

The State of the Stone Terminologies, Continuities and Contexts in Near Eastern Lithics

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and Osamu Maeda**

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Contents

Introduction	ix
<i>Elizabeth Healey, Stuart Campbell & Osamu Maeda</i>	
1 The PPN 1–6 Workshops: agendas, trends and the future	1
<i>Hans Georg K. Gebel</i>	
PPN predecessors	23
2 PPN predecessors: current issues in Late Pleistocene chipped stone analyses in the southern Levant	25
<i>Lisa A. Maher & Tobias Richter</i>	
3 Nebekian, Qalkhan and Kebaran: variability, classification and interaction. New insights from the Azraq Oasis	33
<i>Tobias Richter</i>	
4 Lithic “culture” issues: insights from the Wadi al-Hasa Epipalaeolithic	51
<i>Deborah I. Olszewski</i>	
5 Technological rationality of core reduction and blank production in the Natufian lithic industries of the Galilee	67
<i>Christophe Delage</i>	
6 Newly discovered Late Epipalaeolithic lithic assemblages from Dederiyeh Cave, the northern Levant	79
<i>Yoshihiro Nishiaki, Yosef Kanjo, Sultan Muhesen & Takeru Akazawa</i>	
7 The Epipalaeolithic chipped stone from Pınarbaşı, on the central Anatolian plateau	89
<i>Anne Pirie</i>	
Beyond chipped stone	97
8 On floor level: PPNA indoor cupmarks and their Natufian forerunners	99
<i>Danny Rosenberg & Dani Nadel</i>	
9 Pestle sectioning at Dhra’: a <i>chaîne opératoire</i> for basalt pestles and their derivatives	109
<i>Philipp M. Rassmann</i>	
10 Stone ring production in the Neolithic of the Near East and analogies from the American West	125
<i>Marc W. Hintzman</i>	
11 Halaf bead, pendant and seal ‘workshops’ at Domuztepe: technological and reductive strategies	135
<i>Ellen H. Belcher</i>	
Change or continuity?	145
12 Social and symbolic meanings of lithic technology during the PPN in the Middle Euphrates	147
<i>Juan José Ibáñez & Jesús González Urquijo</i>	
13 Lunates as projectiles at the onset of the Neolithic period	157
<i>Alla Yaroshevich, Ofer Bar-Yosef & Vladimir Zbenovich</i>	
14 Geometrics from the Neolithic settlement of Tall i Mushki, south-west Iran	163
<i>Masashi Abe</i>	
15 Did the diffusion of Levantine Helwan points to north-eastern Africa really take place? A study of side-notched and tanged projectile points in north-eastern Africa	171
<i>Noriyuki Shinai</i>	

16	The lithic assemblage of Ayia Varvara Asprokremnos: a new perspective on the Early Neolithic of Cyprus <i>Carole McCartney</i>	185
17	The PPNB site of Beisamoun (Hula Basin): present and past research <i>Fanny Bocquentin, Omry Barzilai, Hamoudi Khalaily & Liora Kolska Horwitz</i>	197
18	Changes in chipped stone industries in south-eastern Anatolia: Akarçay Tepe (7,600–6,800 cal. BC) <i>Ferran Borrell</i>	213
19	The lithic assemblage of Sha‘ar Hagolan: PPN/PN continuity? <i>Zinovi Matskevich</i>	227
20	Is the PPNC really different? The flint assemblages from three layers at Tel Roim West, Hula Basin <i>Dani Nadel & Michal Nadler-Uziel</i>	243
21	A note on the complexity of lithic assemblages <i>Laurence Astruc</i>	257
	Social contexts of production and use	265
22	Nahal Lavan 1021: a PPNB knapping site in the western Negev dunes <i>Omry Barzilai & Nigel Goring-Morris</i>	267
23	A methodological approach, using GIS applications, to stratigraphy and spatial analysis at PPNB Kfar HaHoresh <i>Michal Birkenfeld & Nigel Goring-Morris</i>	277
24	Knapping methods and techniques at Tell Halula (middle Euphrates valley), during the mid VIII th millennium cal. BC <i>Ferran Borrell</i>	291
25	Lithics in a ritual context at the PPNB site of Mishmar Ha‘emeq: do they display special characteristics? <i>Omry Barzilai, Nimrod Getzov, Yael Givol-Barzilai, Nimrod Marom & Ofer Marder</i>	305
26	The social roles of the use of flint and obsidian artefacts at Salat Cami Yanı in the upper Tigris valley <i>Osamu Maeda</i>	317
27	Stones of the living and bones of the dead? Contextualising the lithics in the Death Pit at Domuztepe <i>Stuart Campbell & Elizabeth Healey</i>	327
28	Side-blow blade-flakes from the Ghassulian sickle blade workshop of Beit Eshel: a Chalcolithic solution to a Neolithic riddle <i>Jacob Vardi & Isaac Gilead</i>	343
29	On becoming a skilled flint knapper: practising flint knapping at the Chalcolithic sickle blade workshop of Beit Eshel, a preliminary refitting study <i>Angela Davidzon & Isaac Gilead</i>	357
	4th International Workshop on Chipped Lithic Industries (Niğde, Cappadocia, Turkey) 4th–8th June 2001	369
30	Introduction <i>Nur Balkan-Atlı</i>	371
31	LPPNB blade caches at Tell Ain el-Kerkh, north-west Syria <i>Makoto Arimura</i>	373
32	Flint and obsidian industry of Mezraa-Teleilat (Urfa, south-east Anatolia), PPN-PN <i>Güner Coşkunsu</i>	385
33	An obsidian industry from Neolithic Hagoshrim, Upper Galilee <i>Avi Gopher, Ofer Marder & Ran Barkai</i>	395
34	Obsidian distribution and cultural contacts in the southern Levant during the 7 th millennium cal. BC <i>Yosef Garfinkel</i>	403
35	The typological analysis of Aşıklı arrowheads and problems <i>Semra Yıldırım Balcı</i>	411

36	Preliminary results of the technological analyses of Musular obsidian – central Anatolia <i>Nurcan Kayacan & Mihriban Özbaşaran</i>	417
37	Parallel lives: Abu Ghosh and Yiftahel, economic strategies of two PPNB sites in the southern Levant <i>Ofer Marder, Hamoudi Khalaily & Ianir Milevski</i>	421
38	Assessing lithic raw material availability, abundance and use in the Late Upper Palaeolithic, Epipalaeolithic and Neolithic of the Wadi al-Hasa, Transjordanian Plateau <i>Deborah I. Olszewski</i>	429
39	PPNA stone and flint axes as cultural markers: technological, functional and symbolic aspects <i>Ran Barkai</i>	443
40	The spatial distribution of arrowheads and microliths in the Near East (10,200–8,000 cal. BC) <i>Olivier Aurenche & Stefan K. Kozłowski</i>	449
41	Preliminary notes on the Pre-Pottery and Pottery Neolithic lithics from Tell Seker al-Aheimar, the upper Khabur: the 2000–2001 seasons <i>Yoshihiro Nishiaki</i>	457
42	Points and glossed pieces from Tell Sabi Abyad II and Tell Damishliyya I (Balikh Valley, Djezireh) <i>Laurence Astruc</i>	465
43	Symbolic behaviour reflected in stone and bone objects from Nahal Hemar Cave, Judean Desert <i>Ofer Bar-Yosef</i>	475
44	Stones in their symbolic context: Epipalaeolithic – Pre-Pottery Neolithic continuity in the Jordan Valley <i>Dani Nadel</i>	481

PPNA stone and flint axes as cultural markers: technological, functional and symbolic aspects

Ran Barkai

Abstract

In this paper the earliest Neolithic bifacial tools, flint and stone axes, are carefully examined in order to understand the role of these technological innovations in PPNA mundane and sacred realms. It is argued that since their first appearance axes played an important role in Neolithic societies acting both as functional woodworking implements and cultural markers of the new Neolithic perceptions. This conclusion is based on technological, functional and contextual study of PPNA flint and stone axes from the Levant and sheds new light on the dynamic nature of the Neolithisation process.

Introduction

Stone and flint axes made their first appearance in the southern Levant during the Pre-Pottery Neolithic A period and had soon become important and meaningful tool types in the Neolithic tool kit. The use of axes seems to reflect new Neolithic adaptations and activities, related to the transition to food production and sedentism.

I would like to argue here that as a new Neolithic tool type, the axe may represent new life-ways and world-views of Neolithic people and stand for the new relationships between man and nature, as well as the new economic, social and symbolic systems.

In this paper I will emphasise the technological, functional and symbolic differences between the two distinct axe types of the PPNA namely the polished stone axe and the flaked flint (tranchet) axe (Table 1). It will be argued that these two axe types have different roles in Neolithic functional and symbolic systems, each representing different aspects of the Neolithic economic and social world-views.

Flint bifacial tools re-appear in Natufian assemblages after the Acheulian hand axes had disappeared at the end of the Lower Palaeolithic. Single massive tools do appear in earlier Epipalaeolithic contexts, but none are truly shaped as bifacials. Natufian bifacial tools are usually classified as “heavy-duty tools” and the most distinguished tool type is the pick. Natufian bifacial tools are not standardised and the use of bifacial knapping is not systematic (Belfer-Cohen 1988a; Barkai 2000). It seems that there were no crystallised conventions regarding bifacial tool manufacture during

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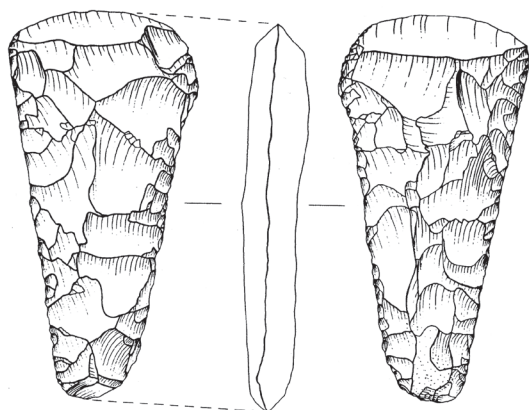


Fig. 1: Flint tranchet axe (shaped by transversal blows) from Netiv Hagdud.

Natufian times and the standards for these tools were not yet set. The use of Natufian bifacial tools is still not clear and awaits detailed use-wear analysis. It seems reasonable to assume that some new activities, developed during the Natufian, brought about the production of these tools. The introduction of these massive tools into late Epipalaeolithic assemblages is important since bifacial tools stand against the traditional Epipalaeolithic tendency of flint miniaturisation. The technological changes in lithics mentioned above reflect important developments taking place at this transitional period between a hunter-gatherer way of life and a settled, food-producing society. The main axis of this process is a conceptual change in relationship between man and nature. During the Natufian, people began to manipulate and use natural resources at an unprecedented scale. This was the case with vegetal resources as reflected in the newly invented sickles and the abundance of pounding/grinding tools; the use of wood in house construction; the domestication of dogs and the increased use of resources around habitation sites as a result of a sedentary way of life (see summaries in Belfer-Cohen 1991; Bar-Yosef and Belfer-Cohen 1992; Valla 1995).

The presence of bifacial tools in burials at Hayonim cave (Belfer-Cohen 1988a; Belfer-Cohen 1988b) could indicate that these tools served both as working tools and as symbolic objects, probably reflecting their important role in the changing economical and social systems. It must be emphasised that in my opinion Natufian bifacial tools are not the direct prototypes or precursors of Neolithic axes. While Neolithic axes were shaped according to strict technological and typological standards and used as composite hafted tools for woodworking, Natufian bifacials do not accord with any of these criteria. It seems to me that Neolithic axes are a genuine Neolithic innovation, based on Natufian conventions regarding large and massive tools, but with no clear nor direct technological or typological continuity (Barkai 2000, 323–330).

It is of interest to note that at the very beginning of the Neolithic period, in a cultural phase known as Khiamian

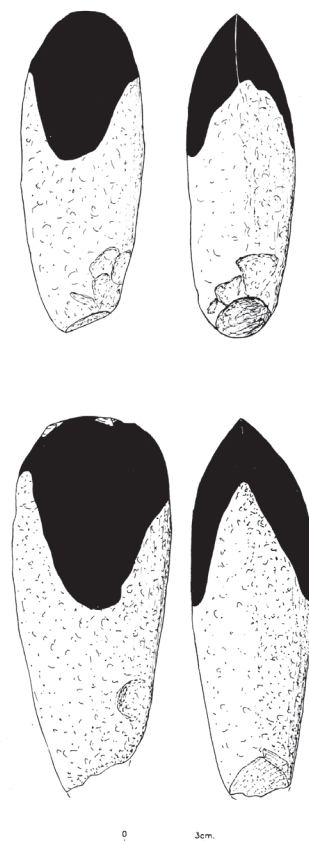


Fig. 2: Basalt polished stone axes from a PPNA site in Samaria hills (Wadi Qanah, survey finds).

(which is still under debate, see Garfinkel 1996; Kuijt 1996; Bar-Yosef and Gopher 1997; Gopher and Barkai 1997; Ronen and Lechevallier 1999), no bifacial tools, especially tranchet axes, were found. This state of affairs emphasises discontinuity in the use of bifacial tools between the end of the Epipalaeolithic and the beginning of the Neolithic period.

Sultanian flint and stone axes

The Sultanian culture of the PPNA marks a real change in the bifacial tool category with the appearance of flint tranchet axes – axes shaped by transversal blows (Fig. 1) and polished stone axes made of basalt, limestone and other materials (Fig. 2). These two axe types may be regarded as pure Sultanian technological and typological innovations.

Axes are not the only early Neolithic lithic innovations, since PPNA lithic assemblages have other prominent “new” tool types such as arrowheads and sickle blades. These tools probably reflect the new life-ways of Neolithic people with the basic activities being hunting, plant harvesting and relatively large scale vegetal resource manipulation. Large tools are manufactured and used (instead of the traditional Epipalaeolithic microlithic implements) and new blade production technologies (such as naviform technology) replace the bladelet production technologies. The appearance of axes in Sultanian assemblages are part of a comprehensive process of change that brought an almost total replacement of Natufian

tool kits. The technological and typological changes in the lithic industry are part of a greater cultural change at the transition from Epipalaeolithic forager societies to Neolithic food producers, reflected in the appearance of large villages; monumental architecture such as the tower, wall and storage facilities at Jericho; intensive use of cereals and the probable cultivation of several species; large scale trading systems and settlement hierarchy (Kuijt 1994; Bar-Yosef 1995). These major changes created the infrastructure for the invention of unique bifacial tools – the tranchet axes – which usually appear only in the very early stages of the Neolithisation process. Tranchet axes were independently invented in different parts of the world at the same cultural stage, the shift to a Neolithic way of life. Tranchet axes appear in Sultanian assemblages of the Levantine PPNA; in late Mesolithic and early Neolithic assemblages of Europe (e.g. Radley and Mellars 1964; Ashton 1988; Gardiner 1990; David and Williams 1995); in prehistoric Egypt in Naqada assemblages (Holmes 1990) and in Mayan assemblages from central America (e.g. Shafer 1983; Shafer and Hester 1983; Shafer 1985; Shafer and Hester 1991). In some of these cases tranchet axes appear alongside polished stone axes (in the southern Levant, Egypt and Europe). It seems that the transition to a Neolithic way of life, both in practical and conceptual terms, brought about new needs which find expression in newly invented tool types, the tranchet flint axe and the polished stone axe. New types of projectiles and sickle blades, the El Khiam point and Beit Ta'amir sickle blade were introduced during the early Neolithic in the Levant and alongside the new axe types represent the Sultanian tool kit. These techno-typological innovations were short-lived and disappeared completely after about 500 years at the beginning of the PPNB. It could be suggested that the Sultanian tool kit was invented during the initial stages of the Neolithic period and was designed for specific needs and adaptations that characterise the Sultanian culture. Thus, the Sultanian tool kit is restricted in terms of time and space and enables a study of technological innovations at the very early stages of the Neolithic culture.

Sultanian tranchet flint axes

Tranchet axes are the dominant bifacial tool type in the PPNA bifacial tool category (on average, almost 50% of the bifacial tools, Barkai 2000). These were shaped mostly by using bifacial flaking for the body and intersecting transversal blows for the working edge. Chisels appear as well, but in much lower frequencies (about 15% of the bifacial tools). Both axes and chisels were shaped by bifacial flaking, creating the outline of the tool and a bifacial ridge at the working edge, intended to guide the transversal blows.

The meticulous preparation by bifacial flaking and the successful execution of the transversal blow demands high technological skills and high planning and performance abilities. It is no wonder, then, that workshops for the production and resharpening of tranchet axes appear in the PPNA (Barkai 2001). Tranchet axes are usually made on blades of high quality, non-homogenous, raw material and on average are very light (37g) and thin (15mm) (data from Barkai 2000).

Being very light and thin, one wonders what the function of these tools, usually classified as “axes” was. Use-wear studies of tranchet axes from different parts of the world, as well as the damage recorded on the Levantine axes, reveal that these tools were used in light, relatively fine woodworking tasks (Keeley 1983; Shafer 1983; Shafer and Hester 1983; Shafer 1985; Holmes 1990; Yamada 2000; Yerkes *et al.* 2003). These conclusion have been drawn both from microscopic examination and from recording edge-damage. It seems reasonable to argue that tranchet axes were not used for felling or chopping trees, or other heavy-duty crafts, but rather for activities such as bush cutting, branch trimming or similar light-activities. These products were used for architectural needs, such as building material and/or roof supports and for other purposes such as making hafts, wooden tools, land clearance, etc. The relation between tranchet axes and round architecture seems reasonable since at the beginning of the PPNB both tranchet axes and round structures are replaced by polished flint axes and rectangular architecture. It appears that no massive woodworking tasks were carried out during Sultanian times and no large scale resource manipulation was practiced.

Sultanian polished stone axes

Polished stone axes are totally different from flint tranchet axes in raw material, the use of polish technique, size and weight (for example, the stone axes from Netiv Hagdud weigh, on average, 191g and are 31.5mm thick, as opposed to the flint axes that weigh 55g and are 16mm thick) and the state of preservation. Most of the stone axes were found complete and undamaged. In addition, while workshops for flint axe production and maintenance are common, no production sites for polished stone axes are known. Since many of the polished stone axes were found complete and without any flaw, it seems reasonable to suggest that these were not working tools. Polished stone axes were found in intentional deposits in association with figurines, stone vessels or aurochs skulls (Noy 1989, 13; Lechevallier and Ronen 1994, 168, 224; Stordeur 2000). This fact reinforces my suggestion that these tools played a symbolic-social role and were not intended to serve in daily, functional activities. Seven polished stone axes from Netiv Hagdud, six made of limestone and one of basalt, were studied by Richard Yerkes in an attempt to understand their function (Yerkes *et al.* 2003). No use-wear traces (using both low and high magnification) or signs of edge-damage were observed on these axes and thus it is argued here that many of the PPNA polished stone axes were never intended to function as woodworking tools.

It is well accepted in the archaeological literature that rare, unusual or outstanding objects, such as large polished axes, could reflect social status and act in the social domain rather than as functional woodworking tools. Olausson suggests that in order to reflect social or economic status the axe has to be outstanding and rare, and thus beyond the reach of each and every community member (Olausson 1982). This rarity could be expressed in an exaggerated size, the use of exceptional raw material or by displaying the non-functional aspect of the object (Olausson 1982, 14).

	Tranchet Flint Axes	Polished Stone Axes
Technology		
Raw Material	Flint	Stone (basalt, limestone, etc.)
Shaping Methods	Bifacial flaking and transversal (tranchet) blows	Pecking and polishing
Place of Production	Workshops, some near raw material sources, and in habitation sites	Unknown
Re-sharpening and Re-shaping	Yes	–
State of Preservation	Mostly broken and damaged	Mostly complete and undamaged
Metrics and Weight	Light and thin	Heavy and thick
Function		
Use-Wear Analysis	Slight damage on the working edge, wood polish, light woodworking	No use signs (on the sample analysed)
Archaeological Context		
Location in the Site	No specific context. In houses, open spaces, fills, etc.	Some were found in specific contexts, deposited with figurines, basalt milling stones, aurochs skulls, etc.

Table 1: Major differences between PPNA flint and stone axes.

The ethnographic literature supports the use of outstanding tools as social objects, while similar but smaller tools are used as functional working tools.

For example, among the Dani of New Guinea the length of the polished axe reflects the level of social competition and the desire to display social status (Pètrequin *et al.* 1998a, 295–296). The Dani sometimes use “ordinary” functional axes that were transformed into “symbolic” or “social” axes, but most of their non-functional axes are especially long and made of extraordinary greenstone. These are usually made and used by men and are believed to reflect reproductive aspects and connections with the ancestors, in addition to their role as social symbols (Pètrequin and Pètrequin 1993). Other studies show that sometimes the ritual and the functional axes are very much alike, but the ritual axes are extraordinarily finished (Strathern 1969, 321).

Long polished axes were deposited in Neolithic graves in Scandinavia. Many hoards includes long, complete and undamaged axes. It seems likely that these tools did not function as working tools. Olausson suggests that these axes are prestige items (Olausson 1982, 10). Many axe hoards in France include exceptionally long axes, usually longer than 15cm, much longer than their counterparts found at habitation sites. These are believed to be of special social significance and probably were not used as working tools (Pètrequin *et al.* 1998b). In other cases in Neolithic France, axes were deposited in burials and/or in megalithic structures. Some of these large, polished and complete specimens were found in passage graves, under menhirs or in special stone cists (e.g. Cordier and Boçuet 1998).

Long bifacial tools were deposited in Neolithic megaliths in Spain. These tools were not only exceptional in terms of size, but were made of very soft materials so it is clear that woodworking or other activities could not be performed using these stone axes (Criado Boado and Fabregas Valcarce

1989). Many of the axes found in hoards or special deposits were polished, aesthetically made and show no damage or flaws. Henceforth, it is assumed that these were not used as working tools (e.g. Wiessner 1990, 110).

The Sultanian polished stone axes, being outstanding in size and shaping method, with no damage, accord well with the definition of “ritual” or “symbolic” axes and it seems likely that these axes played a role in the early Neolithic social domain rather than within the economical-functional system. Polished stone axes found in special contexts in PPNA sites support this argument.

Conclusions

The PPNA Sultanian lithic industry included two different axe types, a thin, light flint tranchet axe for light woodworking tasks and a heavy, large, polished stone axe that functioned in the social domain. The separation between the functional and the symbolic is very pronounced and so is the connection between polished and the non-functional axes.

The establishment of relatively large villages, the construction of standard dwellings and the on-going use of vegetal resources probably brought about new needs and promoted the invention of new woodworking tools. The standardised character of bifacial tools, the high skills that find expression in the production and maintenance of these tools and the appearance of workshops for their production all point to an organised economical and social system that supported this innovative element in the lithic industry. The use of bifacial tools may indicate a growing manipulation of natural resources by humans and the symbolic-ritual use of polished stone axes could indicate that bifacial tools had an important role in the new Neolithic system. The axe probably stood for the new relations between man and nature and the new world-views of the Neolithic.

During the first phase of the Pre-Pottery Neolithic B period (EPPNB), a new axe type was introduced – the polished flint axe. For the first time polish is applied to flint axe manufacture, for the production of functional, woodworking tools. Tranchet flint axes appear in EPPNB contexts as well, alongside the new polished ones, but in much lower frequencies than in the PPNA. The beginning of the PPNB marks an important change in the bifacial tool category – the replacement process of tranchet flint axes by polished ones.

Bifacial tools were used by Neolithic people in order to manipulate nature and make efficient use of vegetal natural resources. Many of the innovative crafts and conceptions of sedentary agricultural societies could not be implemented without bifacial tools. These tools symbolised the changes in the complex relationship between man and nature and the new human attitude towards nature. The characteristics of bifacial tools reflect new world-views and perceptions, as well as the developments in architecture, lime plaster production, the later pottery production, etc. The changes in the bifacial tool categories can be used in the reconstruction of the Neolithic social system that supported and encouraged these rapid changes, leading towards effectiveness and the intensification of human production.

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