch. Additionally, the concave scrapers have simple shapes, though they lack all other typological elements. The single wavy scraper is naturally backed (Figure 24-10: *13*).

The simple scrapers were made on blades (5), flakes (25), chips (7), bifacial thinning flakes (3), and a bifacial thinning blade (1). Except for a few artifacts, the maximum dimensions of scrapers do not exceed 4 cm.

Double Scrapers

Double scrapers were discovered in six levels. Half of the total of 14 double scrapers belongs to two types: double straight and straight-convex (Figure 24-10: *6, 8, 11*). There are also 2 double convex (Figure 24-10: *3*), 2 convex-wavy (Figure 24-10: *4*) scrapers, and single

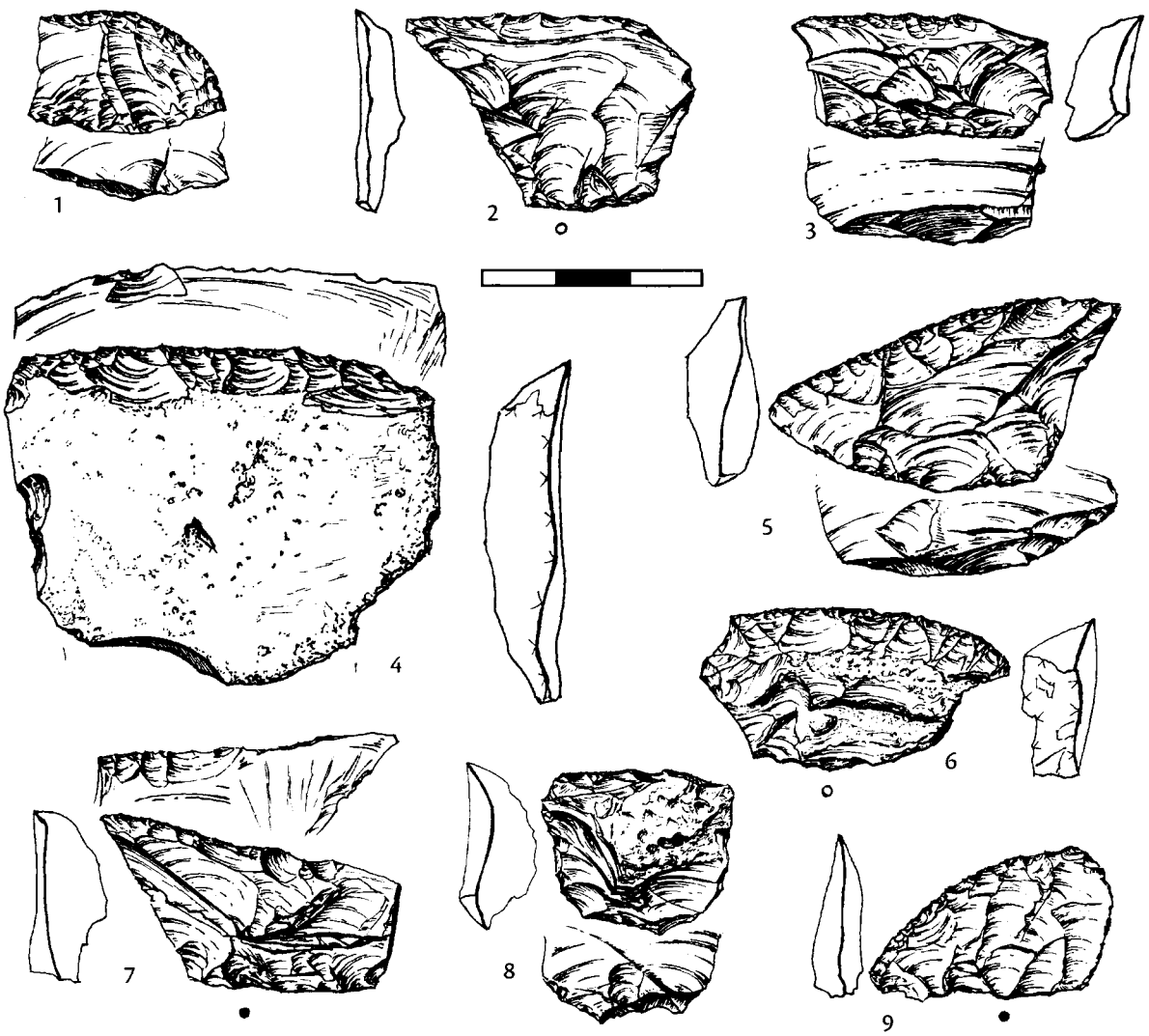

Figure 24-9—Chokurcha I Levels IV-F (3), IV-I (4, 6), IV-I2 (8), IV-M (1, 5), IV-O (7, 9), IV-Q (2) scrapers: *1, 5, 9*–diagonal; *4, 6, 8*–transverse convex; *2, 3*–transverse straight; *7*–transverse straight, alternating. Tools made on: 2, 4, 6, 7, 9–flake; 3, 5–bifacial thinning flake; 1, 8–chip.

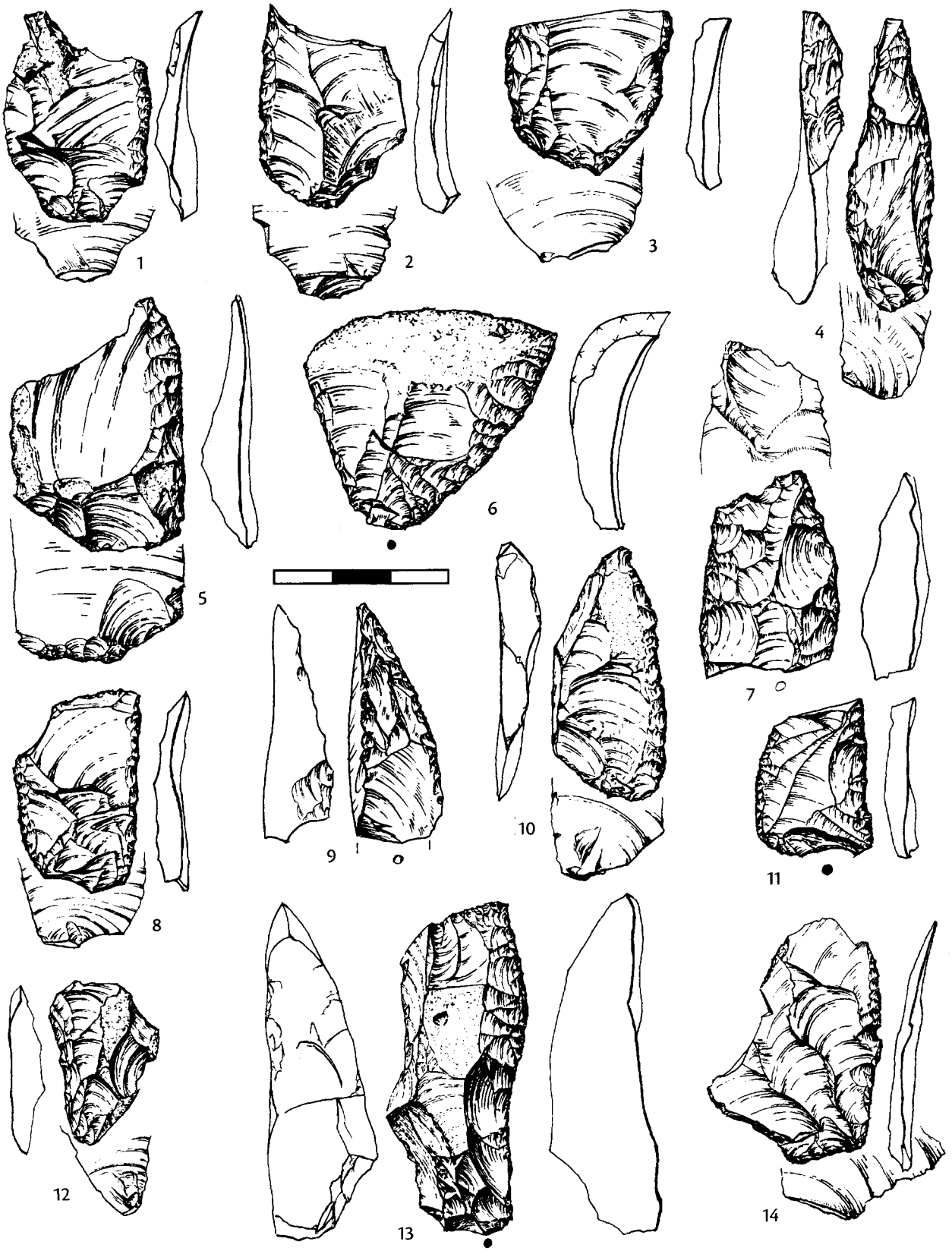

Figure 24-10—Chokurcha I Levels IV-B (9), IV-F (3, 4), IV-I (1, 2, 6, 13), IV-I2 (12), IV-K (8), IV-M (7, 10), IV-O (11), IV-Q (5), IV-S (14) scrapers: *1, 2, 12, 14*–straight; *5*–straight with thinned base; *10*–convex; *9*–convex with natural back; *13*–wavy with natural back; *6, 8, 11*–straight-convex; *3*–double convex; *7*–double-convex with distal thinning; *4*–convex-wavy. Tools made on: 5, 6, 7, 8–flake; 1, 2, 3, 14–bifacial thinning flake; 9, 10–blade; 4–bifacial thinning blade; 11, 12–chip; 13–"ancient" blank: patinated negatives on the dorsal surface shown by stippled wave lines.

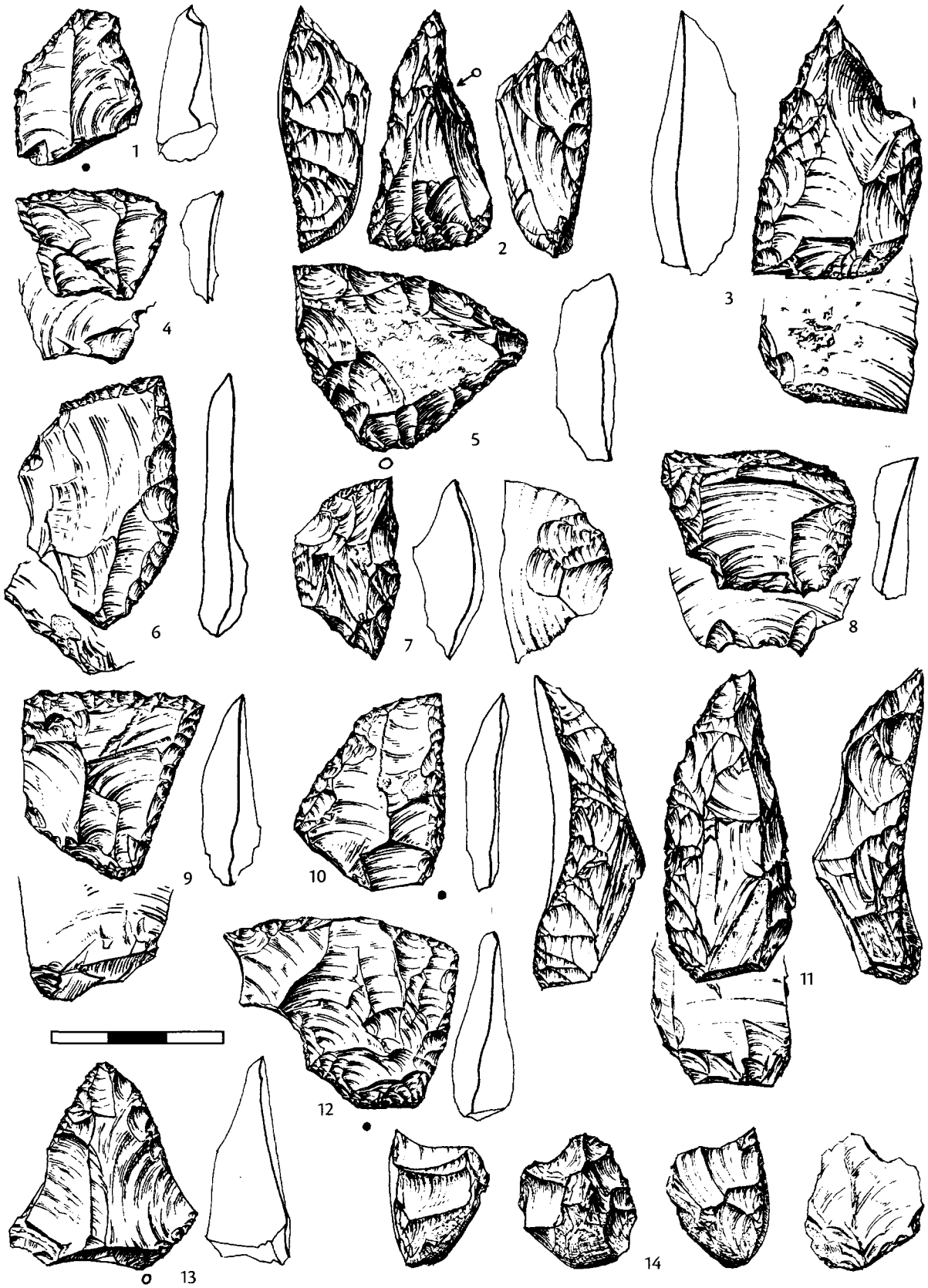

Figure 24-11—Chokurcha I Levels IV-B (6), IV-F (4), IV-I (3, 8, 9, 10), IV-I2 (2), IV-M (5, 7, 14), IV-O (1, 11, 12, 13) scrapers: *2, 5*–triangular; *13*–sub-triangular; *4, 9, 12*–semi-trapezoidal; *8, 10*–sub-trapezoidal; *6*–semi-rectangular; *7*–crescent with thinned back; *1*–semi-crescent; *11*–semi-crescent with thinned base; *3*–sub-leaf; *14*–core-like scraper. Tools made on: 1, 4–chips; 2, 3, 5–10, 12, 13, 14–flakes; 11–blades. Tool 3 also shows traces of use as a retoucher on its bulb of percussion.

examples of the other three types (Table 24-17). All 12 double scrapers have obversely retouched edges and no other secondary modifications. One double straight scraper was both alternately retouched and distally truncated, and another double convex scraper was distally thinned (Figure 24-10: *7*).

The double scrapers were made on flakes (9), bifacial thinning flakes (2), a bifacial thinning blade (1), a blade (1), and a chip (1). Except for a few pieces, their maximum dimensions do not exceed 4 cm.

Convergent Scrapers

Convergent scrapers were found in seven levels. Based on the morphology of the retouched edges, they are subdivided into five main shapes: leaf (2), triangular (4), trapezoidal (17), rectangular (3), and crescent (5). Three others are tip fragments that are morphologically unidentifiable.

The most numerous type, comprising one-third of the convergent scrapers, is semi-trapezoidal with obverse retouch (Figure 24-11: *4, 9, 12*). The remaining trapezoidal shapes are subdivided into three categories: semi-trapezoidal, bi-terminally thinned, sub-trapezoidal (Figure 24-11: *8, 10*), and sub-trapezoidal with thinned back. The semi-rectangular (Figure 24-11: *6*) and sub-rectangular scrapers are morphologically very close to the trapezoidal shapes. In fact, they are only a little more elongated than the semi- and sub-trapezoidal scrapers. In Unit IV, the semi-rectangular and sub-rectangular scrapers are all obversely retouched.

The crescent-shaped scrapers are represented by three types: semi-crescent (Figure 24-11: *1*), semi-crescent with thinned base (Figure 24-11: *11*), and crescent with thinned back (Figure 24-11: *7*). Additionally, there are a few leaf and triangular shapes. Among the foliate-shaped crescent scrapers there are two types (one each): semi-leaf and sub-leaf (Figure 24-11: *3*). Both are obversely retouched. The sub-leaf scraper's bulb of percussion was used as a retoucher (Figure 24-11: *3*). The triangular shapes fall into three types: sub-triangular (Figure 24-11: *13*), triangular (Figure 24-11: *2, 5*), and triangular distally thinned.

The convergent scrapers were made on flakes (24), bifacial thinning flakes (4), and chips (6). Except for a few pieces, the maximum dimensions do not exceed 4 cm.

Core-Like Scrapers

There are only 4 core-like scrapers in the Unit IV tool assemblages (Table 24-17). Three were found in Level IV-O (Figure 24-2: *1a–1c*) and 1 in Level IV-M (Figure 24-11: *14*). All were made on relatively thick flakes. Their ventral surfaces served as the striking platform for a number of removals from around the perimeter of the initial flake. After these removals, the edge of the tool was retouched by scalar steep and stepped retouch. Thus, these artifacts are an intermediate form between cores on flake and scrapers. Their lengths vary from 2.3 to 4.0 cm, their widths from 2.1 to 3.7 cm, and their thicknesses from 0.9 to 2.2 cm. Thus, they are really small for either Middle Paleolithic cores or scrapers.

Endscrapers

A single endscraper was found in Level IV-M (Table 24-17). It is atypical, made on a transverse flake with obverse, scalar, abrupt retouch. The distal retouch is wavy.

Denticulates

Denticulated tools were found in Levels IV-G and IV-O (Table 24-17). All are on flakes; 1 has a straight edge with obverse retouch.

Composite Tools

A single piece from Level IV-M has two modified edges: one denticulated by obverse scalar abrupt retouch, another edge with a notch made by the same kind of retouch.

Bifacial Points

Bifacial points were found in five levels (Table 24-17). Four of the 6 are leaf-shaped (Figure 24-12: *1–4*) and 3 of these have thinned bases. In addition, a single sub-triangular bifacial point (Figure 24-12: *6*), and an unidentifiable broken bifacial point were recovered.

All of the bifacial points are plano-convex; a combination of scalar and parallel retouch was employed in their production. Retouch angles vary from flat to semi-steep. The sub-leaf basally-thinned bifacial point from Level IV-K shows a clear impact fracture on its tip (Figure 24-12: *2*).

The length and width ranges for the bifacial points are not very standardized (5.8–7.9 cm and 2.6–4.7 cm, respectively), while the range of thickness is more limited (1.0 to 1.8 cm). The maximum lengths of the thinning scars on the bifacial tool surfaces vary from 2.6 to 4.8 cm, with most ranging from 3.0 to 4.0 cm.

Bifacial Scrapers

Bifacial scrapers were found in eight levels (Table 24-17). One-third of the Unit IV bifacial scrapers came from Level IV-I, and a moderate number were also found in Levels IV-M and IV-O. Bifacial scrapers are subdivided into five main morphological groups: simple (10), leaf-shaped (4), triangular (6), trapezoidal (2), and crescent (9). Three others are distal fragments that are unidentifiable to shape.

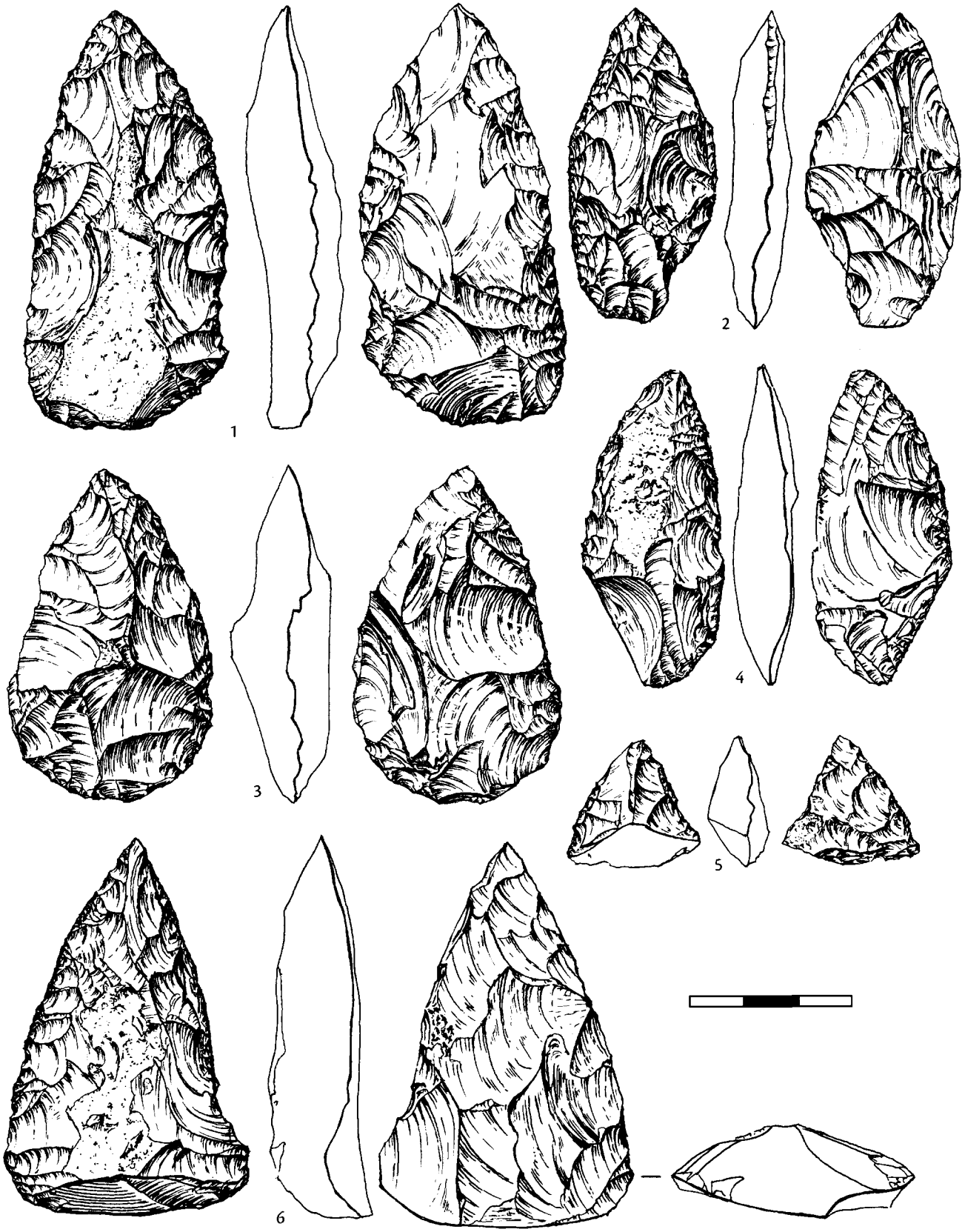

Figure 24-12—Chokurcha I Levels IV-A (4), IV-B (6), IV-I (1, 3, 5), IV-K (2) bifacial points: 1–sub-leaf; 2, 3, 4–sub-leaf, with thinned base; 6–sub-triangular; 5–bifacial tool reutilized fragment.

Simple-Shaped Bifacial Scrapers

The simple-shaped bifacial scrapers exhibit a single convex retouched edge and are subdivided into three types: convex (Figure 24-13: *4*), convex with thinned back (Figure 24-13: *5*), and convex with natural back (Figure 24-13: *1, 2, 3*). In 8 of the 10 cases, the single retouched edge was parallel to a natural back, while another simple bifacial scraper has a thinned back. All of the bifacial simple scrapers are plano-convex, with a combination of scalar flat and semi-steep retouch. Six were made on flint plaquettes, 1 was made on a flake, 2 on artifacts that had already been patinated, and 1 on a flint pebble. The backed bifacial scraper from Level IV-I2 was made on a bifacial tool fragment, where the break served as a natural back. Only 2 of the 9 complete simple scrapers are longer than 5 cm, and 3 are wider than 3 cm. The thicknesses of these tools vary from 1.0 to 1.8 cm. Some of the naturally backed bifacial scrapers in Unit IV were probably the result of multiple stages of reduction, which was the case for all bifacial tool manufacture.

Crescent-Shaped Bifacial Scrapers

The crescent-shaped bifacial scrapers are subdivided into four types: semi-crescent, semi-crescent with natural back (Figure 24-14: *2*), sub-crescent with thinned base, and crescent (Figures 24-14: *1*; 24-15: *5, 9*). Six of 9 are plano-convex. Two pieces have alternately retouched plano-convex edges (Figure 24-14: *1*), and 1 piece has a straight edge with alternating retouch. In 1 case, the edge has demi-Quina retouch, while the rest of the crescent bifacial scrapers were made via a combination of scalar flat and semi-steep retouch. Three of 10 were made on flint plaquettes, while the initial blanks for 9 bifacial scrapers are unidentifiable. In general, the crescent bifacial scrapers are larger than the simple bifacial scrapers. Only 2 of the 7 complete pieces are smaller than 5 cm. The thicknesses of bifacial crescent scrapers range from 0.8 to 1.8 cm.

Triangular-Shaped Bifacial Scrapers

The triangular-shaped bifacial scrapers are subdivided into three types: sub-triangular (Figure 24-15: *1*), sub-triangular with natural back (Figure 24-15: *8*), triangular (Figure 24-15: *2, 6*), and sub-cordiform (Table 24-17). Three of these four scrapers were made on flakes. It is difficult to identify the initial blank type used for sub-cordiform scraper production. The edges of the sub-triangular bifacial scraper from Level IV-F exhibit demi-Quina retouch (Figure 24-15: *1*), while the rest of the triangular-shaped bifacial scrapers were made by a combination of scalar flat and semi-steep retouch. The sub-triangular bifacial scraper from Level IV-F is the only relatively large tool among the triangular-shaped bifacial scrapers (Figure 24-15: *1*). The maximum dimensions of the others do not exceed 5 cm. The thicknesses vary from 0.9 to 2.0 cm.

The shapes of the triangular (Figure 24-15: *2, 6*) and crescent (Figure 24-15: *5, 9*) bifacial scrapers are comparable and likely comprise one morphological group. The only difference is the presence of a right angle between the two short edges. If this angle is sharp, it is triangular-shaped (Figure 24-15: *2, 6*); if the angle is rounded, it is crescent-shaped (Figure 24-15: *5, 9*).

Leaf-Shaped Bifacial Scrapers

The leaf-shaped bifacial scrapers are subdivided into three types: sub-leaf (Figure 24-16: *1*), sub-leaf with thinned base (Figure 24-17), and leaf with thinned base (Figure 24-16: *2*). All of them are plano-convex. The sub-leaf bifacial scraper from Level IV-M was made on a tip fragment of a bifacial tool. The sub-leaf with thinned base bifacial scraper from Level IV-I is heavily exhausted, while all other leaf-shaped bifacial scrapers are massive, with lengths ranging from 6.6 cm to 13.2 cm. The thicknesses of bifacial leaf-shaped scrapers range from 1.0 to 1.7 cm. The maximum length and width dimensions of the largest thinning scars on leaf-shaped bifacial scrapers exceed 5 cm.

It is necessary to note that leaf-shaped points and leaf-shaped scrapers are morphologically very close. The only difference is tip sharpness. In fact, leaf-shaped bifacial points and scrapers fall into the same morphological group.

Trapezoidal-Shaped Bifacial Scrapers

There are 2 trapezoidal-shaped bifacial scrapers and they belong to one type: semi-trapezoidal with natural back. Both are plano-convex, formed by a combination of scalar flat and semi-steep retouch. Both pieces are smaller than 5 cm, while thicknesses vary from 1.3 to 1.5 cm.

Bifacial Heavily Exhausted Tools and Bifacial Reutilized Tool Fragments

There are 4 bifacial heavily exhausted pieces (Table 24-17). The common features of the exhausted bifacial tools are the absence of retouch on the tool edges, as well as their narrow and thick proportions. These proportions distinguish bifacial heavily exhausted tools from preforms of bifacial tools. The heavily exhausted bifacial tool from Level IV-A was an attempt to rejuvenate by thinning an already patinated bifacial tool (Figure 24-15: *4*), resulting in a number of hinge fractures. The edges were not retouched. Also, the artifacts from Level IV-B and IV-F (fragment) are unretouched bifacial pieces at the thinning stage (Figure 24-15: *3*).

These tools were found in three levels (Table 24-17). The broken edges were modified by retouch (Figures 24-12: *5*; 24-15: *7*).

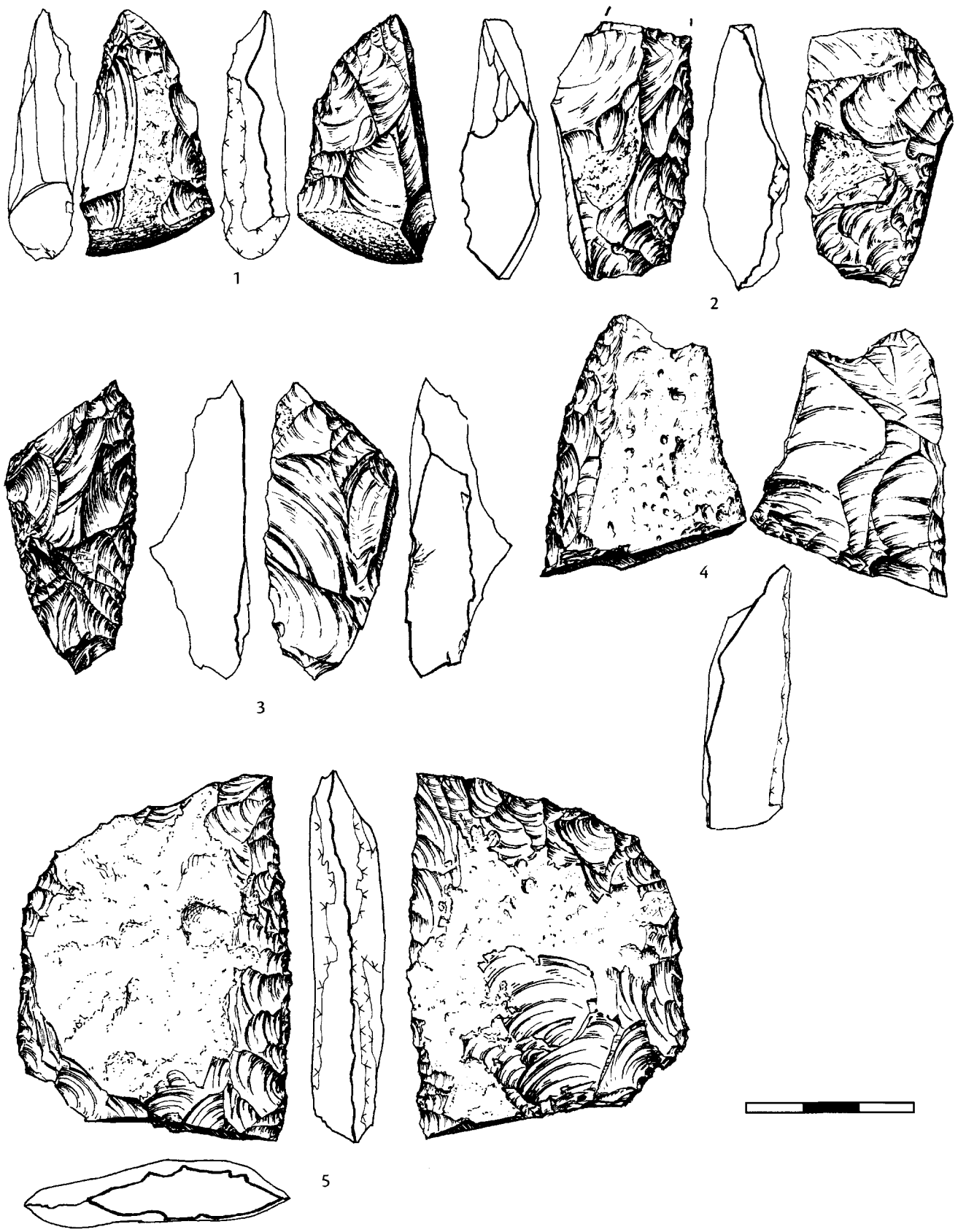

Figure 24-13—Chokurcha I Levels IV-I (2, 5), IV-I2 (3), IV-M (1), IV-O (4) bifacial scrapers: 1, 2, 3–convex, with natural back; 4–convex; 5–convex, with thinned back.

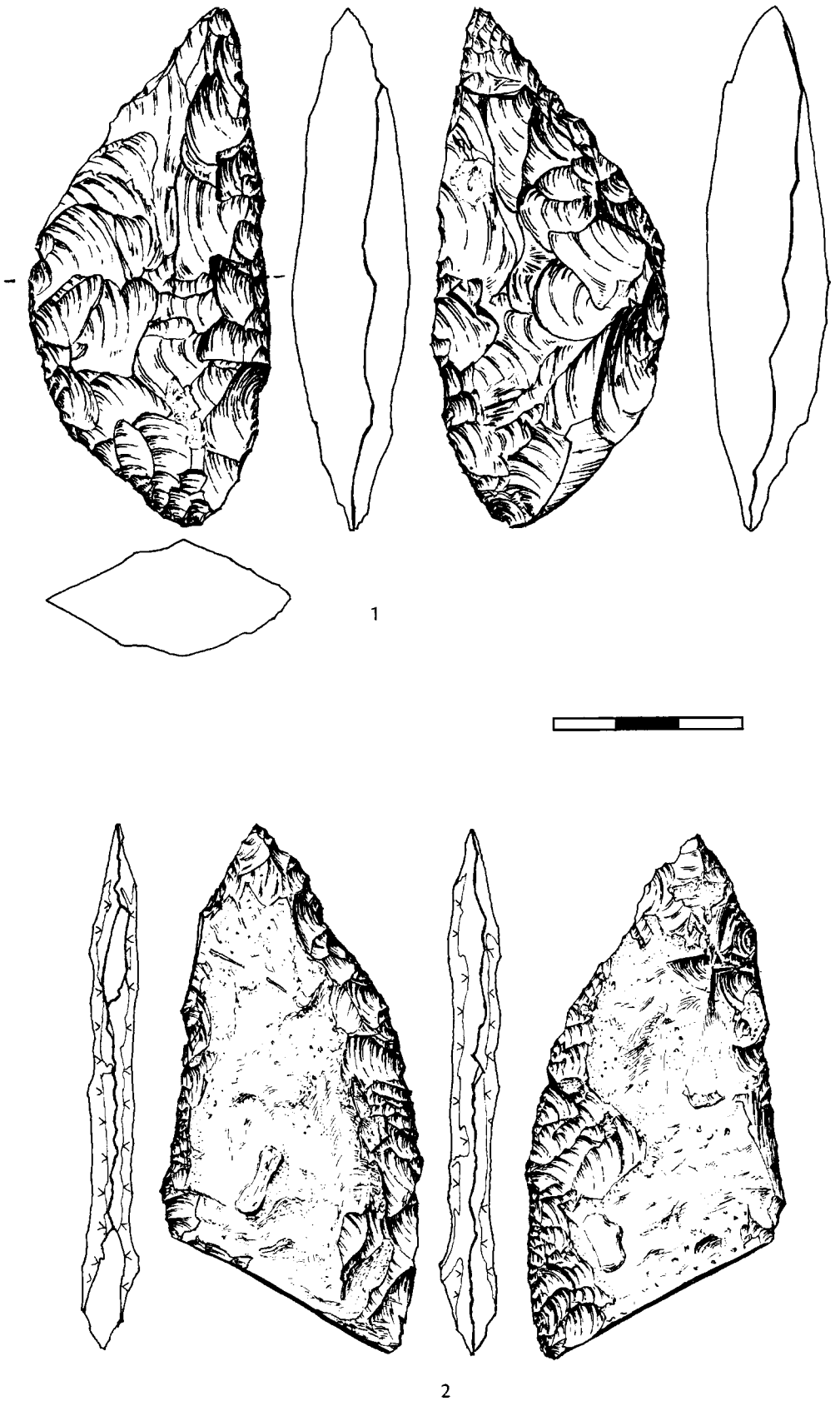

Figure 24-14—Chokurcha I Levels IV-G (1), IV-S (2) bifacial scrapers: 1–crescent; 2–semi-crescent, with natural back.

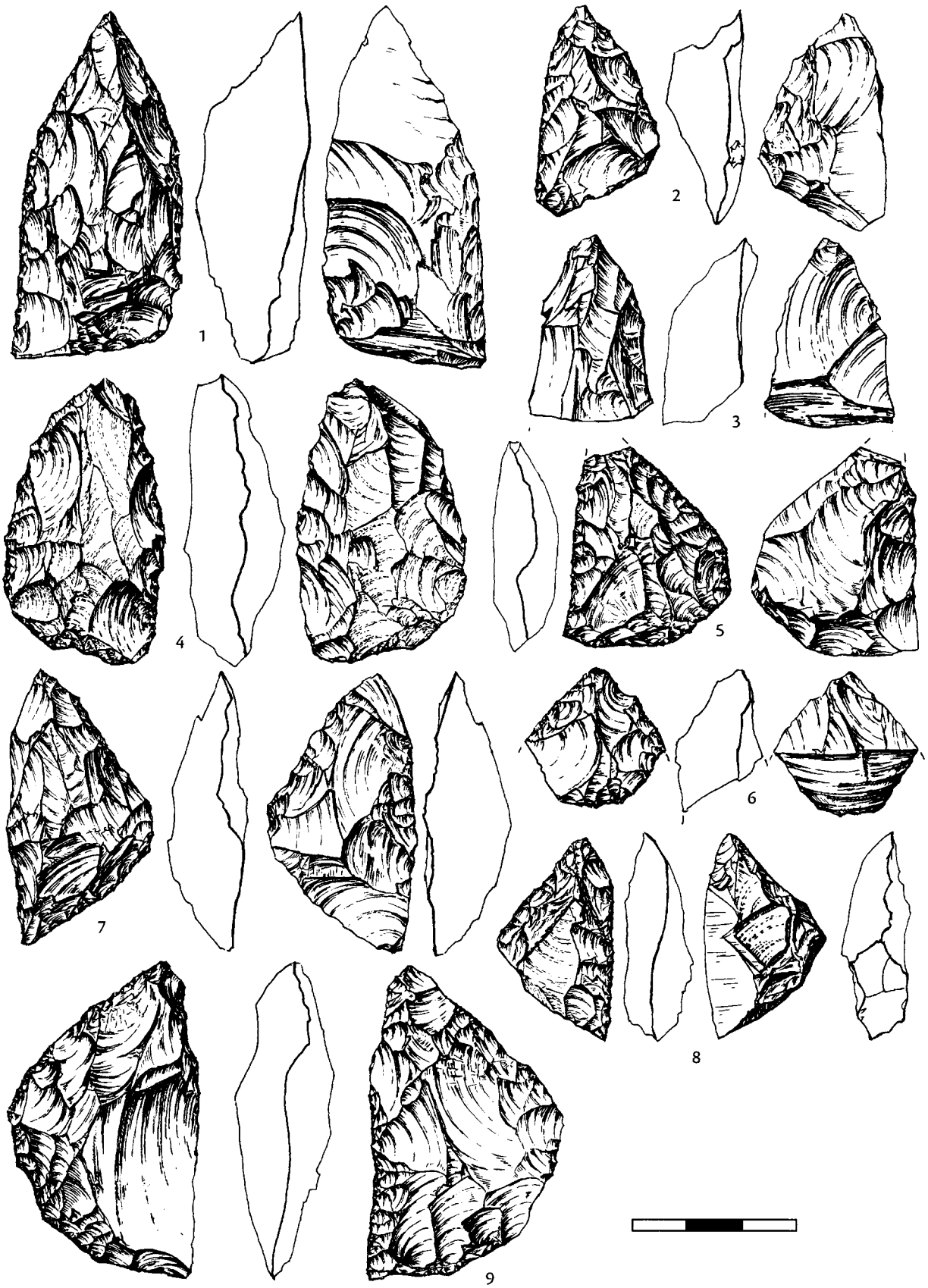

Figure 24-15—Chokurcha I Levels IV-A (4), IV-F (1, 3), IV-I (6), IV-I2 (2), IV-M (5, 8, 9), IV-O (7) bifacial scrapers: *1*–sub-triangular; *2, 6*–triangular; *8*–sub-triangular, with natural back; *5, 9*–crescent. *3, 4*–Bifacial heavily exhausted tools. *7*–Bifacial tool reutilized fragment. The patinated negatives showing by the dotted lines (4).

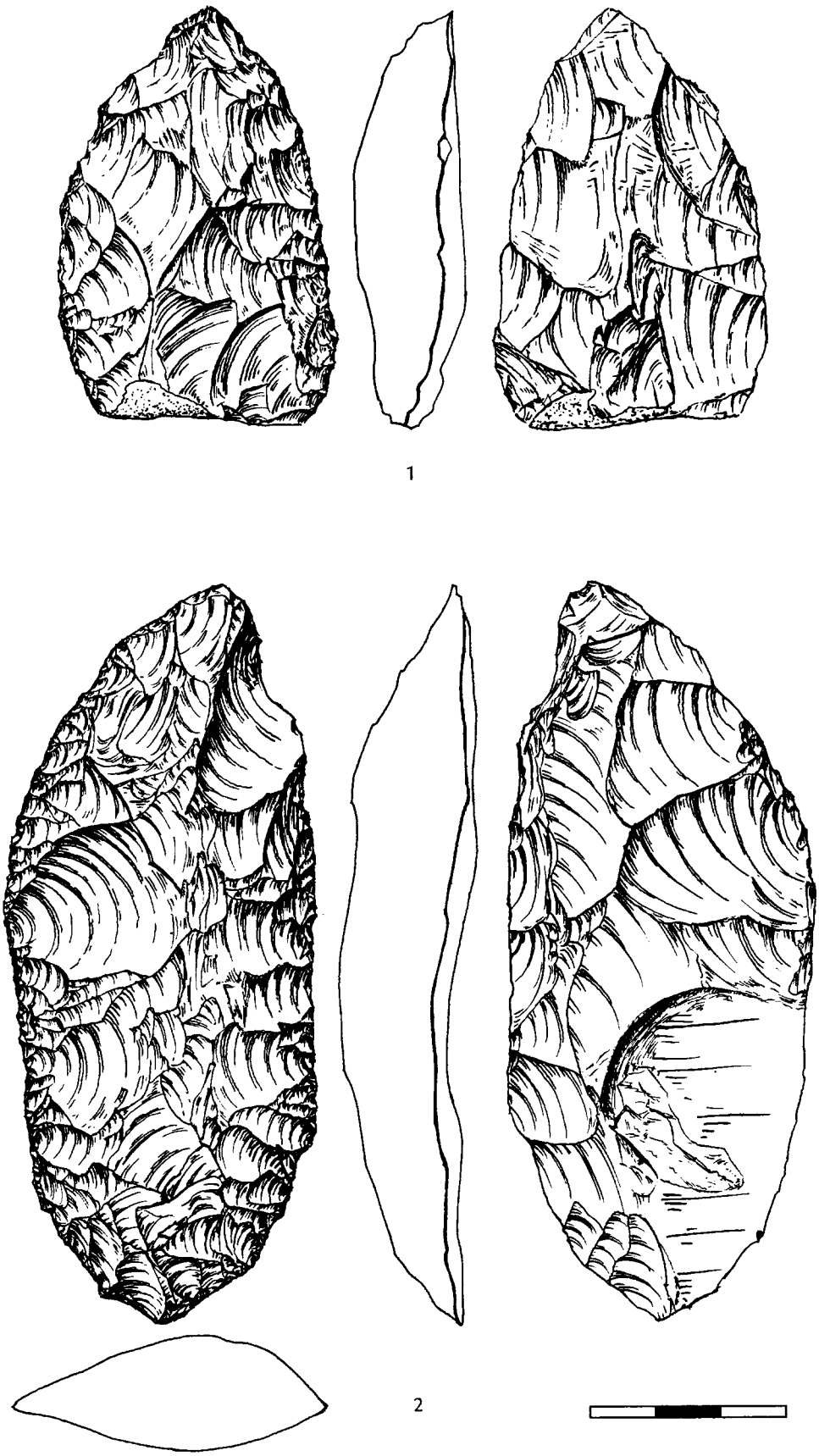

Figure 24-16—Chokurcha I Level IV-I (1, 2) bifacial scrapers: 1–semi-leaf; 2–leaf with thinned base.

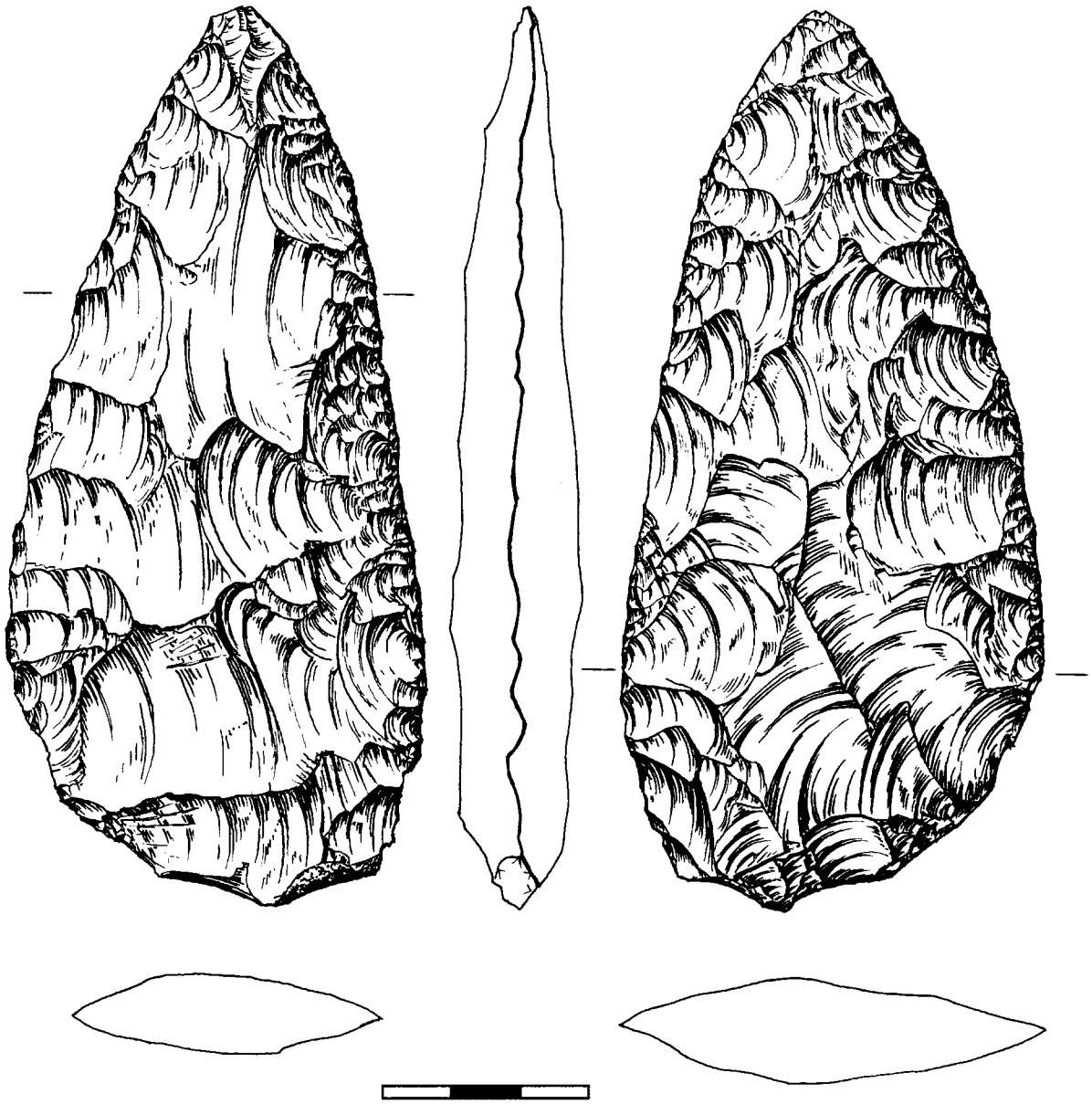

Figure 24-17—Chokurcha I Level IV-A, bifacial scraper: sub-leaf with thinned base.

Retouched Pieces and Thinned Pieces

Retouched pieces were found in seventeen of the nineteen levels containing tools. It is one of the most common tool classes, representing 29.2% of the total number of Unit IV tools. The most numerous form is a flake or chip with one obversely retouched lateral edge. Altogether, these account for ca. 60% of all retouched pieces. The remaining 40% fall into the other nine types of retouched pieces.

There are only two thinned pieces in Unit IV; both are flakes with ventral distal and ventral proximal thinning.

Unidentifiable Tools

The unidentifiable tools are tiny fragments of unifacial tools (59.5%), bifacial tools (38.0%), and heavily burned fragments (2.5%) of either unifacial or bifacial tools.

Pebble Macro-Tools

There are 2 pebble macro-tools in Unit IV: a chopper from Level IV-I and chopping tool from Level IV-M. The dimensions of the chopper are a length of 18.0 cm, a width of 10.5 cm, and a thickness of 6.5 cm. The

chopping tool is somewhat smaller, with a length of 10.2 cm, a width of 9.8 cm, and a thickness of 5.7 cm.

Pebble Retouchers

The 31 pebble retouchers from Unit IV are subdivided into six types (Table 24-18). The most numerous are simple retouchers with one working surface, defined as a zone of cuts and scratches on one end of a pebble (Figure 24-18: *1*). The double retouchers have two working surfaces on opposite ends, but on the same pebble face (Figure 24-18: *2*). The alternate retouchers show two working surfaces situated on opposite ends and on opposite faces. The alternating retouchers have two working surfaces that are situated on the same end but on opposite faces (Figure 24-18: *3*). The semi-bifacial retouchers have three working surfaces, two of them are situated at the opposite ends of one face, and the third is situated on the opposite face. The bifacial retouchers are characterized by four working surfaces that are situated on both ends of both faces (Figure 24-18: *4*).

Pebble retoucher dimensions vary from 3.2 to 7.4 cm in length, from 2.3 to 5.3 cm in width, and from 0.7 to 3.7 cm in thickness. There was no relationship, however, between retoucher type and pebble size. For example, the size of the most complicated bifacial retoucher from Level IV-M is smaller (length = 3.7 cm, width = 2.3 cm, thickness = 1.8 cm) than the simple retoucher from Level IV-A (length = 7.4 cm, width = 5.3 cm, thickness = 3.7 cm). Five retouchers were made on sandstone pebbles, one on jasper, and the rest on tufa-like pebbles.

Table 24-18
Chokurcha I Unit IV: pebble retouchers

	IV-A	IV-A2	IV-B	IV-F	IV-I	IV-I2	IV-M	IV-O	*N*
Simple	1	1	·	2	4	1	2	5	16
Double	·	·	·	·	3	·	1	1	5
Alternate	·	·	1	1	·	·	·	·	2
Alternating	·	·	·	1	·	·	1	·	2
Semi-bifacial	·	·	·	1	·	·	1	·	2
Bifacial	·	·	·	·	2	1	1	·	4
Total	1	1	1	5	9	2	6	6	31

Hammerstones

Four hammerstones on tufa-like (2) and sandstone (2) pebbles came from Levels IV-L (1), IV-L2 (1), and IV-O (2). All exhibit a single working surface on a short and narrow end of the pebble. Pebble hammerstone dimensions vary in length from 6.1 to 7.9 cm, in width from 4.1 to 5.7 cm, and in thickness from 2.5 to 3.4 cm.

Hammerstone-Retoucher

A single piece found in Level IV-K had a combination of retoucher and hammerstone traces. It is on a tufa-like pebble with one area of cuts and scratches on a flat side and an area of deep cuts on a narrow side adjacent to the zone of cuts and scratches. The dimensions of this piece are a length of 6.5 cm, a width of 4.5 cm, and a thickness of 2.1 cm.

Bone Retouchers

Bone retouchers were found in eight levels (Table 24-19) and are subdivided into three types: simple, double, and triple. The simple retouchers have a single working surface on the distal extremity of the convex exterior side of the bone (Figure 24-19: *1, 2*). The simple retouchers were made on tubular bones fragments (18) and ribs (2 pieces). It is difficult to identify the species because of the diminutive size of the bones. It appears the majority of bone fragments (Figure 24-19: *1*), as well as the ribs (Figure 24-19: *2*), came from horses. One bone fragment might have been from a mammoth and 2 others from saiga.

Table 24-19
Chokurcha I Unit IV: bone retouchers

	IV-A	IV-B	IV-F	IV-I	IV-I2	IV-K	IV-M	IV-S	*N*
Simple	1	·	5	7	·	1	5	1	20
Double	1	2	6	4	3	·	5	·	21
Triple	·	1	·	1	·	·	·	·	2
Total	2	3	11	12	3	1	10	1	43

The double retouchers have two working surfaces on the proximal and distal extremities of the convex exterior side of the bone (Figures 24-19: *3*; 24-20: *1*). Double retouchers were made on tubular bone fragments, a rib, and bone flakes. Probably 2 of the 19 tubular fragments came from mammoth (Figure 24-20: *1*). The only double retoucher on a rib might be from a horse.

Two triple retouchers were found. The triple retoucher from Level IV-B has two working surfaces on the proximal and distal extremities of one side, and another working surface on the distal region of the other side of the bone. The retoucher from Level IV-I has two working surfaces on one side of the bone, while the third is on a narrow part of the bone (Figure 24-20: *2*).

There is no relationship between bone retoucher types and sizes. In many cases, it is not clear which bone retouchers are complete and which are broken, though the double and triple bone retouchers are

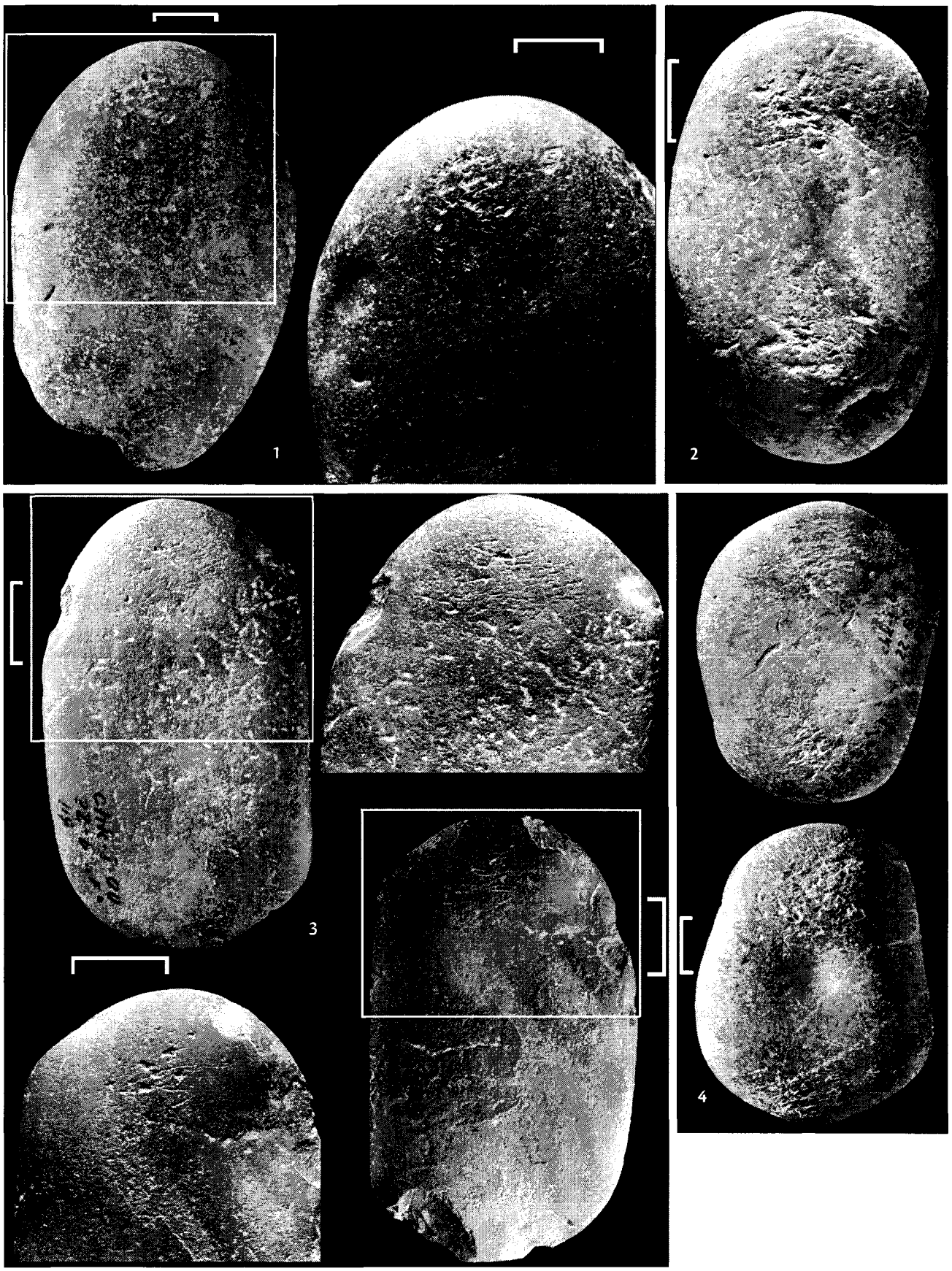

Figure 24-18—Chokurcha I Levels IV-K (1), IV-I2 (2), IV-F (3), IV-I (4) pebble retouchers: *1*–simple; *2*–double; *3*–alternating; *4*–bifacial. Photographed by Yu. Dekonchiev.

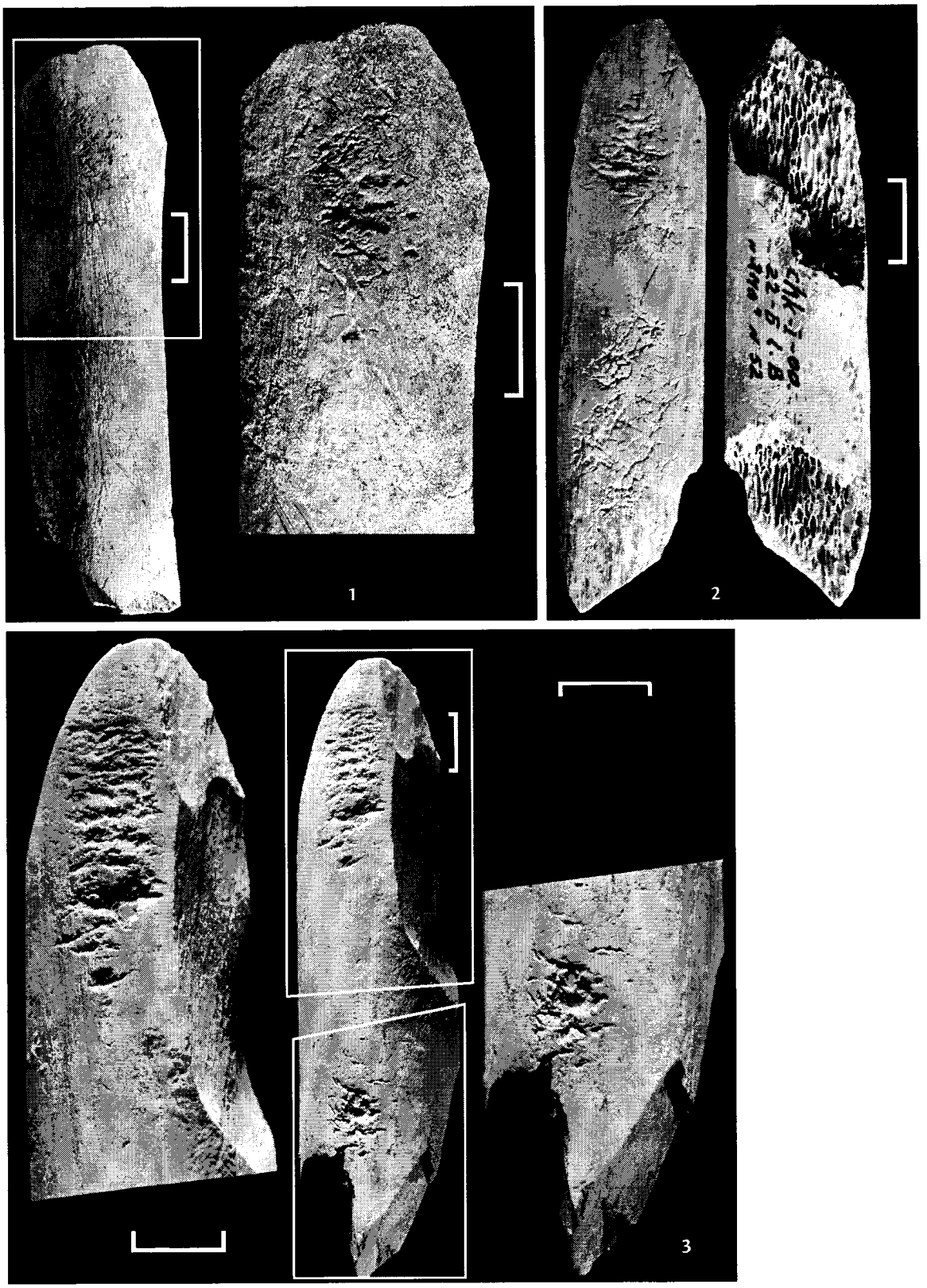

Figure 24-19—Chokurcha I Levels IV-M (1), IV-B (2), IV-I (3) bone retouchers: 1–simple; 2–simple, on rib fragment; 3–double. The lower end of simple retoucher (2) shows the natural destruction of rib surface. Photographed by Yu. Dekonchiev.

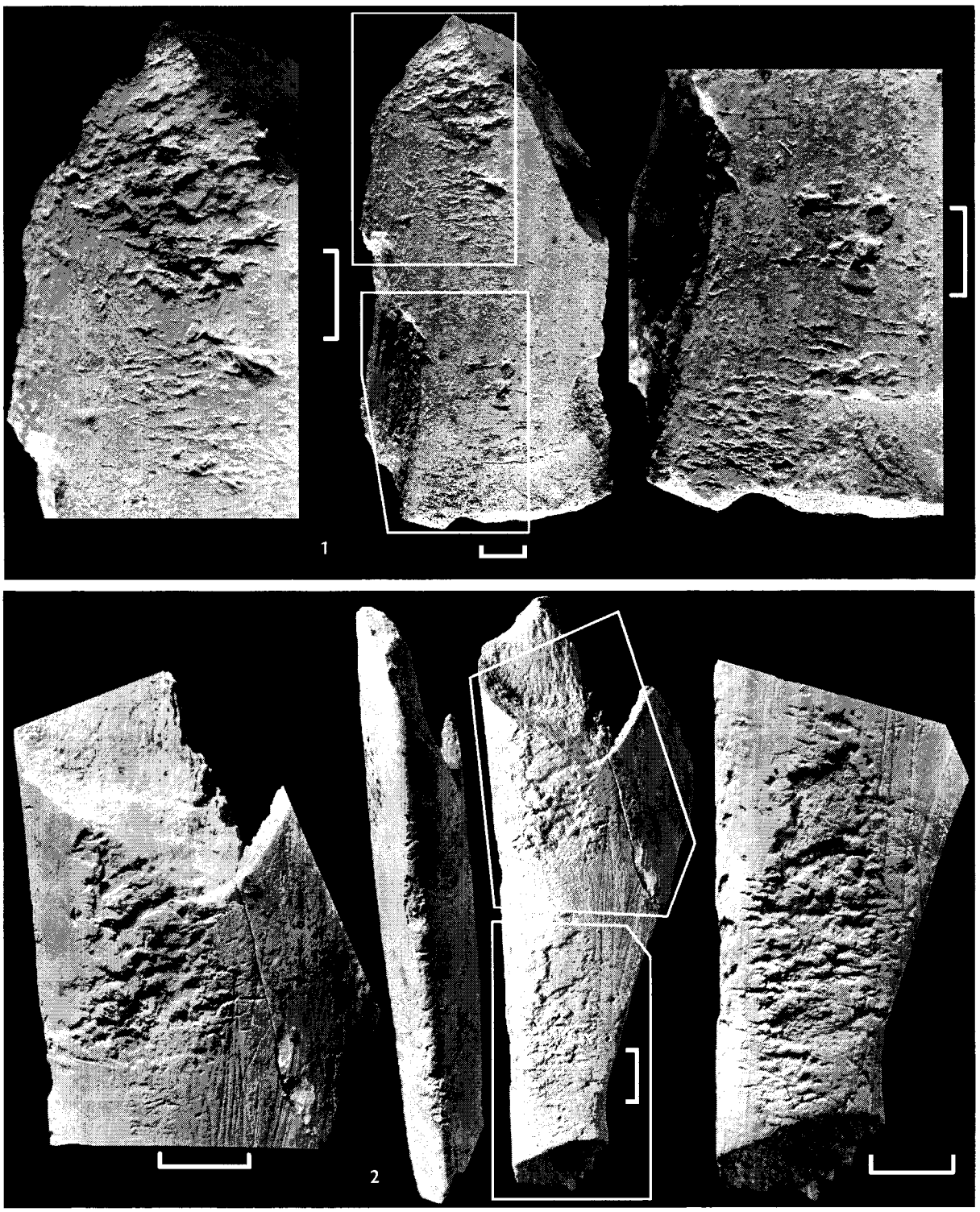

Figure 24-20—Chokurcha I Level IV-F bone retouchers: *1*–simple, on mammoth bone fragment; *2*–triple. Photographed by Yu. Dekonchiev.

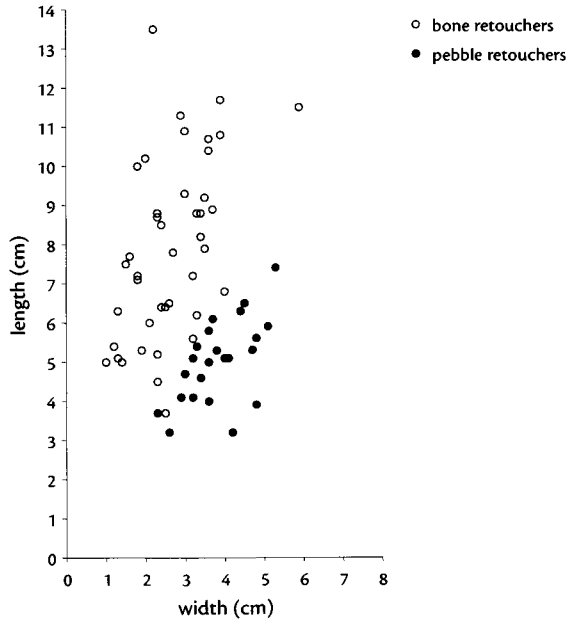

Figure 24-21—Chokurcha I Unit IV: length/width scatterplot for bone and pebble retouchers.

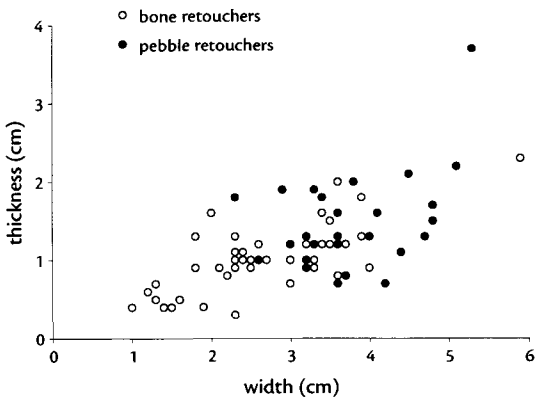

Figure 24-22—Chokurcha I Unit IV: width/thickness scatterplot for bone and pebble retouchers.

assumed to be complete. If so, these two types show the "real" size of bone retouchers. The double and triple retouchers range in length from 5.2 cm to 11.7 cm, width from 1.2 cm to 5.9 cm, and thickness from 0.6 cm to 2.3 cm. The maximum dimensions of simple retouchers are similar (length = 13.5 cm, width = 3.7 cm, thickness = 1.6 cm), while the minimum dimensions (length = 3.7 cm, width = 1.0 cm, thickness = 0.3 cm) differ little from that of double retouchers.

The dimensions of bone and pebble retouchers differ mainly by length (Figure 24-21), rather than by width or thickness (Figure 24-22).

Comparative Typological Analyses

On the whole, all the levels of Unit IV exhibit a similar pattern of artifact attribute composition. The differences that are present are caused by the statistically insufficient samples from many levels. There are three levels that produced a moderate number of artifacts: IV-I, IV-M, and IV-O. The comparison of debitage attributes for these levels found no significant differences.

There are, however, a number of typological differences between these levels, although they all fall within the traditionally recognized variability of the Crimean Middle Paleolithic. The percentages of bifacial tools vary from a maximum of 35.4% in Level IV-I to a minimum of 13.3% in Level IV-O. Usually, such a low bifacial tool percentage, as seen in Level IV-O, is characteristic of either the Staroselian or the Kiik-Koba facies of the Crimean Micoquian. On the other hand, more than 50% of the essential tool count of Level IV-O consists of simple, one-edge scrapers, while convergent scrapers account for only 24.4%. Such a high percentage of simple scrapers and a low percentage of convergent scrapers are considered to be characteristic of the Ak-Kaya facies of the Crimean Micoquian. The small tool size, which rarely exceeds 4 cm in length and width, is more common for the Kiik-Koba facies than the others. The series of small-sized semi-crescent, semi-trapezoidal, and sub-triangular scrapers (Figure 24-11: *1, 12, 13*) also fits well into a Kiik-Koba facies definition. Yet, the absence of points makes the Level IV-O assemblage closer to the Ak-Kaya facies, than to the Starosele or Kiik-Koba facies.

The percentages of bifacial tools in Levels IV-I (35.4%) and IV-M (27.8%), while similar to one another, differ from that of Level IV-O. Such high percentages of bifacial tools are characteristic of the Ak-Kaya facies of the Crimean Micoquian in its clearest manifestations, such as at Zaskalnaya VI Layer II and Kabazi II Units V and VI (Kolosov 1986; Chabai in press). Furthermore, the percentages of simple

scrapers and converging scrapers in the Chokurcha I assemblages are close to what is found in the classic Ak-Kaya assemblages. At the same time, the assemblage of Level IV-M contains a series of small triangular and trapezoidal-shaped points (Figure 24-8: *3–6, 8*) identical in shape and size to the points found in the Kiik-Koba facies.

Certainly, all of these characteristics might be the result of the limited size of the excavated areas and the statistically insufficient number of artifacts. Given the size of the excavated area, it is difficult to prove that these typological differences were caused by either intensity of occupation or different models of raw material exploitation.

Technology

It appears that very little primary flaking took place in the excavated areas of Chokurcha I, thus, there is little to say regarding technology. It is clear that all bifacial tools were produced in the typical Micoquian plano-convex manner. The only pieces related to primary flaking are the core-like scrapers, where some refitting was possible (Figure 24-2: *1a–2c*). Even here, however, it is not clear whether to interpret the flakes struck from the core-like scrapers as "desired" products of primary flaking, or the waste from core-like scraper production. It is possible that the few recovered cores initially might have been bifacial tools that were broken during their exploitation and then reutilized as cores. The only visible technology employed in the Unit IV assemblages was the secondary treatment of both bifacial and unifacial tools. Flat to semi-steep scalar retouch was used on over 95% of both bifacial and unifacial tools in the essential count. The rest of the tools were retouched by a combination of flat or semi-steep scalar and sub-parallel retouch.

The bifacial tools underwent tip rejuvenation and edge resharpening. Bifacial tool tip rejuvenation was achieved by a lateral blow, removing the tool's distal extremity (Figure 24-3: 2, 3, 8, 10). In theory, the next step should have been the modification of this distal part into a plano-convex tip. The initial step of edge resharpening might have resulted in those preforms and/or heavily exhausted bifacial tools that are present in the assemblages (Figures 24-1; 24-15: 3, 4). The patinated bifacial tool shows that the resharpening started with relatively large removals (Figure 24-15: 4), while the subsequent stage retouched the "resharpened" edges. In any case, the edge resharpening resulted in a significant decrease of both width and length, while the thickness remained the same for relatively "fresh" bifacial pieces (Figures 24-7; 24-23).

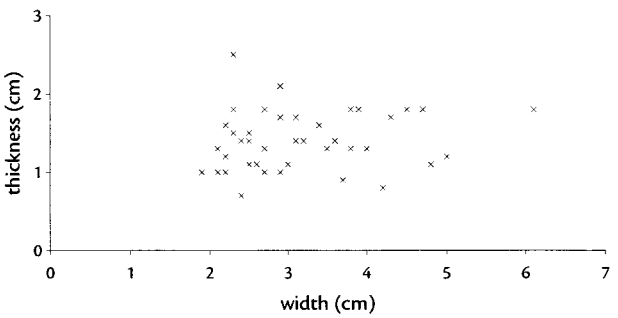

Figure 24-23—Chokurcha I Unit IV: width/thickness scatterplot for bifacial tools.

The Model of Raw Material Exploitation

The high tool percentages in each level (Table 24-1) suggest mainly off-site tool production. This conclusion is strengthened by the rarity of both cores and preforms (Table 24-1). Bifacial tools comprise 13.3% to 35.4% of each tool assemblage. The amount of bifacial thinning and blank rejuvenation (Table 24-2, Figure 24-4), the average blank size (Table 24-4), the size of thinning scars on bifacial tools, as well as the similarities between blank and bifacial tool sizes (Table 24-7) all suggest that the blanks from Chokurcha I Unit IV originated mainly from bifacial tool resharpening, reshaping, and rejuvenation. The process of bifacial tool reshaping/rejuvenation played a significant role in all Unit IV occupations. This is demonstrated by the consistent number of bifacial thinning/rejuvenation blanks (Table 24-2), as well as in the condition of the bifacial tools. If there were only a single bifacial preform, exhausted and reutilized bifacial tools would not be so rare (Tables 24-1, 24-17; Figures 24-1; 24-12: *1*; 24-15: *3, 4, 7*). During their "life," bifacial tools became narrower and shorter, while maintaining about the same thickness as the non-exhausted pieces (Figures 24-7; 24-23). Thus, after a number of resharpening/rejuvenation episodes, bifacial tools became short, narrow, and relatively thick. The number of bifacial tools with such characteristics is about 50% of the assemblages. The abandoned bone and pebble retouchers, as well as the rare hammerstones, appear to be indirect evidence of the dominance of reshaping/rejuvenating processes at the site.

Another result of reshaping/rejuvenation was a number of relatively small blanks. Some (circa 20%) show a combination of attributes that are usually expected from these types of pieces: curved and twisted lateral profiles, lipping, and obtuse platform angles. For the most part, the other blanks show the same attributes, but not necessarily in the combination seen for bifacial thinning pieces. It is unlikely that this indicates another, non-bifacial origin for these blanks. The sizes of most of the "regular" and bifacial thinning blanks are identical (Figure 24-5). So, there is no reason to believe that they derived from different reduction processes. The blank, obtained from bifacial tool reshaping were intensively used for unifacial tool production (Table 24-16; Figures 24-9: *3, 5*; 24-10: *1-4, 14*).

There are some blanks that do not look like the result of on-site raw material reduction. They are significantly larger in all dimensions, including platform size (Figures 24-5; 24-6; 24-7), than most blanks at Chokurcha I Unit IV. They also usually exhibit dorsal surface cortex. It is likely these "big" blanks were the result of off-site raw material reduction. Usually, "big" blanks were used to produce complex tools, such as points and convergent scrapers of various shapes (Figure 24-8: *1, 2, 10*).

In sum, the raw material exploitation in the Unit IV occupations was based on some bifacial and unifacial tool importation into the site area, with the majority of unifacial tools being produced on the by-products of bifacial tool reshaping/rejuvenation. A number of assemblages, especially from the levels that have thick lenses, contain both reduced and "fresh" tools. This might have resulted from numerous visits to the same surface during the "life" of the level.

Chokurcha I Unit IV in the Context of the Crimean Micoquian

The Chokurcha I Unit IV assemblages show strong affinities with the Ak-Kaya facies of the Crimean Micoquian, both typologically and technologically. The subdivision of the toolkits into simple, convergent, and bifacial tools, used in Crimean Middle Paleolithic studies as criteria for facies attribution (Chabai and Marks 1998), shows that the Chokurcha I Unit IV assemblages exhibit all possible varieties of the Ak-Kaya facies (Figure 24-24). Level IV-I has one of the highest percentage of bifacial tools (35.4%) within the Ak-Kaya facies, while the percentage of bifacial tools in Level IV-O (13.3%) places it at the other extreme of the Ak-Kaya cluster. This low percentage is more typical of the Starosele facies. The variability in the proportion of convergent tools is also significant. While the percentage of convergent tools in Level IV-I (16.7%) is the lowest for the Ak-Kaya facies, that of Level IV-M (39.4%) is close to the upper limit of its proportional distribution among Ak-Kaya facies assemblages. Finally, the simple tool distribution is bounded by Level IV-M (30.3%) on one side of the Ak-Kaya cluster, and by Level IV-O (57.5%) on the other. In spite of the seemingly significant differences in percentages, these variations are not terribly important when content is considered; that is, these typological ranges reflect the same or about the same technological and typological patterns.

As stressed in the introductory chapter (Chabai, Chapter 21), the characteristic feature of the Chokurcha I Unit IV sediments is the combination of at least two types of deposits: those from the in situ weathering of soft, Middle Eocene nummulitic limestones and those from river alluviation. So, the Chokurcha I Unit IV sedimentary rate appears to have been one of the most rapid in Paleolithic Crimea. This resulted in excellent preservation of both fauna and artifacts, as well as a clear separation of the numerous occupations by sterile sediments. In fact, there is no direct analogy for such an archeological sequence in Crimea. To some extent, the Chokurcha I Unit IV stratigraphic sequence might be viewed as a model for the extremely thick cultural layers at Zaskalnaya V. Zaskalnaya V is a collapsed rockshelter in same kind of limestone as Chokurcha I. The sediments comprising up to 4.5 m of the stratigraphic sequence were mainly from the weathering of the limestone wall and roof. As described by Kolosov (1983:45, 70), cultural layers II and III of Zaskalnaya V were each 35 to 45 cm thick. These horizons consisted of numerous ashy and burned bone lenses with fauna material and artifacts. The thickness of each lens did not exceed even a few centimeters. Yet, there were no sterile lenses in between the ashy/burned bone lenses. This absence was taken as evidence for a continuous occupation of the rockshelter. On the basis of this interpretation, the layers V and VI of Zaskalnaya V were evaluated as long-term base camps, with a large variety of on-site activities, including: primary flaking, tool production, meat consumption, and the creation of numerous constructions such as pits and hearths. Excluding primary flaking and intensive tool production, the range of activities at Chokurcha I Unit IV and Zaskalnaya V are identical. The significant primary flaking at Zaskalnaya V was because there were high quality flint sources nearby, which was not true at Chokurcha I. At the same time, the structure of the lenses that comprise the Zaskalnaya V cultural

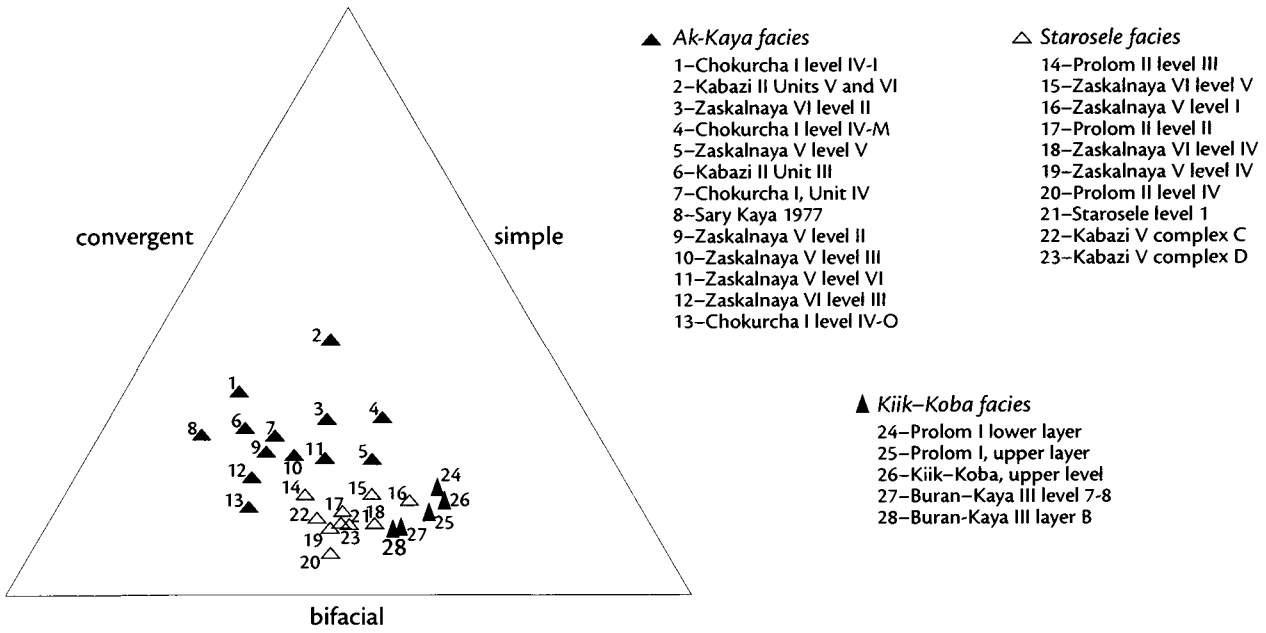

Figure 24-24—Facies distribution of the Crimean Micoquian assemblages.

layers is not much different from what was found in Chokurcha I Unit IV, especially for Levels IV-B, IV-F, IV-I, IV-M, and IV-O. All of these contain clusters of ash and burned bones, some of them exhibit pits and fireplaces. So, the ashy/burned bone lenses of cultural layers II and III of Zaskalnaya V are the "depositional analog to the archeological levels of Chokurcha I Unit IV." The only clear difference between the Zaskalnaya V and Chokurcha I Unit IV sequences is that, because of rapid sedimentation, the Chokurcha I Unit IV occupations were separated by sterile sediments in several archeological levels, while the Zaskalnaya V occupations, due to the relatively low sedimentation rate, were condensed into thick cultural layers. Thus, the Chokurcha I Unit IV data might be a basis for reevaluating the definition of the Zaskalnaya V settlement type.

The model of raw material exploitation employed at Chokurcha I Unit IV does not suggest any long-term occupation of the site area. To some extent, the Chokurcha I Unit IV raw material exploitation resembles that employed at Sary-Kaya and Kabazi II Unit III (Chabai and Marks 1998; Marks and Chabai 2001). At these sites, raw material exploitation was based on both bifacial and unifacial tool importation, which was slightly augmented by some on-site primary flaking. Yet, the difference between Chokurcha I, Sary-Kaya, and Kabazi II Unit III is seen in the rarity or even complete absence of tool resharpening/rejuvenation at the latter sites. Unlike Chokurcha I Unit IV, no traces of fireplaces or other kind of construction activity were ever found at Sary-Kaya or Kabazi II Unit III. Finally, the Sary-Kaya and Kabazi II Unit III occupations were killing/butchering stations, which is not the case for Chokurcha I Unit IV (Patou-Mathis, Chapter 22). Given the relative intensity of tool resharpening and the presence of some structures (pits, fireplaces) in a few of the archeological levels, the duration of the Chokurcha I Unit IV occupations may have been somewhat longer than those at the ephemeral killing/butchering stations.

Another analogy to the raw material exploitation seen at Chokurcha I Unit IV is the Kabazi II Units V and VI assemblages (Chabai, in press). These assemblages, as well as Chokurcha I Unit IV, were based on the importation of both bifacial and some unifacial tools into the site, with some weak evidence for core reduction and bifacial tool production. Also, fireplaces were present in the site area, and the pattern of faunal exploitation was very close to that found at Chokurcha I Unit IV. At the same time, resharpening/rejuvenating processes were not as intensively undertaken at Kabazi II Units V and VI as they were at Chokurcha I Unit IV.

The resharpening/rejuvenation processes at Chokurcha I Unit IV might have been as frequent as at Buran-Kaya III Layer B—a Kiik-Koba facies. For instance, at Buran-Kaya III Layer B, the bifacial thinning flakes comprise 29.3% of blank types (Demidenko, Chapter 9), while in the Chokurcha I Unit IV assemblages, bifacial thinning flakes comprise 25.2% of the total number of flakes with complete butts. The density of artifacts at Buran-Kaya III Layer B is considerably higher than for any level at Chokurcha I, plus the average dimensions of artifacts are much smaller than in the Chokurcha I Unit IV occupations.

The main reason for these differences might be the rate of sedimentation; that is, the unburied artifacts at Buran-Kaya III Layer B were utilized and reduced each time the site was revisited.

So, the Chokurcha I Unit IV occupations belong to a variety of short-term stations (Chabai and Marks 1998; Marks and Chabai 2001), which exhibit a number of common, as well as disparate, features for raw material and faunal exploitation. The most pronounced similarities are on-site importation of bifacial and unifacial tools, the absence or rarity of evidence for on-site tool production, and the presence of fireplaces.

In spite of the small excavated area, Chokurcha I Unit IV has added new information to our understanding of Crimean Micoquian variability. The ranges of typological variation in the Crimean Micoquian, and even within the facies of the Crimean Micoquian, may be relatively significant. Chokurcha I assemblages such as Level IV-M contain characteristic features of both Ak-Kaya and Kiik-Koba facies. Though the bifacial leaf-shaped points and bifacial backed scrapers that are characteristic of both the Staroselian and Ak-Kaya facies were found in Level IV-I, as a whole, the Chokurcha I assemblages exhibit a toolkit more characteristic of the Ak-Kaya facies, as well as the same raw material exploitation. So, in the case of the Crimean Micoquian, there is no reason to believe that this variability was caused by stylistic factors derived from three "paleo-ethnic groups": Ak-Kaya, Staroselian, and Kiik-Koba. In spite of seemingly sufficient differences in tool frequencies, the assemblages of the Crimean Micoquian exhibit technological and typological continuity that lasts about 100,000 years in the southern regions of Eastern Europe.