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The Flint Assemblage of the Pottery Neolithic Site of Tel Yosef (Tell esh-Sheikh Ḥasan)

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Introduction

This report analyzes the flint assemblage of the Pottery Neolithic site of Tel Yosef, on the southern fringes of the Ḥarod Valley (see Covello-Paran, this volume; Rosen, this volume).[1] A salvage excavation was carried out at the site in 1993, exposing three superimposed Pottery Neolithic occupations (Strata III–I; see Covello-Paran, this volume). The flint assemblages of Strata III and II could not be distinguished on stratigraphical grounds, and thus, they are presented and discussed below as a single assemblage. Combined, these two layers produced the vast majority of the flints. In contrast, attribution of items to Stratum I is based on sound stratigraphic associations. The flint artifacts were classified into two major categories: waste and tools. The presentation of the waste material is accompanied by some technological observations, while the tools are presented solely on typologically grounds.

Raw Materials

The site's immediate vicinity offers various sources of flint, mainly found in the Eocenian formation of the Gilboʿa Mountains (Flexer 1961). Most of the local flint sources are chalky and coarse, of medium quality, ranging in color from whitish brown to white. Gray and dark brown flints occur in small quantities. In contrast, formal tools found at the site were knapped from a high quality flint, originating from outcrops far from the site. It is possible that the tools, such as sickle blades and arrowheads, were manufactured off-site and subsequently brought to it. The lack of similar waste among the debitage supports this assumption. Other ad hoc artifacts were locally fashioned from the local whitish to gray flints.

[1] I wish to thank Karen Covello-Paran and Zvi Gal, for allowing me to study this material; Ofer Marder, Rina Bankirer and Vladimir Zbenovich, for their useful remarks; and Michael Smilanski, for the illustration of the flint artifacts.

THE LITHIC ASSEMBLAGE

Debitage

Among the debitage category, primary elements and flakes are the most common items (Table 1), constituting together more than 70% of all waste material. Most were knapped using a hard hammer as reflected from the plain platforms and prominent bulbs. Only 12% of them were knapped using a soft hammer. Analysis of the scar pattern on their dorsal surface indicates that more than three-quarters of the flakes were produced from single platform cores. Generally, the flakes display a trianglular shape with pointed ends and their profiles are straight. Flakes that have bidirectional scars comprise only 8%. Most of them are small and thin (0.5–1.2 cm) and it seems that they were produced in advanced stages of core reduction. The rest of the flakes displayed multi-directional scars and were probably manufactured from cores that have more than two striking platforms.

Blades and bladelets, however, comprise 25% of the waste material. Some 60% of the blades were knapped from local raw material, usually light gray or white in hue. They are asymmetric; the vast majority was produced from single platform cores. The remainder 40% are long (mean length 4.6 cm) and many are complete planks with a standardized shape. Their scars indicate that they were produced from two opposed platform cores. It is possible that some of them were knapped off-site and brought to the site as a finished product. This assumption is supported also by the lack of knapping products among the waste material. Bladelets are particularly narrow and mostly broken. Their shape and state

Table 1. Waste Frequencies from all Strata

	N	%
Debitage		
Primary elements	391	16.7
Flakes	1425	60.7
Blades/bladelets	495	21.1
CTEs	35	1.5
Total Debitage	*2346*	*100.0*
Debris		
Chunks	1001	55.2
Chips	813	44.8
Total Debris	*1814*	*100.0*
Debitage	2346	48.6
Debris	1814	37.6
Cores	110	2.3
Tools	552	11.5
Total	*4822*	*100.0*

of preservation indicate that there was no special reduction sequence of bladelets and they were in fact a byproduct of the major reduction sequences at the site.

Debris

A total of 1814 debris fragments were collected, comprising 37.6% of the total assemblage (see Table 1), approximately two-thirds of which are chunks. The small quantity of chips (n = 813) may be attributed to the relatively limited sieving of accumulations on floors and within floor matrices. Most of the chunks are roughly flaked (less than three scars) on tabular yellowish white flints; they vary in size and shape. In many cases, they display square sections, with cortex covering most of their outer surfaces. A significant amount of the larger chunks are naturally broken, probably having rolled down from the slope nearby. Double patina covers some of the broken surfaces.

Cores

A total of 110 cores were recovered: 85 from Strata III–II and 25 from Stratum I. They are either small- or medium-sized, ranging between 12 and 76 mm in length and 15–32 mm in width. The cores were classified into five groups according to their debitage plane (Table 2).

Type 1: Single Striking-Platform Cores (Fig. 1:1–3). This group comprises 41 cores, 37.3% of the total core assemblage. Of these, 34 are flake cores and seven are blade cores. Cortex covers 25–50% of the total surfaces, while the debitage surfaces display double patina; no scars were removed after the original patination. The cores are mostly pyramidal in shape, with a few irregular examples.

Type 2: Double Striking-Platform Cores (Fig. 1:4, 5). There are 17 cores (15.5% of the total core assemblage) in this group, all exploited from local raw material(s). The majority are flake cores, with only two cores used for the production of blades. Eleven of the cores have opposed platforms, two have two platforms with 90° angles, while the other four cores have two platforms at relatively different angles.

Table 2. Core Frequencies

Type No.	Strata III–II	Stratum I	Total	%
1	30	11	41	37.3
2	13	4	17	15.5
3	4	3	7	6.4
4	16	1	17	15.5
5	19	6	25	22.7
6	3		3	2.7
Total	*85*	*25*	*110*	*100.0*

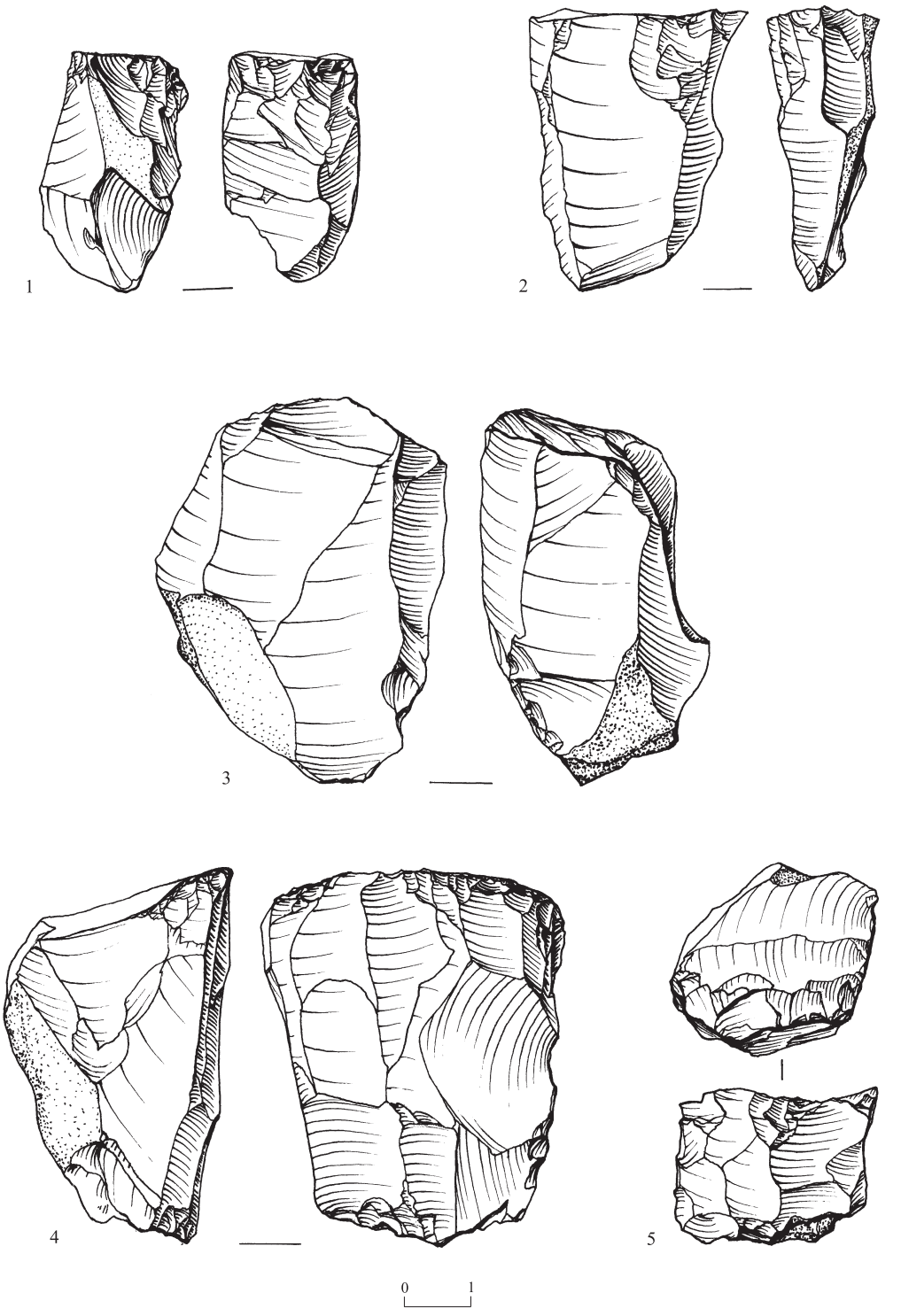

Fig. 1. Cores: single striking-platform (1–3); double striking-platform (4, 5).

Type 3: Multi Striking-Platform Cores (Fig. 2:1, 2). Only seven items belong to this group (6.4% of the total core assemblage). Four have opposed platforms on the same side. The remaining cores have three platforms in various locations. All of the objects in this category are flake cores. Cortex covers only 10–20% of the total surface.

Type 4: Broken Cores. Seventeen broken or exhausted cores are included in this group (c. 15.5% of the cores); thirteen of them are medium-sized and were probably used for knapping flakes. Two were used for both flakes and blades and display signs of heating. The remaining two are blade cores. Due to their shape, only less than 10% of their surfaces are covered with cortex.

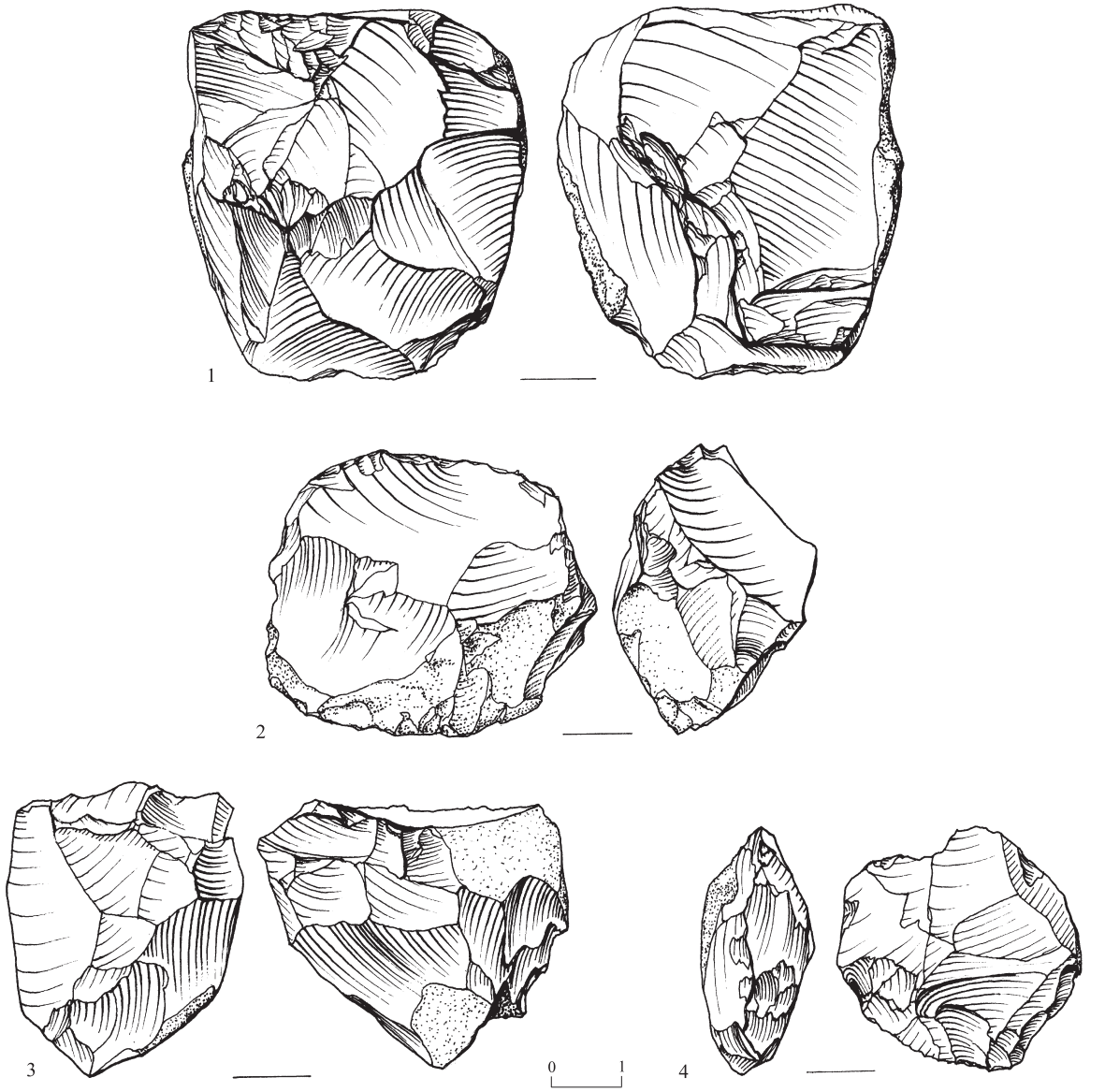

Fig. 2. Cores: multi striking-platform (1, 2); amorphous (3); discoidal (4).

Type 5: Amorphous Cores (Fig. 2:3). Amorphous cores are the second largest group in the core assemblage, comprising 25 items (22.7%). This group includes all cores whose state hinders the determination of clear striking platforms or knapping directions. They are generally small, rounded in shape, and exhausted.

Type 6: Discoidal (Fig. 2:4). This group includes two cores, one of which (not illustrated) was knapped on a large flake.

Tools

Of the 552 tools uncovered at Tel Yosef, 496 were retrieved from Strata III and II; only 56 tools were recovered from Stratum I. The tools from all the layers combined comprise 11.5% of the flint artifacts (Table 1). Most of them are expedients or ad hoc tools. The formal groups, such as arrowheads, sickle blades and bifacials are present in considerable quantities due to biases in the retrieval methods (Table 3). The typological analysis of the tools is based on the type list suggested by Gopher for the Neolithic assemblages at Munḥata (Gopher 1989; 1994; Barkai and Gopher 2012).

Arrowheads

Tel Yosef yielded 34 projectile points, constituting 6.2% of the tools. Despite the fragmentary condition of many of the objects, their stylistic grouping is recognizable. The classification here follows the type lists in Gopher 1985 and Burian and Friedman 1979.

Table 3. Tool Frequencies

Type	Strata III–II	Stratum I	Total	%
Arrowheads	33	1	34	6.2
Sickle blades	59	6	65	11.8
Scrapers	42	7	49	8.9
Burins	17	3	20	3.6
Awls/borers	29		29	5.3
Truncations	21	1	22	4.0
Notches	27	9	36	6.5
Denticulation	30	3	33	6.0
Retouched flakes	133	17	150	27.2
Retouched blades	77	8	85	15.4
Bifacials	10	1	11	2.0
Knives	9		9	1.6
Varia	9		9	1.6
Total	*496*	*56*	*552*	*100.1*

Type A-6: 'Amuq Points (Figs. 3; 4:1–3). The 'Amuq point is a leaf-shaped point with a pointed base and no barbs. It is triangular, plano-convex or trapezoidal in section. Pressure flaking covers the whole point or part of it. Most of the arrowheads at Tel Yosef belong to this type, comprising 19 complete arrowheads and 8 segments. This type can be divided into two subtypes: elongated and narrow leaf-shaped points, fashioned by full pressure flaking (n = 5; Fig. 3:1, 2); and leaf-shaped points with pressure flaking, mainly on the tangs, and extending to a limited part of the body (n = 8; Figs. 3:3–6; 4:1–3). The latter have a pointed tang and semi-abrupt retouch appears on their ventral surface. One arrowhead has bifacial denticulation along the lateral edges; the denticulations are deep and fashioned by pressure retouch (Fig. 3:6). Two arrowheads have broken tangs and were reused as burins (Fig. 4:3). The arrowhead fragments comprise five bases and three tangs.

Type A-8: Nizẓanim Points (n = 2; Fig. 4:4). The arrowhead shown in Fig. 4:4 is small, about 20 mm long. It has a pointed tang and was fashioned by semi-abrupt retouch. The wings are short and the base is slightly asymmetric. The other arrowhead (not illustrated) is longer, 32 mm, and is shaped by pressure retouch.

Type A-9: Herẓliyya Points (n = 2; Fig. 4:5, 6). One arrowhead (Fig. 4:5) is a small, elongated leaf-shaped point. Pressure retouch shaped its dorsal surface. It has a triangular section and a pointed end. The arrowhead in Fig. 4:6 is coarser and wider; the tip is the only part fashioned by pressure retouch.

Varia (n = 3; Fig. 4:7, 8). Two Jericho points (only one illstrated) and one transversal arrowhead belong to this category. The two fragmentary Jericho points (Fig. 4:7) were flaked off pink-purple flint; their shape resembles that of the Jericho points of the PPNB. The transversal arrowhead (Fig. 4:8) found in Stratum I is the only type that can be exclusively attributed to the Wadi Rabah culture.

Sickle Blades

Sixty-five sickle blades were recovered, comprising 11.8% of the tools. Most of the blades are coarsely denticulated. Only four artifacts have regular fine retouch, probably belonging to a late stage in the Pottery Neolithic. Three types of sickle blades were distinguished, following Gopher's (1989) classification.

Type A (n = 8; Fig. 5:1–8). These sickle blades are typified by coarse denticulation on one lateral or on both sides, as well as bifacial pressure retouch. The sections of the blades are either triangular or trapezoidal. The edges are plain, and only a few were truncated (Fig. 5:2, 4). One blade has deep pressure retouch, which also covers the dorsal surface (Fig. 5:4). Heavy sickle gloss is visible along the working edges, evidence of long-term use. Of the eighteen sickle blades belonging to this type, nine are complete and the rest are fragmentary. The Type A sickle blades exclusively belong to the Yarmukian culture.

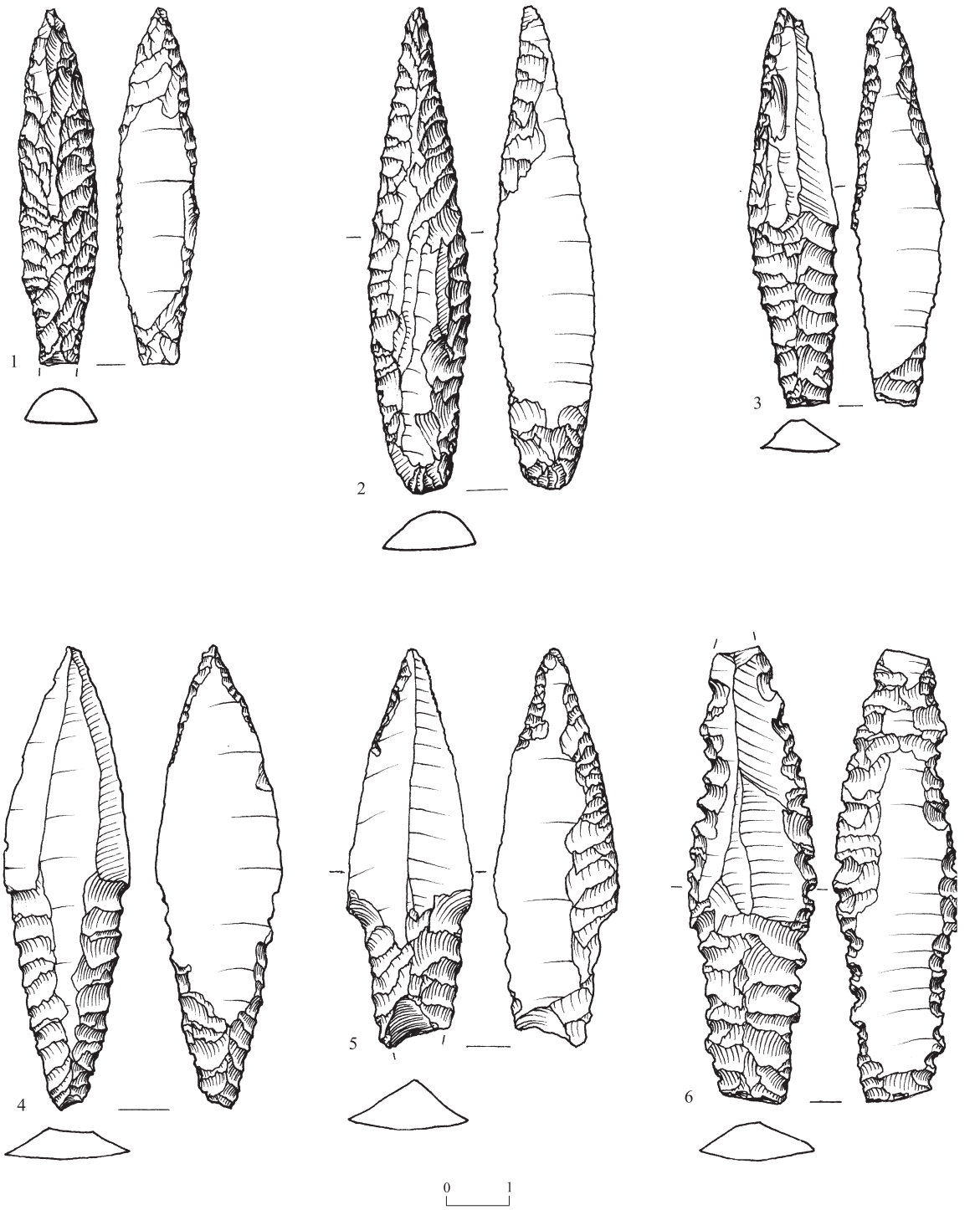

Fig. 3. Arrowheads Type A-6 (‘Amuq points).

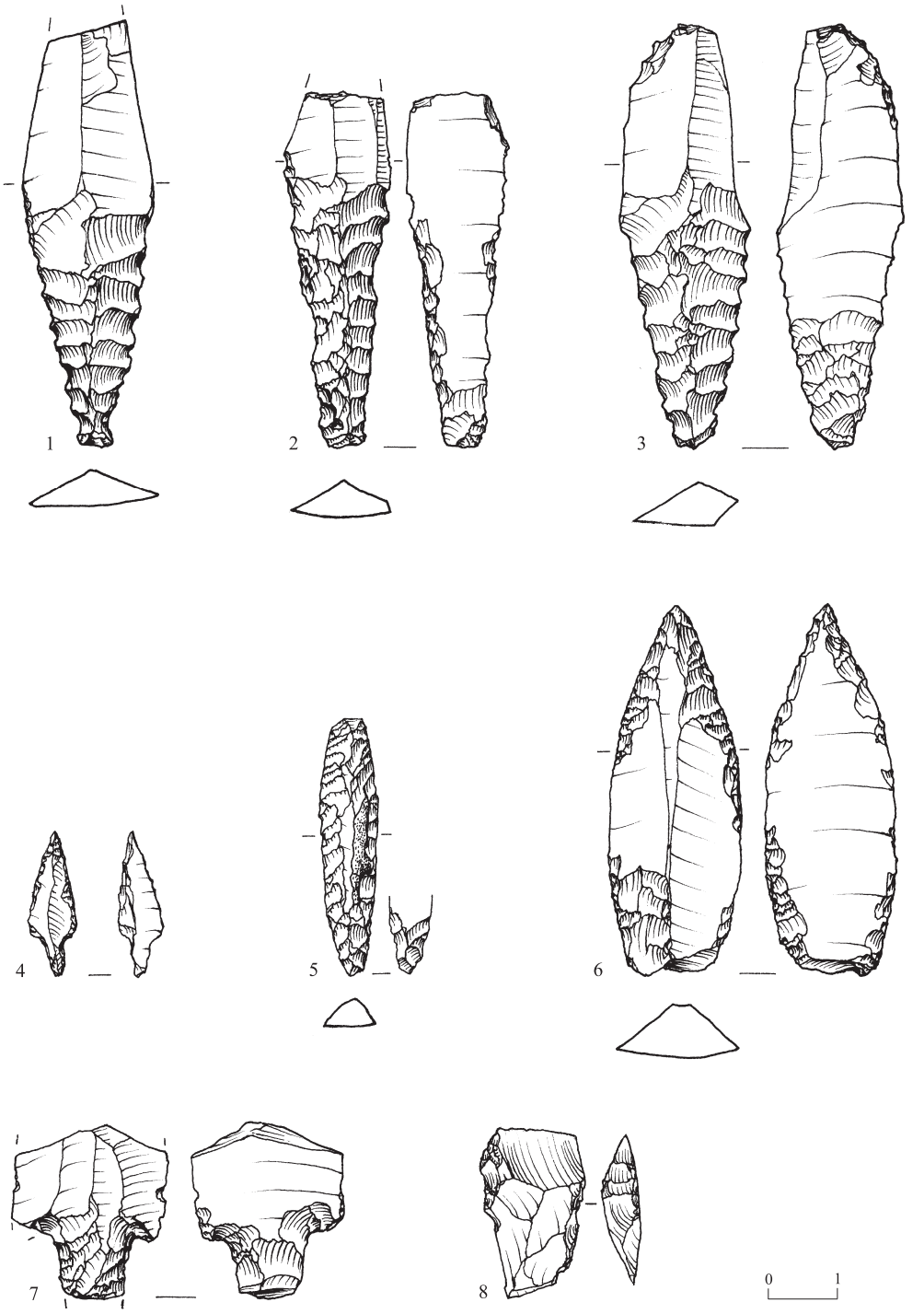

Fig. 4. Arrowheads Type A-6 (‘Amuq points) (1–3); Niẓẓanim point (4); Herẓliyya point (5, 6); Jericho point (7); transversal (8).

Type B (n = 24; Figs. 5:9–11; 6:1, 2). This type is defined by its distinct shape and section. The working sides are shaped by wide bifacial retouch. Pressure retouch was only noted on a few of the artifacts. In most cases, the other lateral sides have no retouch. Most distal and

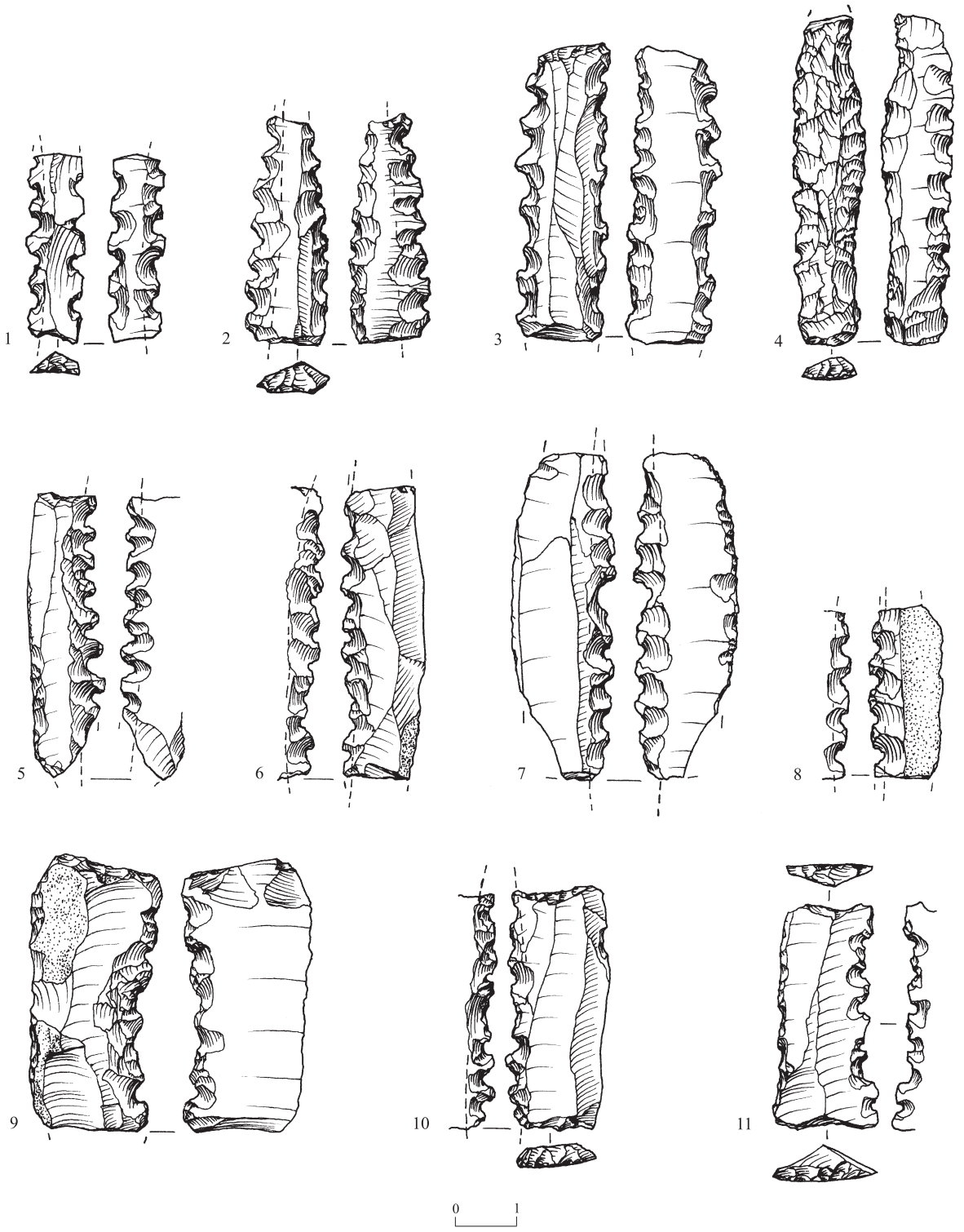

Fig. 5. Sickle blades: Type A (1–8); Type B (9–11).

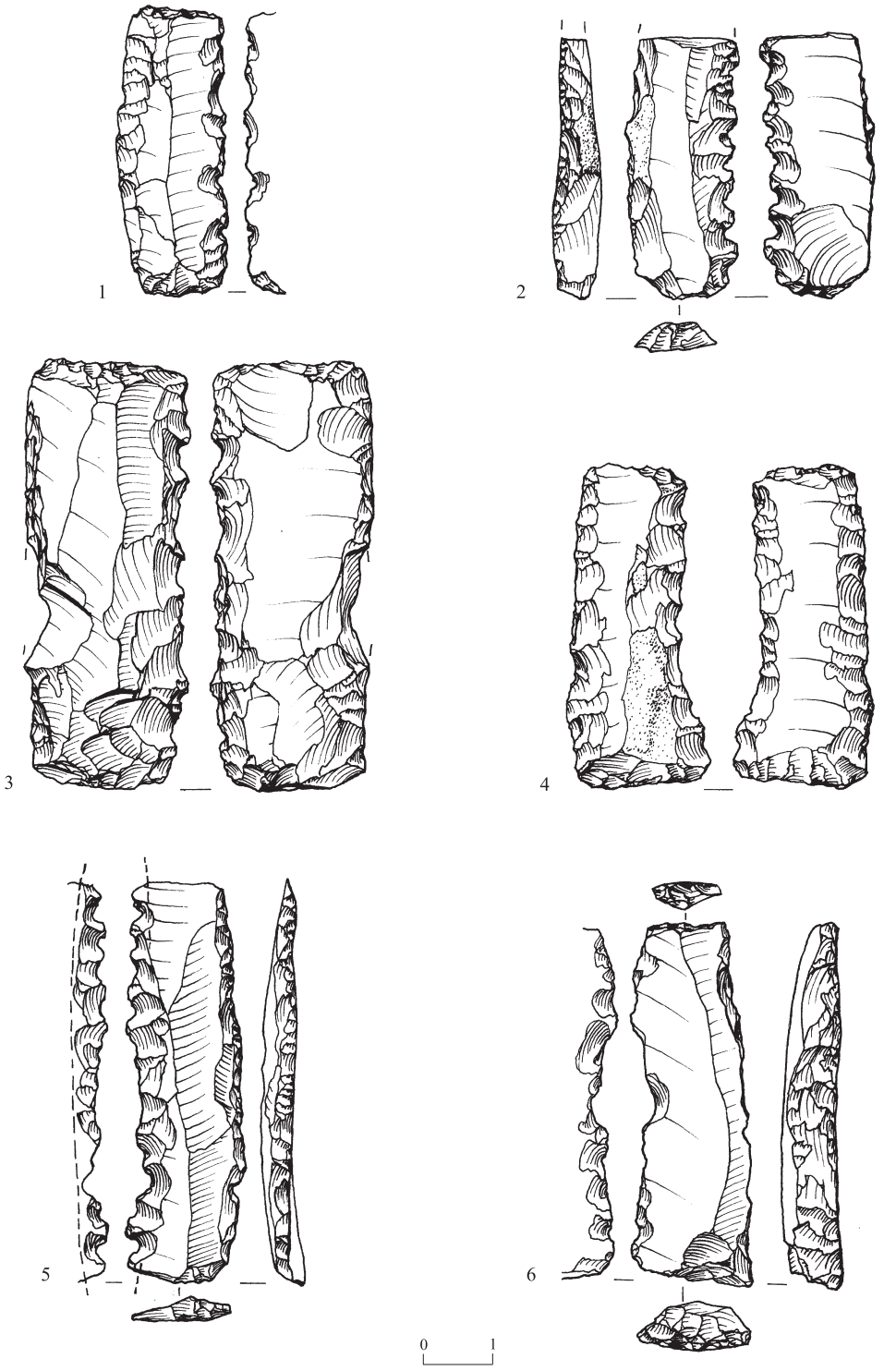

Fig. 6. Sickle blades: Type B (1, 2), Type C (3, 4) and Type D/E (5, 6).

proximal ends were truncated by semi-abrupt to abrupt retouch. This type may be assigned to either the Yarmukian or Jericho IX culture.

Type C (n = 19; Fig. 6:3, 4). These sickle blades were fashioned on elongated blade blanks. One of their working edges is marked by irregular and shallow denticulation, while the other is backed by abrupt retouch. In one case (Fig. 6:3), the backed blade is fashioned by bifacial retouch.

Type D/E (n = 4). Four sickle blades were associated with either Type D or E of Gopher's classification (Gopher 1989; 1994). Two of the objects are wide-backed blades, their working edges finely retouched (Fig. 6:5, 6). The other two (not illustrated) are characterized by limited shallow denticulation on one side and bifacial retouch on the other. The distal end is truncated by semi-abrupt retouch. These types differ from the former Types A–C in both shape and retouch, and can most likely be associated with the Wadi Rabah culture (Baruch 1978), as proposed for the same types found at Munḥata (Gopher 1989; Garfinkel 1992).

Scrapers (n = 49; Fig. 7)
Scrapers comprise 8.9% of the tool assemblage. All artifacts were manufactured from local, whitish gray flint. Sixty percent of the artifacts have a cortex covering 10–30% of the total surface. Double patina appears on a few artifacts. Two-thirds of the scrapers were on flakes and flake fragments. The main type of scraper is the endscraper on flakes and retouched flakes. Twenty-nine such artifacts were found, most of which were complete. Five scrapers are thick carinated objects (Fig. 7:1, 2). In addition, there is one on a denticulated blade, and two double-end scrapers (Fig. 7:3). Three items are core scrapers, two of which are radial (Fig. 7:4). In one case, the scraper was treated by fire. Eleven endscrapers were fashioned on blades and retouched blades (Fig. 7:6), mostly on the latter. Finally, two tools are multiple tools: a scraper/burin and a scraper/notch.

Sidescrapers. Six sidescrapers were found, three of which are on large flakes. The scraping retouch covers one or both lateral edges (Fig. 7:7). The other three are on fragments.

Burins (n = 20; Fig. 8:1–4)
Of the 20 identified burins, 14 were on flakes and 6 on blades. All are flaked of local raw material, and double patina covers the dorsal and ventral surfaces. The burins were prepared on large flakes, generally of a single blow. Few had double blows toward the ventral surface (Fig. 8:1). The burin blows appeared on one lateral side of blade blanks, from proximal to distal ends (Fig. 8:4). One burin is on truncation (Fig. 8:2).

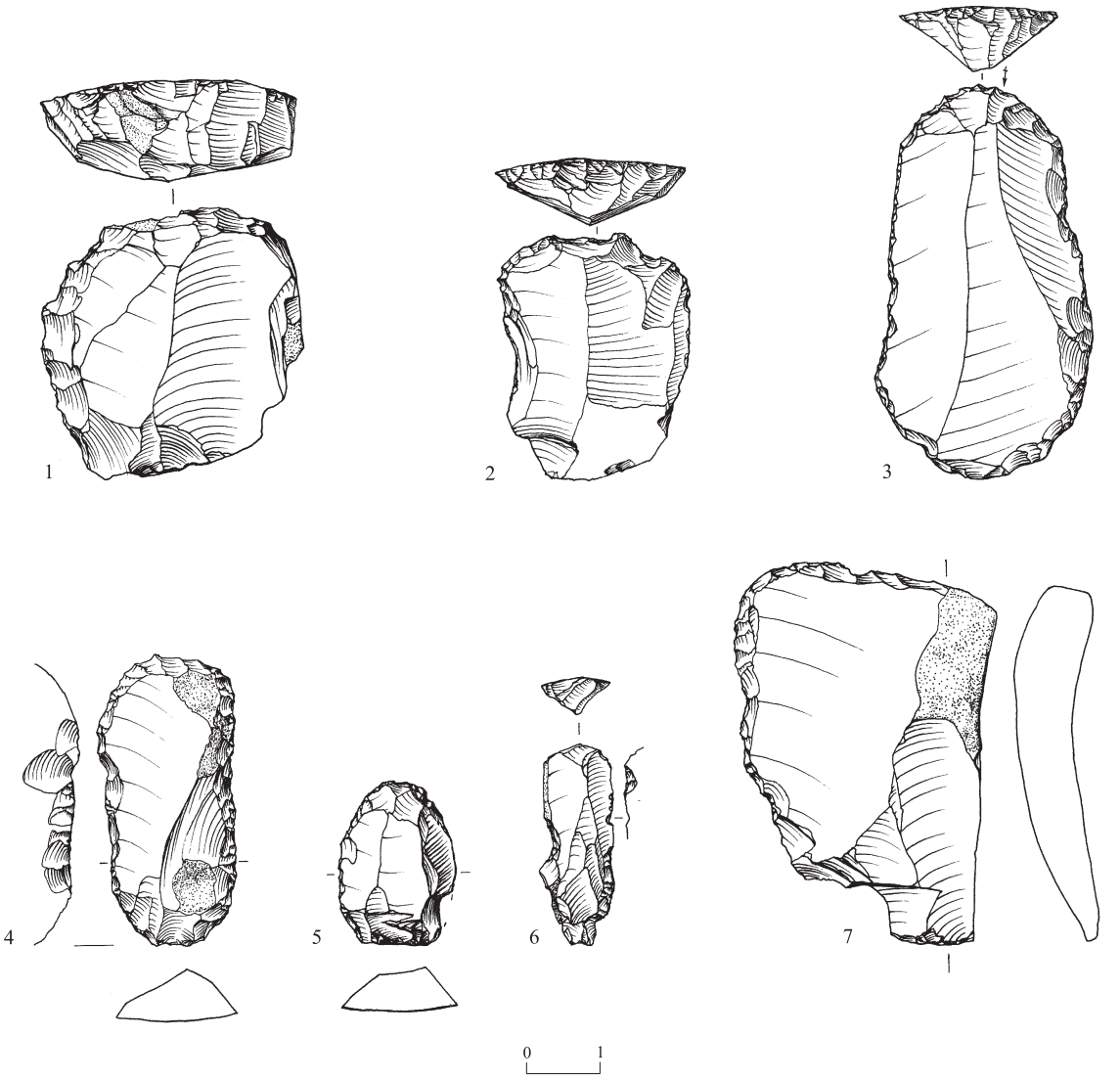

Fig. 7. Scrapers (1, 2), double endscraper (3), radial scraper (4), endscraper on flake (5), endscraper on blade (6), sidescraper (7).

Awls and Borers (n = 20; Figs. 8:5–7; 9)

The tool assemblage of Tel Yosef includes 29 awls and perforators, divided almost evenly between them. Although the blank preference showed a preference for flakes rather than blades, and twenty of the tools were shaped on flakes, the number of the drills in this assemblage is higher than the awls. This is due to the fact that the massive drills were

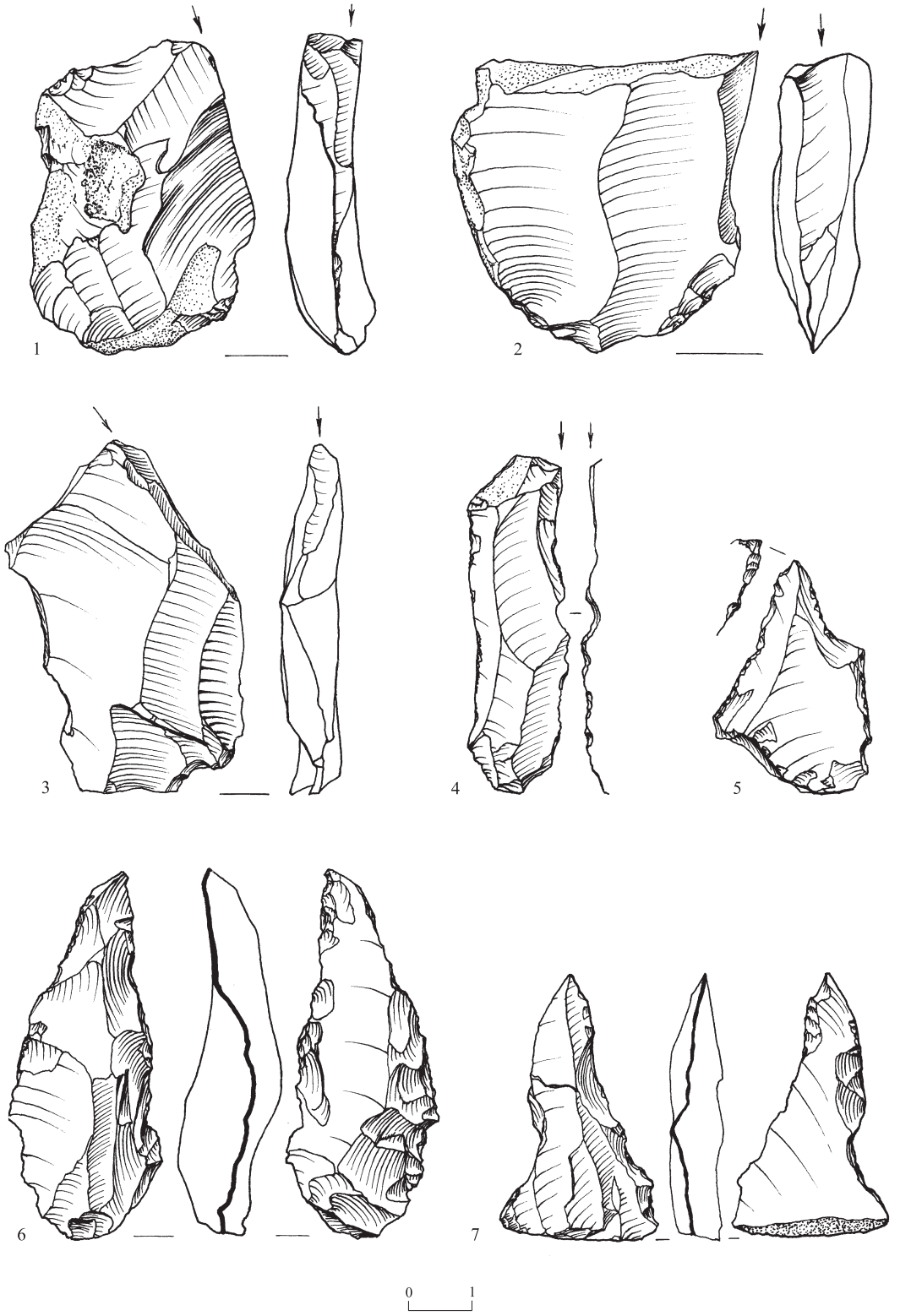

Fig. 8. Burins (1–4) and borers (5–7).

shaped particularly on thick flakes (Fig. 8:5–7) rather than the normal drills that were usually shaped on blades and bladelets.

The awls, on the other hand, were shaped on a variety of flakes and even on core fragments. The location of working edges is not uniform, the majority was on the long side of the item (Fig. 9:1), but there are some on the distal end.

Notches and Denticulates (Fig. 9:2)

Notches were abundant in the Tel Yosef assemblage. Both wide notches and denticulates often exhibit additional retouch along the lateral edges. Single notches are dominant. Compound notches, usually a set of irregular spaced notches, appeared on flake and blade blanks. One item has two notches on the distal and proximal ends (Fig 9:2). Denticulates

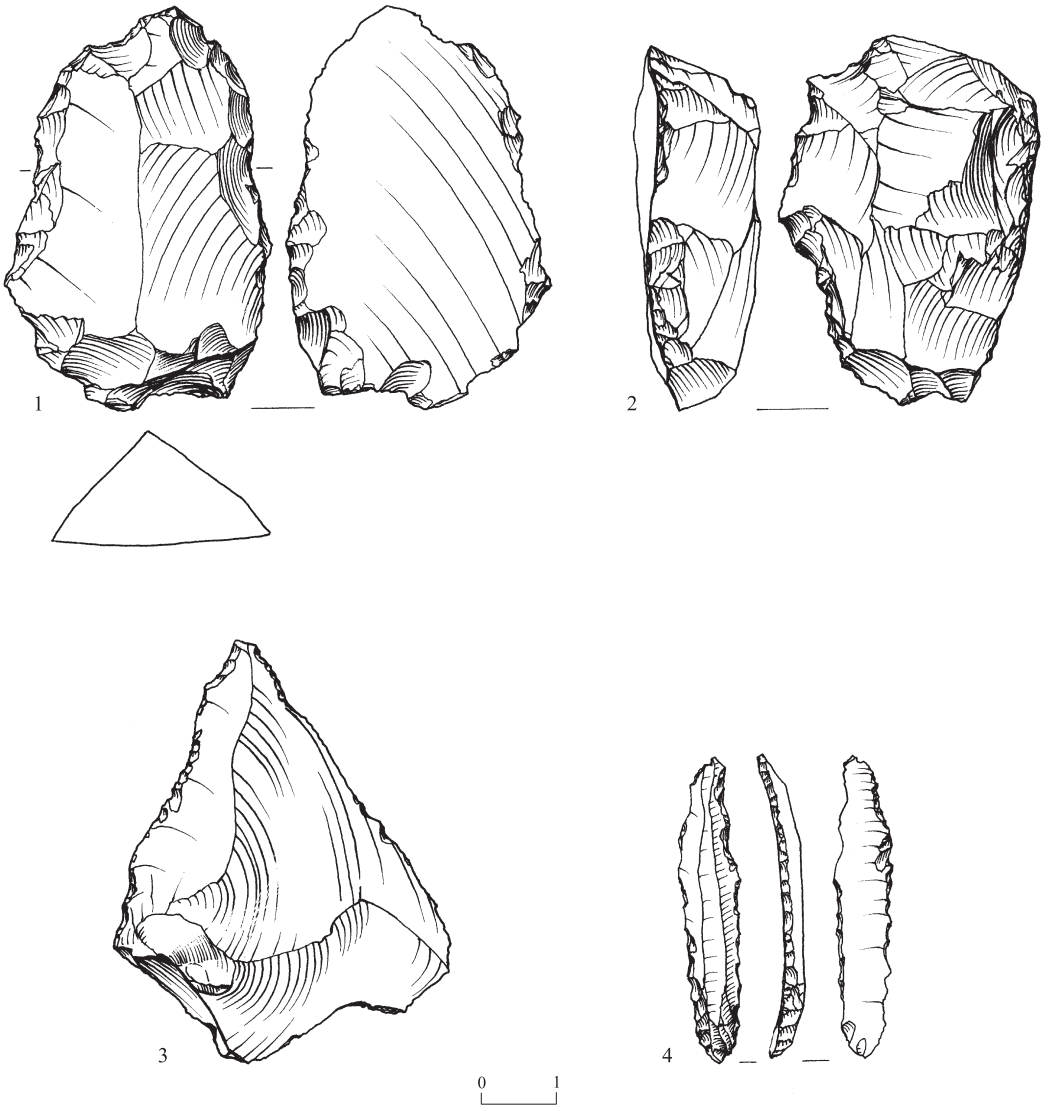

Fig. 9. Awl (1), notch (2), retouched flake (3), retouched blade (4).

were formed on large flakes, 55–85 mm in length. Irregular denticulation appears along one or two edges. Two artifacts had denticulation along the edges and the distal end.

Retouched Flakes (n = 150; Fig. 9:3)
The retouched flakes are the most frequent type at Tel Yosef, comprising over 27% of the tool assemblage. All were manufactured of local raw material, the cortex covering almost 25% of their surfaces. Of the retouched flakes, 21 are large, 79 are medium and 50 are small. In some cases, irregular retouch appeared along a single edge.

Retouched Blades (n = 85; Fig. 9:4)
This group comprises about 15% of the tool assemblage; more than half are fragmentary. The majority are made of raw material of high quality. This material is not abundant in the vicinity of the site, indicating that either raw material was brought from afar, or more likely, that the tools were produced elsewhere. The blades manufactured of local flints had cortex and double patina. Some of the blades have marginal retouch on the ventral surface, or on alternate surfaces. Others have fine regular retouch. Seven blades are ridge blades and six are backed.

Bifacials (n = 11; Figs. 10–12)
This type includes six axes, two bifacial picks and three other bifacial tools. All the recovered axes were produced from white to gray flint, flaked carefully, with almost no cortex left. Their sections are usually oval. Two axes (Fig. 10) have wide, straight working edges, one exhibits polishing marks on the working edge. Two other axes (Fig. 11), as well as three additional fragments, are thicker than the oval-shaped tools and their working edges are arched and polished. No adzes were found.

Two bifacials were identified as picks. Both were shaped by bifacial retouch and have a pointed end. The heavy bifacial pick shown in Fig. 12:1 is elongated (154 mm long) and has a convex-convex section. Cortex covers part of the ventral and dorsal sides. The edges are pointed and there are signs of polishing on its working edges. Heavy picks such as this already appeared in the PPNB of Beisamun (Lechavallier 1978:245). The bifacial pick in Fig. 12:2 is small, made of coarse gray flint and has some cortex on its dorsal surface. It has a biconcave section and a pointed working edge.

Several bifacials cold not be defined as a specific tool. One such object is a thick flake with a plano-convex section and bifacial retouch on both dorsal and ventral sides. Another is a core flake of dark brown flint, oval in section, bifacially flaked and with a slightly polished working edge. The third is a large bifacial flake with cortex covering its dorsal side. There are signs of resharpening on the working edge.

Knives (n = 9; Fig. 13:1–3).
Seven items utilized blade blanks, one was produced on a flake and one on a tabular flint. The raw materials utilized are of high quality (Eocene) flints, ranging in color from brown to dark brown. Three items were produced of pink flint and were probably treated by fire.

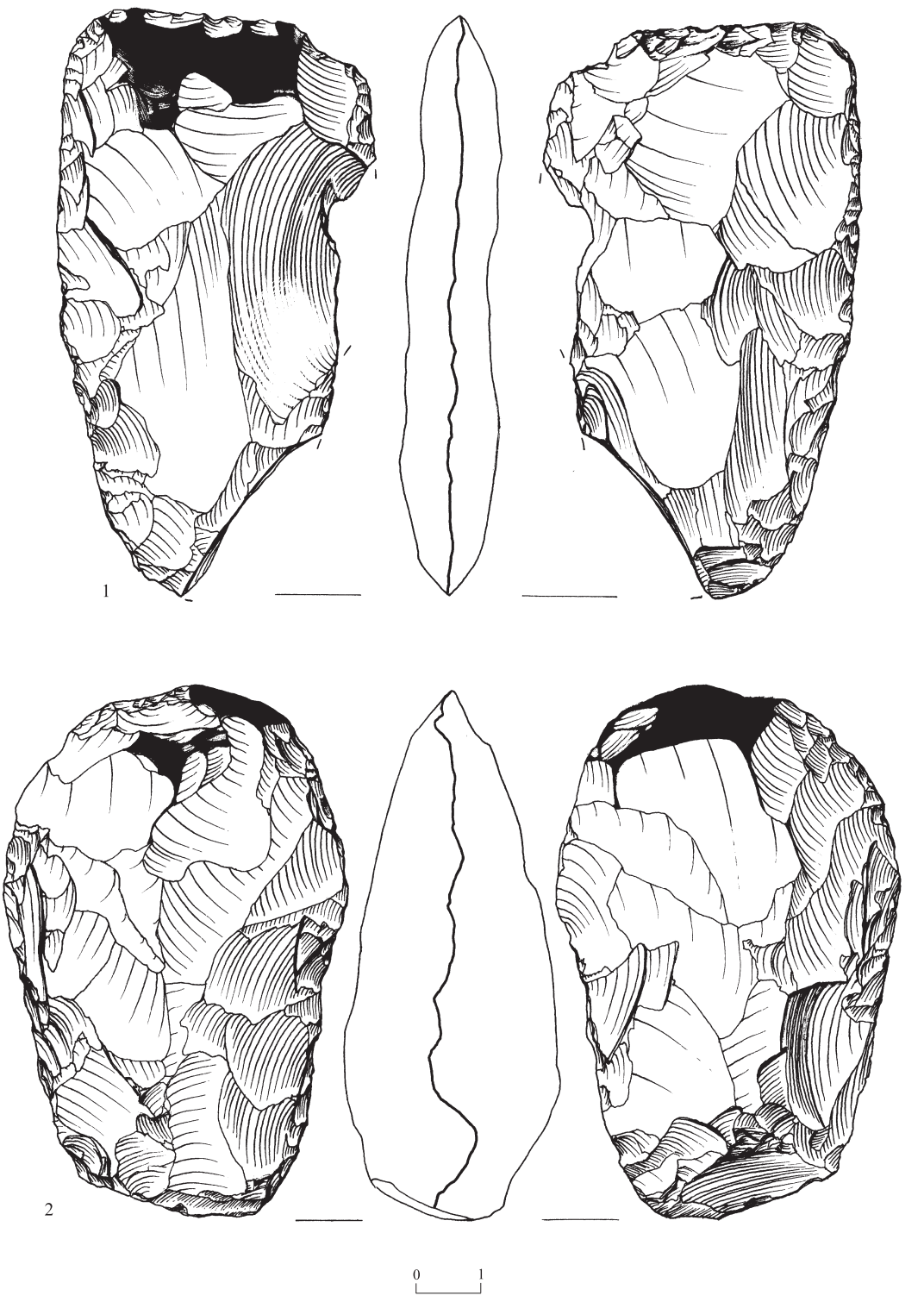

Fig. 10. Axes.

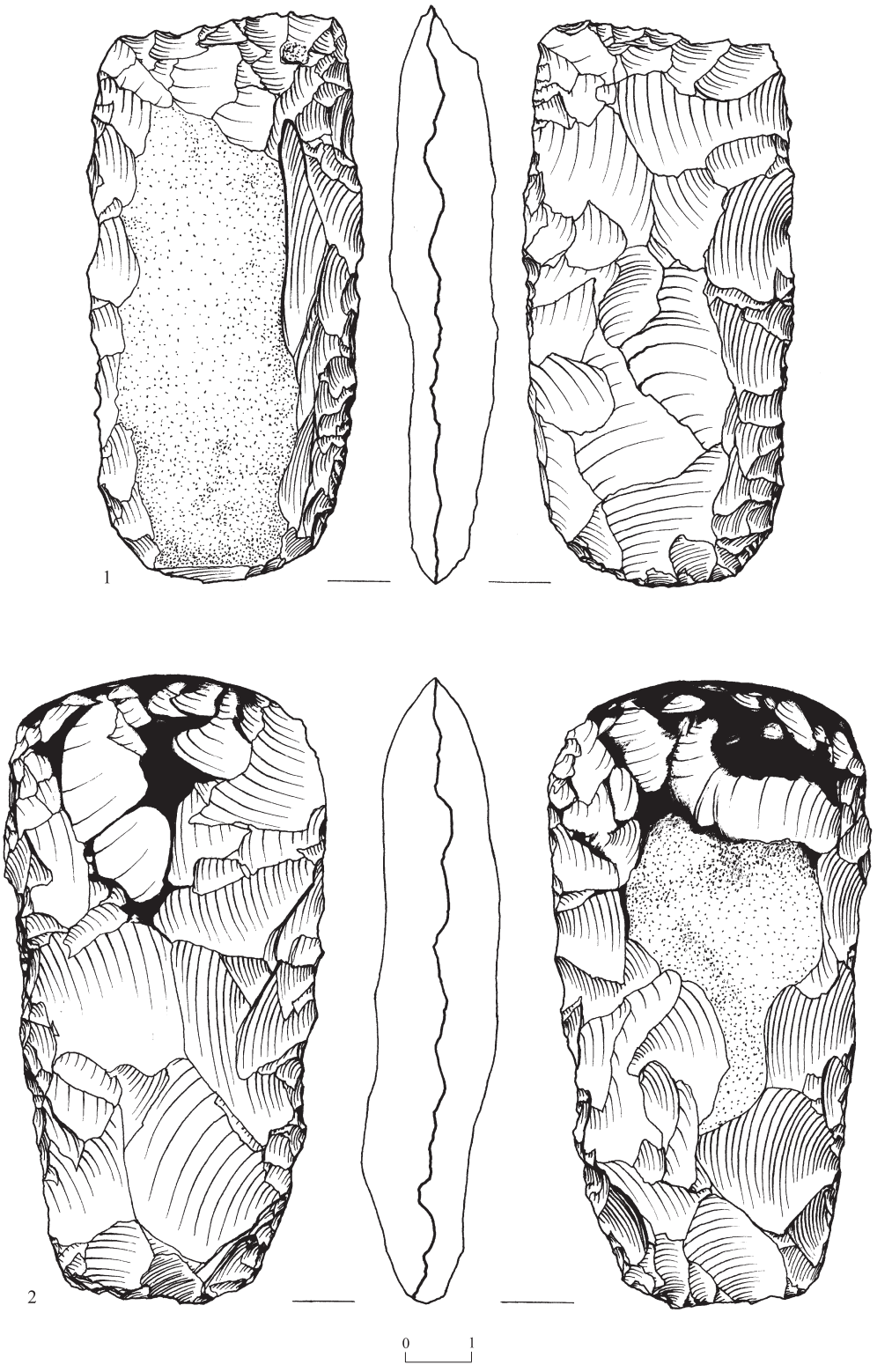

Fig. 11. Axes (cont.).

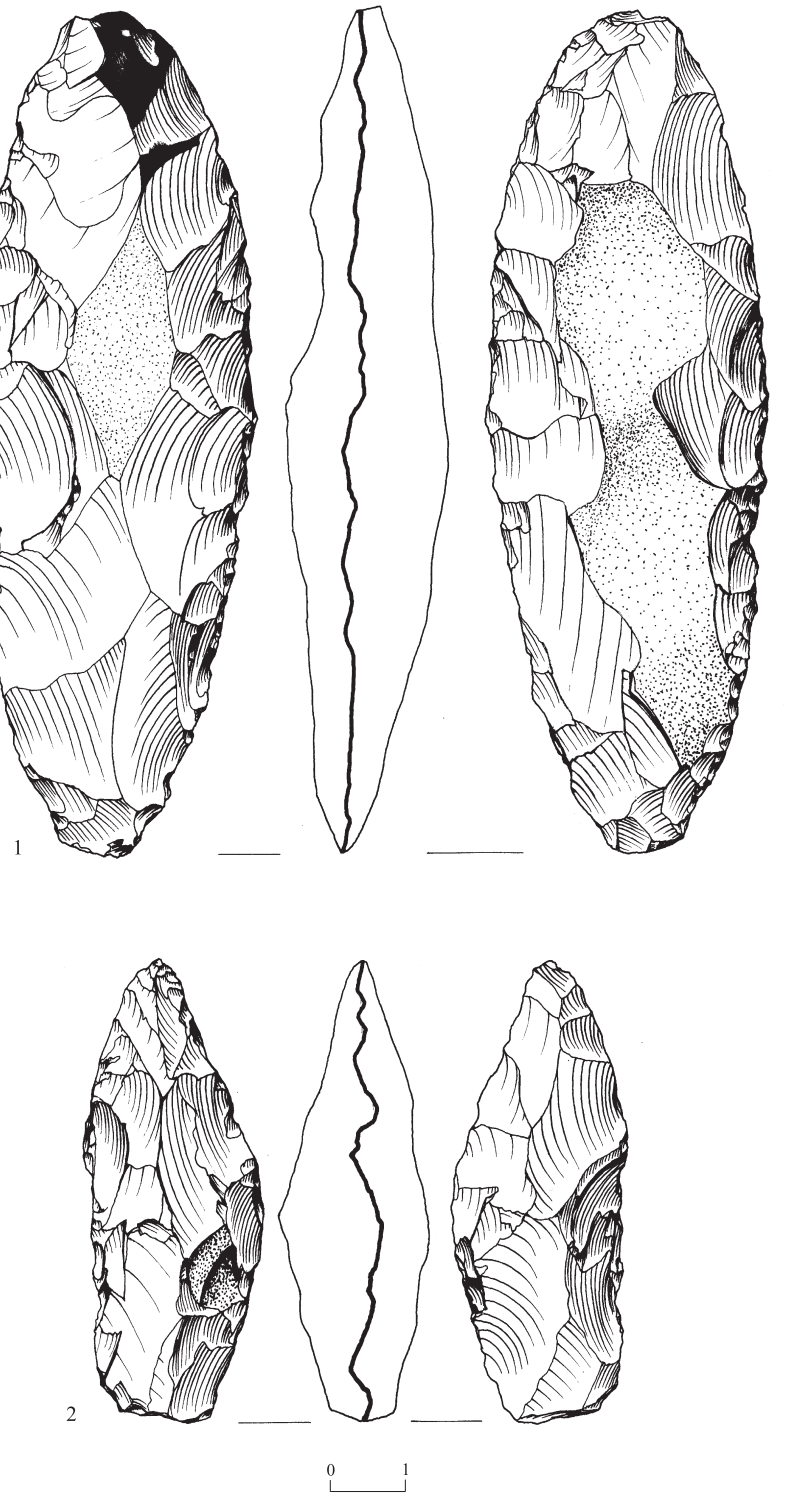

Fig. 12. Bifacial picks.

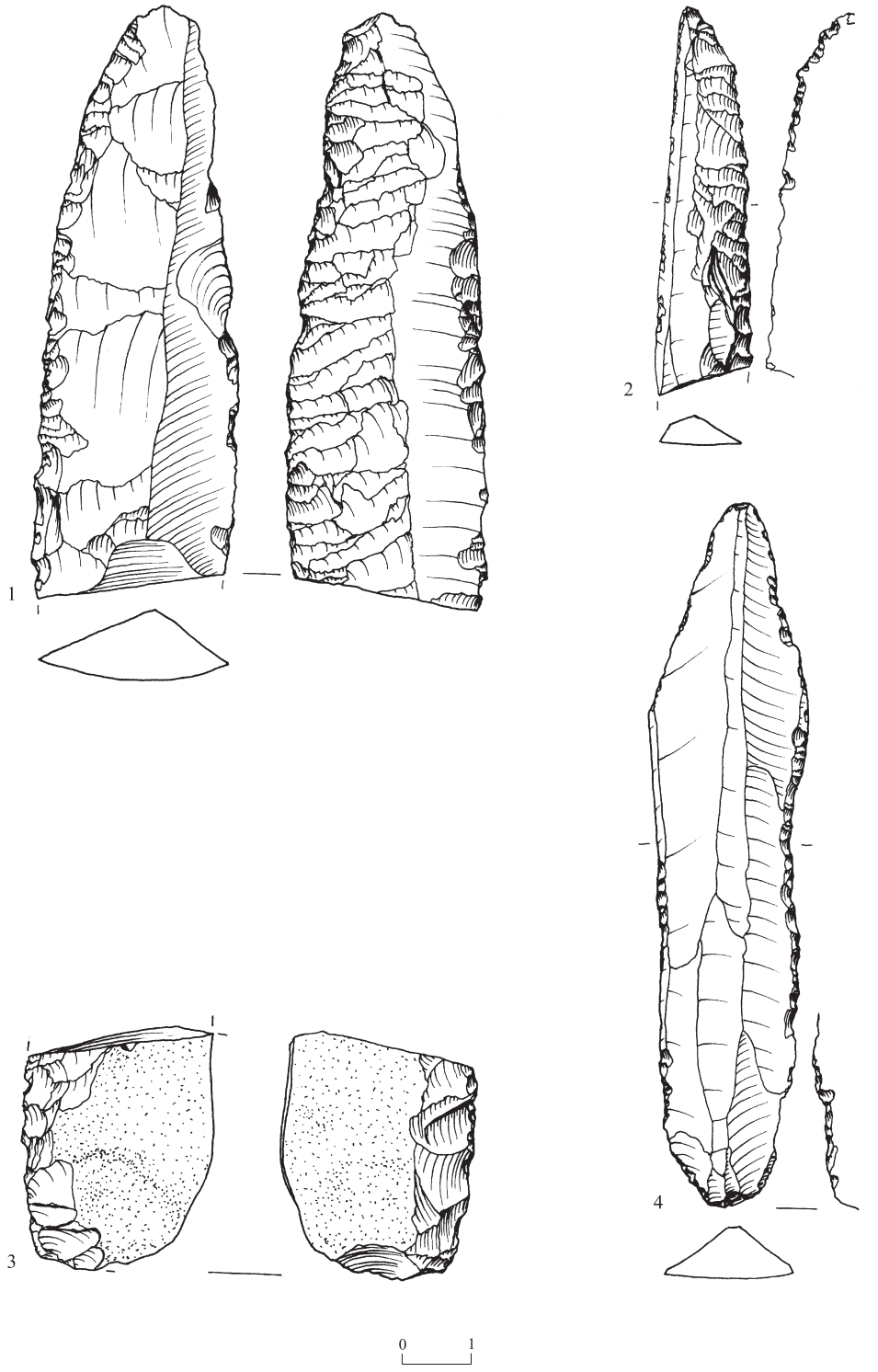

Fig. 13. Knives (1–3), PPNB retouched blade (4).

The item shown in Fig 13:1 is a large knife, with the working edge retouched by bifacial retouch, which deeply covers the ventral side, and the other edge exhibits limited pressure flaking. One knife (Fig. 13:2) was fashioned on a broken blade. The working edge is retouched by steep retouch which covers the dorsal side, while the ventral side has fine retouch and is pointed on its distal end. The broken knife in Fig. 13:3 was flaked of light brown tabular flint. Cortex covered most of both dorsal and ventral faces. Bifacial retouch shaped its main working edge.

Earlier Lithic Remains

Nine tools were found in the excavations, predating the Pottery Neolithic period, possibly indicating human activity at the site prior to the Stratum III occupation. These include four Mousterian flakes, three Mousterian points and two massive tools fashioned on broken blades. The Mousterian artifacts have double patina. As these artifacts predate the Pottery Neolithic, they may indicate the re-deposition of earlier artifacts from the surrounding hills, or as suggested above, provide evidence for pre-Stratum III activity at the site. The long blade shown in Fig. 13:4 was produced of pink flint and has retouch along both lateral sides. It is similar to blades retrieved from the PPNB assemblage of the Naḥal Ḥemar Cave (Bar-Yosef and Alon 1988:7).

DISCUSSION

The dating of the Tel Yosef flint assemblage conforms with the dates provided by the ceramic evidence (see Covello-Paran, this volume). The dating of the larger assemblage of Strata III–II is more complex. Whereas some of the artifacts can be attributed to the Jericho IX culture (Khalaily 1999:42–47; Gopher and Blockman 2004:47), the majority can be dated exclusively to the Yarmukian culture. This is primarily based on the typological analysis of the formal tools, such as the sickle blades and arrowheads. This stands in contrast with the pottery analysis, which suggests that the remains be attributed to the Lodian (Jericho IX) horizon (see Covello-Paran, this volume). One possible explanation is that there is a certain chronological overlap between the two cultural entities, represented by the Tel Yosef finds. This can be supported by the relatively rapid changes in ceramic trends as opposed to the lithic industry, which was much more conservative.

The Yarmukian dating of the assemblage is based on various types of sickle blades with deep denticulation (Type A; Fig. 5:1–8) and the ʻAmuq arrowheads (Type A-6; Figs. 3; 4:1–3), which comprise the majority of the tool types. The arrowheads differ in style from the ʻAmuq points of the PPNB (Gopher 1989:42; 1994:39). Such arrowheads and sickle blades are common in Yarmukian assemblages of the Southern Levant, for example at Shaʻar Ha-Golan (Stekelis 1972; Garfinkel 1992; 1993; Garfinkel and Miller 2002), Munḥata (Perrot 1972; Gopher 1989), ʻEin Ghazal (Rollefson and Simmons 1986), Jebel Abu Thawwab (Kafafi 1993; 2001), Tel Te'o (Eisenberg, Gopher and Greenberg 2001) and Jericho (Crowfoot-Payne 1983).

Some of the tools within the assemblage, such as arrowhead Types A-8 (Niẓẓanim points; Fig. 4:4) and A-9 (Herẓliyya points; Fig. 4:5, 6), and sickle blades of Type B (Figs. 5:9–11; 6:1, 2) are more frequent in the Lodian (Jericho IX) assemblages (Khalaily 1999:47; 2006). Such types, however, also appear in Yarmukian assemblages (see, e.g., Kafafi 2001:140–142; Garfinkel and Miller 2002:160–164), although in smaller quantities.

Although the assemblage from Stratum I is small, the objects are culturally and chronologically uniform, dating to the Wadi Rabah phase. In this light, especially noteworthy are the wide-backed sickle blades (Fig. 6:5, 6) and the transversal arrowhead (Fig. 4:8). Both of these types are hallmarks of Wadi Rabah assemblages (see also Gopher 1993; Gopher and Gophna 1993). Similar assemblages are known from many late Pottery Neolithic sites in the Jordan Valley, such as Ha-Gosherim (Khalaily and Vardi, forthcoming), Jericho Stratum VIII (Crowfoot-Payne 1983), Munḥata Stratum 2a (Perrot 1972; Gopher 1989), Tabaqat al-Buma in Wadi Zeqlab (Banning et al. 1989; Banning 1998) and Abu Ḥamid (Lovell, Kafafi and Dollfus 1997). They are also reported from sites in the Jezreel Valley, such as Bet She'an Stratum XVIII (de Vaux 1971), Tel Qiri (Baruch 1987) and Naḥal Zehora (Barkai 1996).

In conclusion, the Tel Yosef excavations yielded three layers, attributed to two successive cultural phases within the Pottery Neolithic period. The earlier occupation (Strata III and II) can be dated to the sixth millennium BCE. The lithic assemblage from these strata can be more specifically attributed to the Yarmukian culture, while Stratum I is associated with the Wadi Rabah culture of the first half of the fifth millennium BCE.

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