'Atiqot 94, 2019

The Chipped Stone Assemblage from Ḥorbat Nevallaṭ

Hamoudi Khalaily

Introduction

The lithic assemblage described below originated from a salvage excavation at the site of Ḥorbat Nevallaṭ in the northern Shephelah, conducted in 1999 (see van den Brink and Lazar, this volume).[1] The excavation revealed several phases of activity dating to the Chalcolithic period: a number of structures and features, some with packed ashy floors; and several installations, including cupmarks, which were hewn in the bedrock in the vicinity of the site. A few refuse pits were also found. Most daily activities were probably carried out in courtyards adjacent to buildings.

Artifacts were collected using conventional methods, with 'loci' marking all the anthropogenic features and 'baskets' comprising the smallest unit of excavation. Sieving was only employed in certain loci. Thus, the possibility cannot be excluded that some small chipped stone pieces or other artifacts were missed. However, given the nature of the flint assemblage—oriented toward the production of larger items (Hermon 2003)—any missing of small artifacts probably would not have influenced the conclusions regarding its general characteristics.

The Assemblage

A total of 3720 flint artifacts were collected and analyzed. Debitage (dominated by flakes) comprises over 50% of the collection (Table 1). Debris (mostly chunks) is frequent, amounting to a quarter of the assemblage. Other waste products, such as primary elements and blades, are also represented, suggesting that at least to some extent flint tool production was carried out on-site.

Tools represent 15.9% of the assemblage (Table 2). Given the fact that most tools were already broken when discarded, and that the site appears to have been abandoned in an

[1] The author wishes to thank the excavators for the opportunity to study this material. Thanks are also due to Sorin Hermon, for his help and comments, and Leonid Zeiger and Michael Smilansky, for drawing the artifacts.

Table 1. Waste Frequencies

Type	N	%
Debitage		
Primary elements	305	16.1
Flakes	1411	74.4
Blades	92	4.8
Bladelets	38	2.0
CTEs	51	2.7
Total debitage	*1897*	*100.0*
Debris		
Chunks	663	70.0
Chips	284	30.0
Total debris	*947*	*100.0*
General		
Debitage	1897	60.3
Debris	947	30.1
Cores	302	9.6
Total	*3146*	*100.0*

Table 2. Tool Frequencies

	Type	N	%
Formal	Sickle blades	38	6.6
	Backed blades	15	2.6
	Bifacials	42	7.3
	Tabular scrapers	8	1.4
Non-Formal (ad hoc)	Scrapers	58	10.1
	Micro-endscrapers	33	5.7
	Notches and denticulates	119	20.7
	Awls and borers	41	7.2
	Burins	14	2.5
	Retouched flakes	148	25.8
	Retouched blades and bladelets	46	8.0
	Multiple tools	12	2.1
Total		*574*	*100.0*

organized manner, the original number of tools produced and used here was probably higher. One-third of the tools were made on blades produced from single-platform blade cores, while the remainder were made on flakes. Sickle and backed blades, together with bifacials and tabular scrapers, were classified as 'formal' tools, implying that particular reduction schemes were applied to their manufacture, as opposed to the rest of the tools, which are considered 'non-formal' (i.e., ad hoc). The tools of both categories appear in a specific range of 10 to 50 items, except for notches and denticulates (n = 119) and retouched flakes (n = 148), which are at least twice as common as any other type. Apparently, there was a tendency to choose blades and bladelets as a preferred blank for the production of formal tools, and flakes for the other group (excluding bifacials, usually made on chunks).

Raw Material

Several flint types were used: gray flint, originating from pebbles; brown (various shades); dark brown with white microfossils; semi-translucent (small nodules); and Eocene dark brown flint (also known as Canaanean flint). This was used exclusively in the Early Bronze Age to produce blades. The provenience of most of these flint types is unknown. Several sources are suspected, probably outcrops in the general vicinity. Nearby wadis have yielded small, low-quality flint pebbles. Other, possibly more distant sources, such as Naḥal Yarmut and Eyla, were exploited for semi-translucent flint.

Gray, brown and light brown flints were most extensively used, each amounting to about 25% of the assemblage. However, most tools are on gray flint or the dark brown type with white micro-fossils, while a majority of waste products are on light brown flint. This difference may perhaps reflect the original characteristics of light brown flint nodules, requiring more preparation before removing a desired blank, while dark brown and gray flints are more easily manipulated and thus produce less debitage and debris. The possibility that some tools were brought to the site as finished products cannot be excluded.

The raw material used for cores follows the general ratio/distribution of the overall assemblage: most were of gray, light brown and brown flint. The main difference between the raw materials used for flake and blade debitage is that approximately 5% of the blade blanks were of semi-translucent flint, whereas none of the flake blanks were of that flint type. This tendency is also well-reflected in the raw materials utilized for the tools: with few exceptions, semi-translucent flint occurs only among tools made on blades (see below).

More than half of the bifacials were made from dark gray flint and the rest were on dark brown flint. Neither semi-translucent nor Canaanean flint—the highest-quality material in the assemblage—were used for the manufacture of bifacials.

Almost half the borers were of gray flint, about a quarter of brown flint, and the rest of assorted types and shades. Scrapers were mainly produced on brown and gray flint, although other types were also used to a lesser extent.

Blades, retouched blades and sickle blades were mainly made from three types of flint: brown, gray and light brown. This is in contrast to blade blanks, which were almost exclusively produced on light brown flint. This difference probably relates to various modes of core exploitation according to the qualities of the raw material: light brown cores were reduced using a blade scheme of removals, while the initial reduction of gray cores was aimed at producing blades and later flakes. It is also possible that a deliberate choice of light brown (and semi-translucent) flint affected the reduction sequence, these types being used mainly for the production of blades. Another factor may be nodule size, which enabled an extensive exploitation of gray cores (as opposed to light brown and semi-translucent types).

In addition to the common gray, brown and light brown flint types, some 5% of the retouched blades, bladelets and micro-endscrapers are made of semi-translucent flint. This is in keeping with the quantity of blade blanks of the same material. It is possible, though less plausible, that most blanks of semi-translucent flint were taken away from the site and used elsewhere.

Waste

Debitage

Flakes.— Flakes constitute about 75% of the debitage. Several technological variants are evident among the flakes. Three butt types were observed: flat (50% of flakes), faceted (33% of flakes), and the rest either dihedral, linear or punctiform. This reflects several knapping techniques, using either a soft or hard hammer.

The number of scars on the dorsal face of flakes varies between one and four, the most common being three. This high number is probably the result of an extensive use of cores (see above). A centripetal scar pattern appears on almost half of the flakes, which were apparently removed from centripetal cores. A third of the sampled flakes have a unipolar scar pattern, being removed from single-platform cores; the rest derive from bipolar cores. These patterns accord with those among cores (and blades, see below) and indicate that mostly multiplatform cores were used for the production of flakes.

Blades and Bladelets.— These represent some 7% of the debitage. The flake-to-blade ratio clearly reflects the flake orientation of this industry, also attested by the small quantity of cores that were used exclusively to produce blades. However, a quantitative comparison of formal tools on flakes and tools on blades shows a preference for blade blanks for the production of tools. The small number of blade blanks collected may be due to their high exploitation and is not necessarily the result of small-scale production. Moreover, on their debitage surface, two-thirds of the collected cores display negatives from blade and bladelet removals. Therefore, the possibility cannot be ruled out that most tools on blades were produced on-site.

More than half of the blades have a trapezoidal cross-section, with parallel, unipolar scars on their dorsal face from previous removals. One-third of the sampled blades present triangular cross-sections, while some are rectangular. Several butt types were observed—the most common being flat—on more than half of the blades. One-fifth of the blades have a faceted butt. Occasionally punctiform, linear or dihedral butts were used, probably at different stages of core exploitation. Most blades have more than three scars on their dorsal face, five or more being most common. The high number of scars among blades and bladelets suggests an extensive exploitation of the cores—a conclusion which is supported by patterns among flakes and cores (see above).

Cores and Core-Trimming Elements (Fig. 1).— A total of 302 cores were collected, representing 9.6% of the waste assemblage (Table 1). The common blank type was the

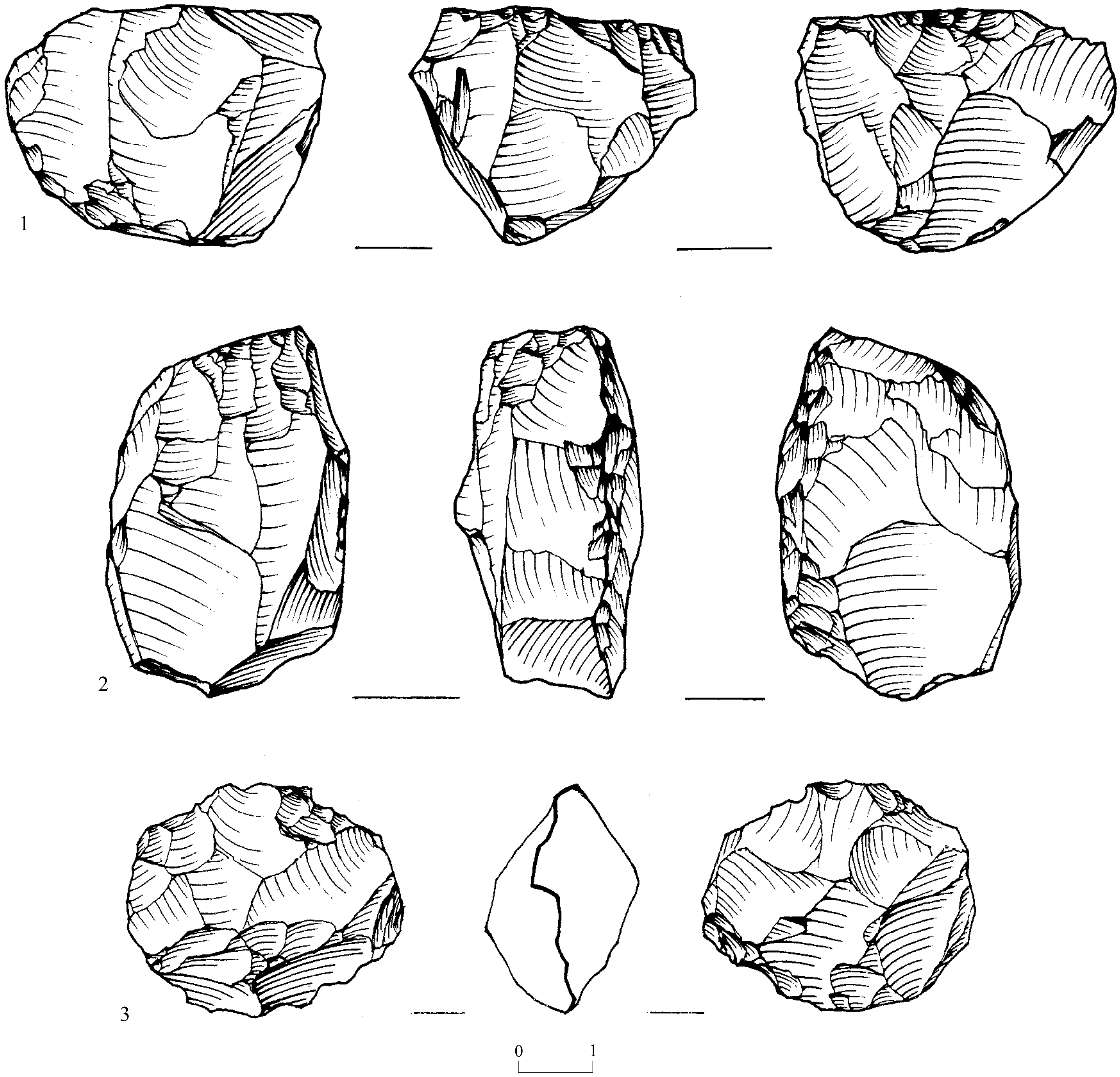


Fig. 1. Area A: cores.

No.	Locus	Basket
1	130	4108
2	157	4248
3	158	4243

nodule; however, a relatively high percentage (16%) of flakes were used as cores, which suggests an intensive exploitation of available blanks. This impression is further supported by the fact that most cores have multiple platforms (Fig. 1:1), oriented in various directions. About a quarter of them are faceted (Fig. 1:2), probably increasing the efficiency of their exploitation.

A large number of core-trimming elements (CTE) were collected. Among these, all types appear in similar amounts. The core-to-CTE ratio shows that more than two-thirds of the cores were renewed. The presence of several CTE subtypes supports longstanding assumptions regarding the high degree of core exploitation during this period, and changes in core function at different removal stages.

Tools

A total of 574 tools were collected (Table 2), which can be subdivided into two main categories: formal and non-formal. The non-formal group dominates, comprising some 82% of the tools. There are several differences between these categories, the most significant being their production mode. Formal tools are the result of various pre-determined and relatively rigid reduction schemes, while non-formal implements are products of a flexible reduction mode, adapted to raw material and available blanks.

Formal Tools

This category comprises all tool types which can help date the assemblage.

Sickle Blades and Backed Blades (Fig. 2).— These represent 9.2% of the tool assemblage (n = 53), and almost 51% of the formal tools (Table 2). They are generally bitruncated and backed, with one working edge modified by fine denticulation (Fig. 2:2, 5). However, other shapes also occur (Fig. 2:6). Almost half the sickle blades have a denticulated working edge; the rest incorporate a finely nibbled working edge. Research has shown that denticulation improves the cutting efficiency of a working edge (Vardi 2012:235); the presence of sickle blades both with and without a denticulated working edge suggests a non-standardized production of these items (different knappers, without a crystallized tradition). This impression is supported by variation observed in sickle blade shapes.

The majority of sickle blades were truncated; in fact, most complete sickle blades were bitruncated, which emphasizes the importance of a required length for these composite tool inserts (e.g., Fig. 2:1–4). The possibility that broken items were also truncated at both ends cannot be rejected.

More than half of the sickle blades were backed, probably to improve their hafting in the sickle shaft. Un-backed pieces were probably either hafted differently, or their width did not allow backing (Gilead and Hermon, in press).

On two-thirds of the sickle blades the gloss is delineated parallel to the working edge, extending along the length of the blade (Fig. 2:1–3). The rest of the items have a partial sickle

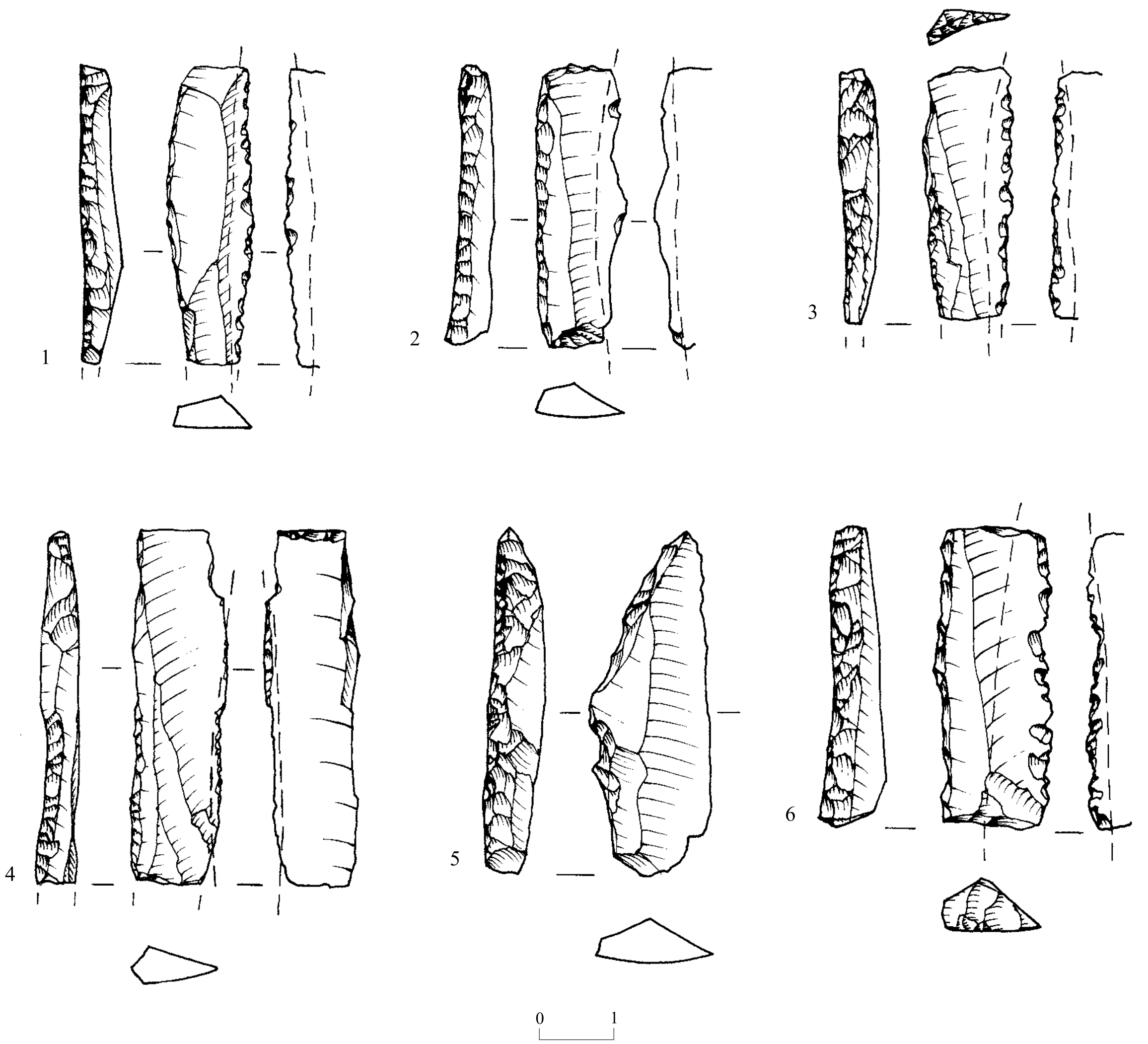


Fig. 2. Areas A and B: sickle blades.

No.	Locus	Basket
1	166	4316
2	157	4248
3	166	4273
4	318	3017
5	157	4248
6	166	4316

gloss. The position of a segment within the sickle haft and the shape of the tool would have dictated the orientation and extent of gloss. These observations suggest that the sickles used by the inhabitants of Nevallaṭ were curved, the cutting edge consisting of probably no more than three flint pieces (Vardi 2012:102). The mean size and the raw materials of the sickle blades show remarkable similarity to the blanks of sickle blades in the debitage and to the retouched blades of the non-formal tools. This suggests that blanks produced on-site were further modified into retouched blades. Therefore, it may be concluded that sickle blades were mostly produced at Ḥorbat Nevallaṭ, being the end products of a similar reduction scheme as retouched blades. The different sizes and shapes of sickle blades suggest a non-standardized method of their manufacture.

Bifacials (Figs. 3, 4).— These represent 7.3% of all tools (Table 2). Apart from two morphologically crude picks (e.g., Fig. 4:2), with a pointed working edge and rounded shape, the main bifacial subcategories are represented in almost equal quantities: adzes (n = 14; Fig. 3:1), chisels (n = 15; Fig. 3:2, 3) and axes (n = 13; Fig. 4:1). The main difference between the three types is the shape of their working edge (see below). The functional difference between adzes and chisels also influenced their hafting.

The amount of cortex on the faces of both types is minimal. However, while up to 90% of the chisels have no cortex at all, half of the adzes retain some. It is possible that this difference denotes a higher investment in the production of chisels, which may have been imposed by hafting methods.

The blank types chosen for the preparation of these bifacials were either elongated pebbles or large flakes. Some technological and stylistic indices were observed. Most adzes and chisels are made on elongated pebbles, while only one-third of the axes are on pebbles; the rest were produced from large flakes. The cross-section shape of adzes and chisels depends on the number and orientation of striking platforms from which they were produced (Hermon 2003:110). Items with an isosceles or right-angle trianglular cross-section were shaped from three striking platforms, each reflected in a point of the triangle. Items with a trapeze cross-section were shaped from two striking platforms, located along their edges. More than two-thirds of the adzes have a trapeze cross-section, the rest being either isosceles (a quarter of the items) or a right-angle triangle.

As noted, among bifacials two main working-edge shapes were observed, reflecting different activities performed with these tools. The working edges of adzes and chisels are straight, while that of axes is curved. One-third of the adzes are polished, while only a few chisels show signs of this. The axes retain no polish. In some instances, there is evidence that the working edges of adzes were renewed, and this is further supported by the presence of eight bifacial spalls bearing polish remains. Probably even more adzes were originally polished, but intensive resharpening removed their finish. Indeed, it is plausible to assume that most bifacial tools from Nevallaṭ were renewed, given their probable higher rate of deterioration as a result of their relatively rough use. In support of this, more axes than chisels were found with a damaged working edge, suggesting that axes were struck against

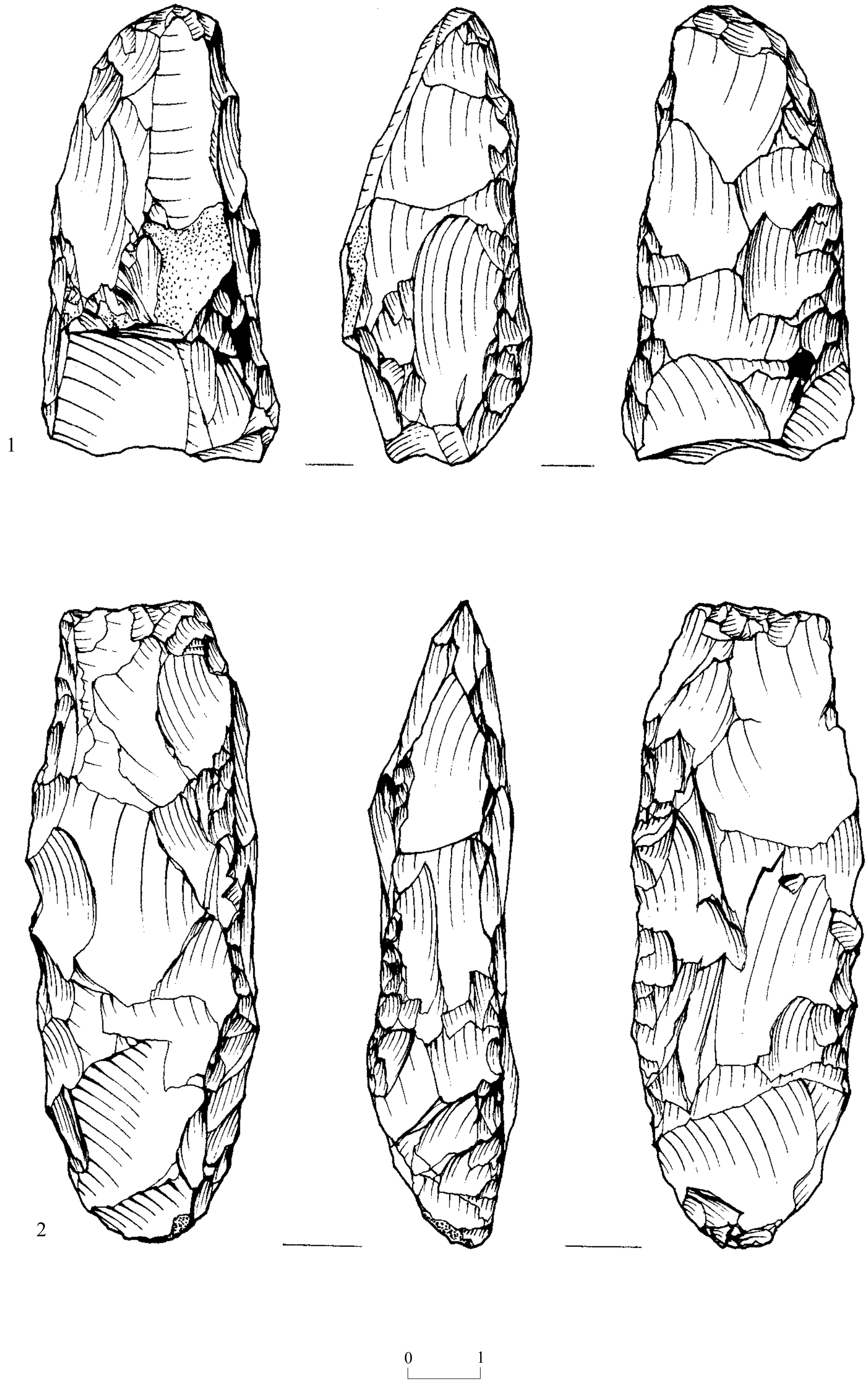
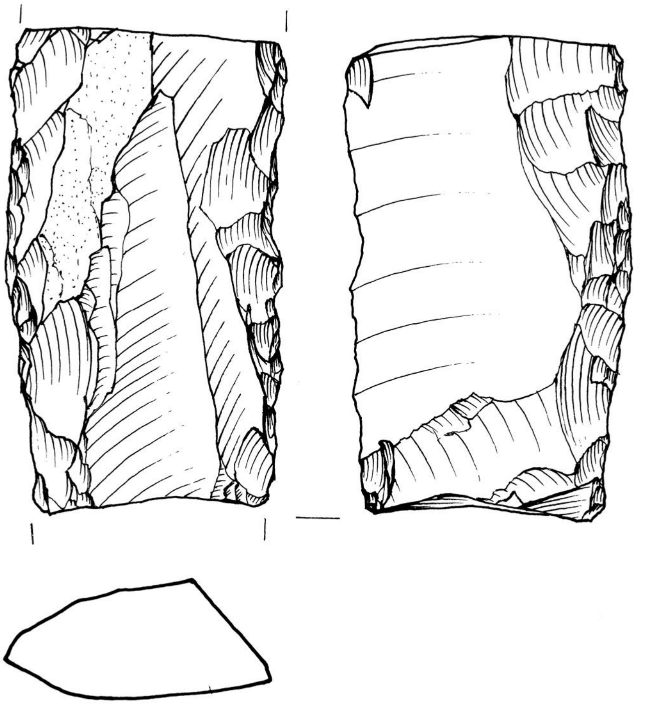


Fig. 3. Areas A and C: bifacials.


3

0 1

Fig. 3. (cont.).

No.	Locus	Basket
1	213	4357
2	165	4266
3	157	4251

harder materials than chisels (and probably with greater force). The fact that more adzes bear polish and show more wear and tear may suggest that polish was applied to improve the qualities of the working edge, increasing its durability.

Tabular Scrapers (Fig. 5:1, 2).— These tools were found in low quantities (Table 2). Half were found broken to a degree which hampers identification of their original shape and other characteristics. Among the relatively complete pieces, two are rectangular (Fig. 5:2), two were probably oval in shape, and only one can be described as a typical 'fan' scraper (Fig. 5:1). Two items have a faceted butt; in one case, this was thinned (Fig. 5:1). Since these items were produced on a characteristic tabular flint, which was not found among the waste, it can be assumed that these tools were brought to the site as finished products.

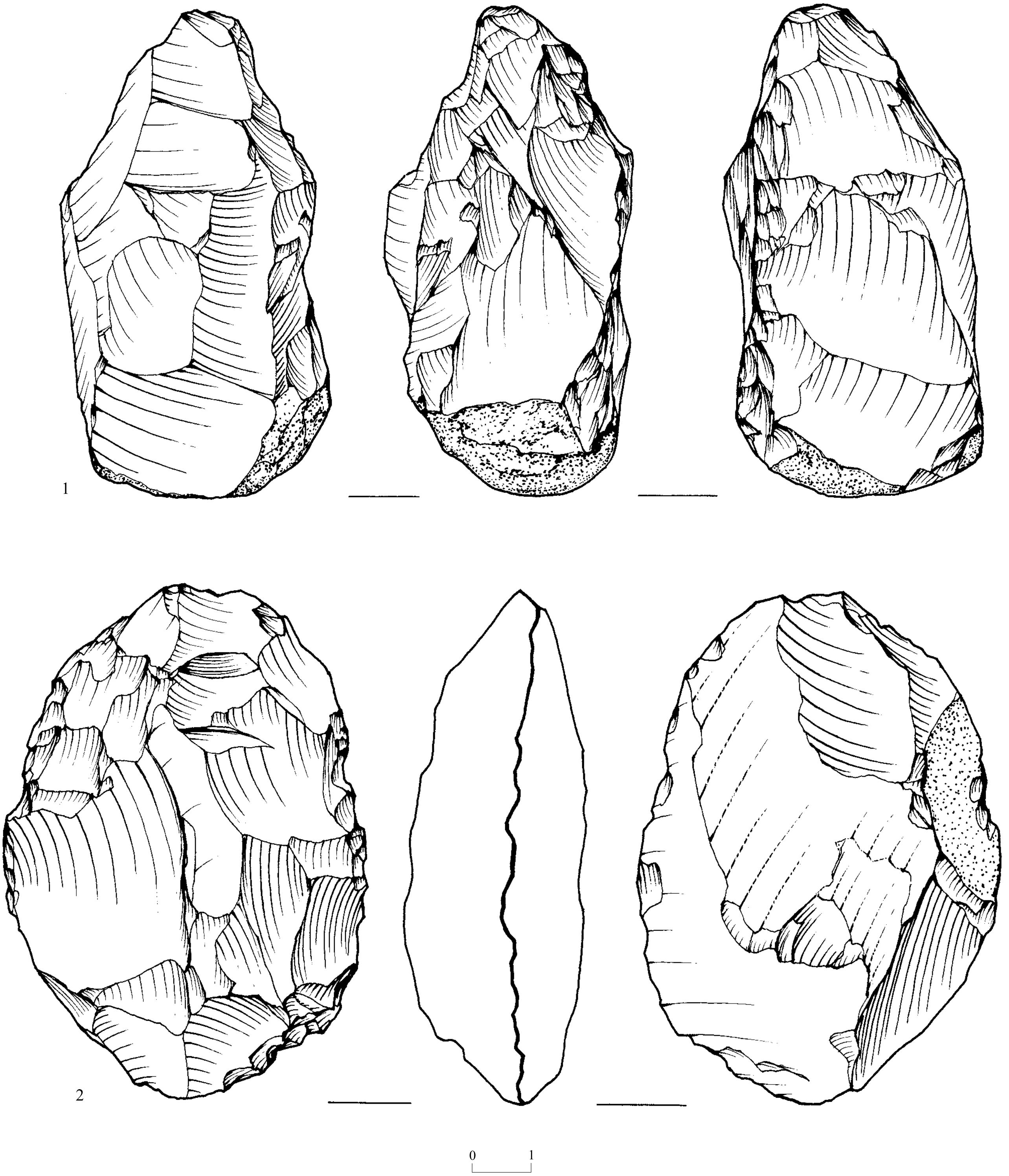


Fig. 4. Areas A and B: bifacials.

No.	Locus	Basket
1	316	3014
2	164	4258

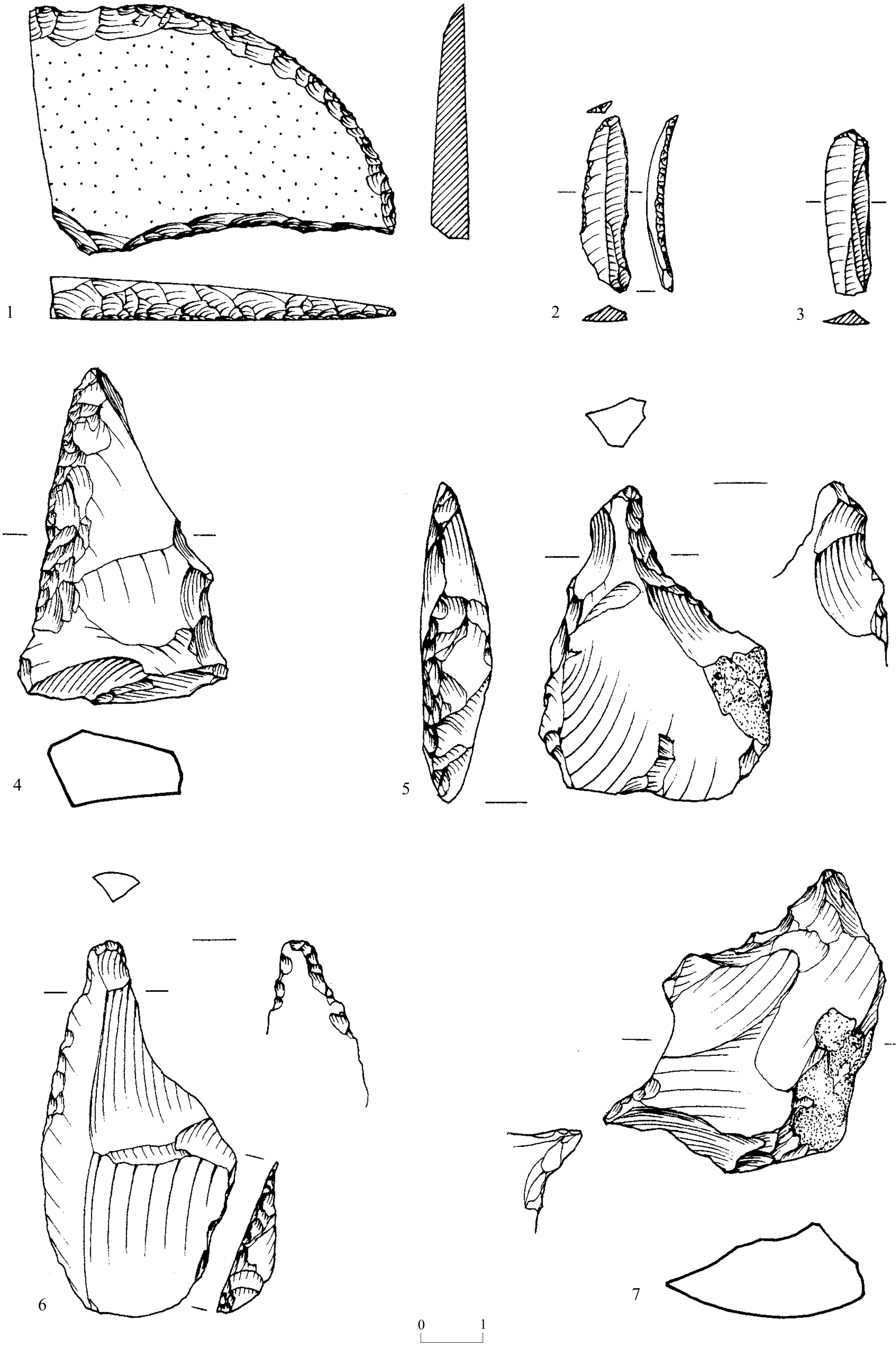


Fig. 5. Area A: scrapers and perforators.

◂ **Fig. 5**

No.	Type	Locus	Basket
1	Tabular scraper	149	4242
2	Micro-endscraper	127	4112
3	Micro-endscraper	148	4245
4	Perforator	149	4221
5	Perforator	179	4345
6	Perforator	189	4346
7	Perforator	157	4267

Non-Formal (Ad Hoc) Tools

These comprise 82% of the tool assemblage. They share the same mode of manufacture, apparently a simple and non-predetermined scheme, using blanks of various shapes and sizes.

Scrapers.— These represent 10.1% of the tools. Like the burins, their large numbers at Nevallaṭ contrasts with southern Chalcolithic assemblages. The preferred scraper blank type was the flake. Scrapers on blades represent less than 20% of the collection. Most scrapers retained very little or no cortex on their dorsal face, suggesting that the chosen blanks were knapped from cores during the later stages of reduction. Only 3% of the scrapers were made on primary elements. Almost half of the scrapers were modified at their distal end; 25% are rounded and less than 20% are side-scrapers. The remainder are retouched along one edge and the distal end. The high variability in scraper shapes probably relates to their mode of production, which was without a planned scheme of reduction. It is possible that the various forms reflect different modes of use. The mean size of scrapers corresponds to that of blank flakes, which reinforces the conclusion that scrapers were locally produced from suitable flakes.

Micro-Endscrapers (Fig. 5:2, 3).— This tool type (Gilead 1984) is almost invariably made on bladelet blanks, in most cases using semi-translucent flints. In the current assemblage several micro-endscrapers were made on retouched blades. The bladelets display a modified distal end through fine retouch, generally forming a rounded or oblique distal working end. Of the 33 micro-endscrapers recovered at Nevallaṭ, most were found broken.

Notches and Denticulates.— These types represent 20.7% of the tools. They share several characteristics with retouched flakes, including their turnover rate. Therefore, unsurprisingly, retouched flakes, notches and denticulates comprise almost half of the flint tools. Most notches and denticulates were manufactured on flakes, and with notch features that vary in shape and depth.

Perforators (Fig. 5:4–7).— These represent 7.2% of all tools. One-third were made on elongated blanks and were modified by continuous abrupt retouch along both edges. These can be classified as borers (Fig. 5:5, 6), among which length of point equals length of item. The rest—in which the length of the point does not exceed half the tool's length—are awls (Fig. 5:7). Among the latter, one was made on a burin spall and three on a CTE. The flakes chosen are similar in size to those used for scrapers and flake blanks. Apparently, there were no distinctive traits in blanks which drove their selection as potential borers. However, it seems that borers were used for a specific primary purpose: drilling two types of holes, probably in wood or leather.

Burins.— These represent 2.5% of all tools. Burins on truncations dominate (n = 7), followed by burins on breaks (n = 5); the remaining two are dihedral. All except four of the burins are made on flakes; the exceptions were produced from reworked awls and retouched blades. It appears that there was no standardized reduction scheme for making burins. Rather, available blanks or broken tools were simply modified into burins by a single blow. This eclectic nature of the burin assemblage—coupled with the number of burin spalls recovered (n = 7)—hints at their on-site production. This tool type is not common in Chalcolithic assemblages of the Negev (Gilead, Hershman and Marder 1995); their presence at Nevallaṭ should be emphasized as perhaps reflecting a distinct functional need or cultural influence at the site.

Retouched Flakes.— These tools were simply modified by a partial fine retouch along one of their edges. These are the most common tool type at Nevallaṭ and represent 31.4% of the non-formal tools. However, their high frequency does not necessarily reflect their importance in the range of activities performed at the site, but rather their high turnover rate (i.e., preparation and discard). It should also be kept in mind that a certain quantity of tools were probably taken when the site was abandoned, as suggested by the fact that most of the collected tools were found broken. The high variability in their morphology and the blanks' sizes chosen for making retouched flakes suggests that there was no deliberate scheme of production for these tools. Rather, it appears that available flakes were opportunistically modified into tools, according to needs.

Retouched Blades and Bladelets.— These types represent 8% of all tools (Table 2). The blades display regular retouch along one or both working edges; the bladelets are microliths, also modified by retouch along the working edges. More than two-thirds of the retouched blades were modified by fine retouch along their edges. Other types of retouch include semi-abrupt (14%) and ventral. The remaining items were backed only. The delineation of retouch is partial on more than two-thirds of the retouched blades. Almost half of these were modified along the left edge, a third along the right edge, and the rest were retouched on both edges.

Only 16% of the retouched blades were truncated, either by one straight or by double truncation. This low number of truncations suggests that a retouched blade's length was not important. The possibility cannot be excluded that these items made up parts of composite tools.

Their low frequency suggests a limited use for these tool types within the excavated portion of the site. However, it is possible that a certain number of retouched bladelets—either as blanks or microliths—were taken away upon site abandonment, or were used in sickle blades.

SUMMARY

During excavation of the site at Nevallaṭ a large number of flint artifacts were collected and classified. Some 25% of the assemblage comprises debris, among which chunks form the majority. The debitage (51% of the assemblage) includes all waste products which are characteristic of on-site flint tool production.

Several types of raw materials were used. Although the site is located in a region where flint sources are immediately available, and similar exploitation strategies were applied on all raw material types, some flint varieties were deliberately chosen for the production of specific tools: semi-translucent flint for retouched blades, or gray flint for bifacials, and high-quality flint for sickle blades. Other flint types followed similar trends, variations probably being due to original nodule size, stone quality and source location.

The flint industry was oriented toward the production of flakes, as reflected by the flake-to-blade ratio. However, the number of tools on blades is higher than expected by this ratio, suggesting that flake quantity does not necessarily reflect demand for blanks, but rather the reduction schemes of cores. As indicated by their final stages of exploitation, some flake cores were probably initially used to produce blades or bladelets. This is supported by the various functions of cores, as reflected by removal scars on their debitage surface.

Tools represent 15.4% of the flint assemblage. Among these, ad hoc tools comprise the majority. One of the characteristics of this assemblage is the relative frequency of formal tools being produced on blades, especially among retouched blades and sickle blades. Among bifacials, there is almost equal representation of adzes, axes and chisels.

The knappers of Nevallaṭ applied what appears to have been an economical approach to blank exploitation, using any available material—including waste and discarded implements—for the production of tools. This intensive exploitation is reflected in the high quantity of resharpened tools: some 14% were made on worn, damaged, or discarded tools. There are several instances of formal tools (e.g., sickle blades and adzes) being reworked to produce non-formal tools (e.g., scrapers, burins and awls). Occasionally, broken adzes and chisels were used as cores, mainly to produce bladelets. Several tools were made from other tools: micro-endscrapers on retouched blades, burins on awls and retouched blades. Most tools were discarded after falling into disuse, after being used as blanks to produce other tools, or when they had been completely worn down. This intensity of use is corroborated by the fact that most tools were found broken or with damaged working edges.

The Chalcolithic chipped stone assemblage from Nevallaṭ is domestic in function and comprises a wide repertoire of types. Notable is the presence and frequencies of several diagnostic forms which are among the hallmarks of the Chalcolithic period and are common in assemblages of the Ghassul-Be'er Sheva' cultures. Among these representative types are sickle blades, bifacials and micro-endscrapers. To date, the sites of Ghassul (Lee 1973) and Abu Maṭar (Gilead and Hermon, in press) have yielded the major well-studied chipped stone assemblages of this culture. Other comparable assemblages exhibiting most of the same tools come from several sites along the coastal plain, including Azor and Ben Shemen (Perrot and Ladiray 1980). However, whilst contemporaneous Chalcolithic sites are also known from the northern Negev region (e.g., Dothan 1959; Levy and Rosen 1987; Gilead 1988:146*; Gilead, Hershman and Marder 1995; Hermon 2003), little has been found from this period in the Judean Hills and the Shephelah, with the exception of Ramat Bet Shemesh (Zbenovich, in prep.), which has yielded a rather unique Chalcolithic assemblage. The chipped stone finds from Nevallaṭ are a valuable addition to this regional corpus.

REFERENCES

Brink E.C.M. van den and Lazar D. This volume. Nevallaṭ: A Chalcolithic Habitation Site with Agricultural Activity Areas in the Shephelah Foothills.

Dothan M. 1959. Excavations at Ḥorvat Beter (Beersheba). *'Atiqot* (*ES*) 2:1–42.

Gilead I. 1984. The Micro-Endscraper: A New Tool Type of the Chalcolithic Period. *Tel Aviv* 11:3–10.

Gilead I. 1988. Shiqmim and the Chalcolithic Period in Southern Israel. *JIPS* 21:145*–150*.

Gilead I. and Hermon S. In press. *The Lithic Assemblages from Abu Matar and Safadi (Beer Sheva).* Jerusalem.

Gilead I., Hershman D. and Marder O. 1995. The Flint Assemblages from Grar. In I. Gilead ed. *Grar: A Chalcolithic Site in the Northern Negev* (Beer-Sheba VII). Be'er Sheva'. Pp. 223–280.

Hermon S. 2003. *Socio-Economic Aspects of Chalcolithic (4500–3500 BC) Societies in the Southern Levant: A Lithic Perspective.* Ph.D. diss. Ben-Gurion University of the Negev. Be'er Sheva'.

Lee J.R. 1973. *Chalcolithic Ghassul: New Aspects and Master Typology.* Ph.D. diss. The Hebrew University. Jerusalem.

Levy T.E. and Rosen S.A. 1987. The Chipped Stone Industry at Shiqmim: Typological Considerations. In T.E. Levy ed. *Shiqmim I: Studies concerning Chalcolithic Societies in the Northern Negev Desert, Israel (1982–1984)* (BAR Int. S. 356). Oxford. Pp. 281–294.

Perrot J. and Ladiray D. 1980. *Tombes à ossuaires de la région côtière palestinienne au IV^e millénaire avant l'ère chrétienne* (Mémoires et travaux du Centre de recherches préhistoriques français de Jérusalem 1). Paris.

Vardi J. 2012. *Sickle Blades and Sickles of the Sixth and Fifth Millennia BCE in Light of the Finds from the Chalcolithic Sickle Blade Workshop Site of Beit Eshel.* Ph.D. diss. Ben-Gurion University of the Negev. Be'er Sheva' (Hebrew; English summary, pp. I–IX).

Zbenovich V.G. In preparation. The Flint Assemblage of the Chalcolithic Settlement at Kh. el-'Alya (East).