

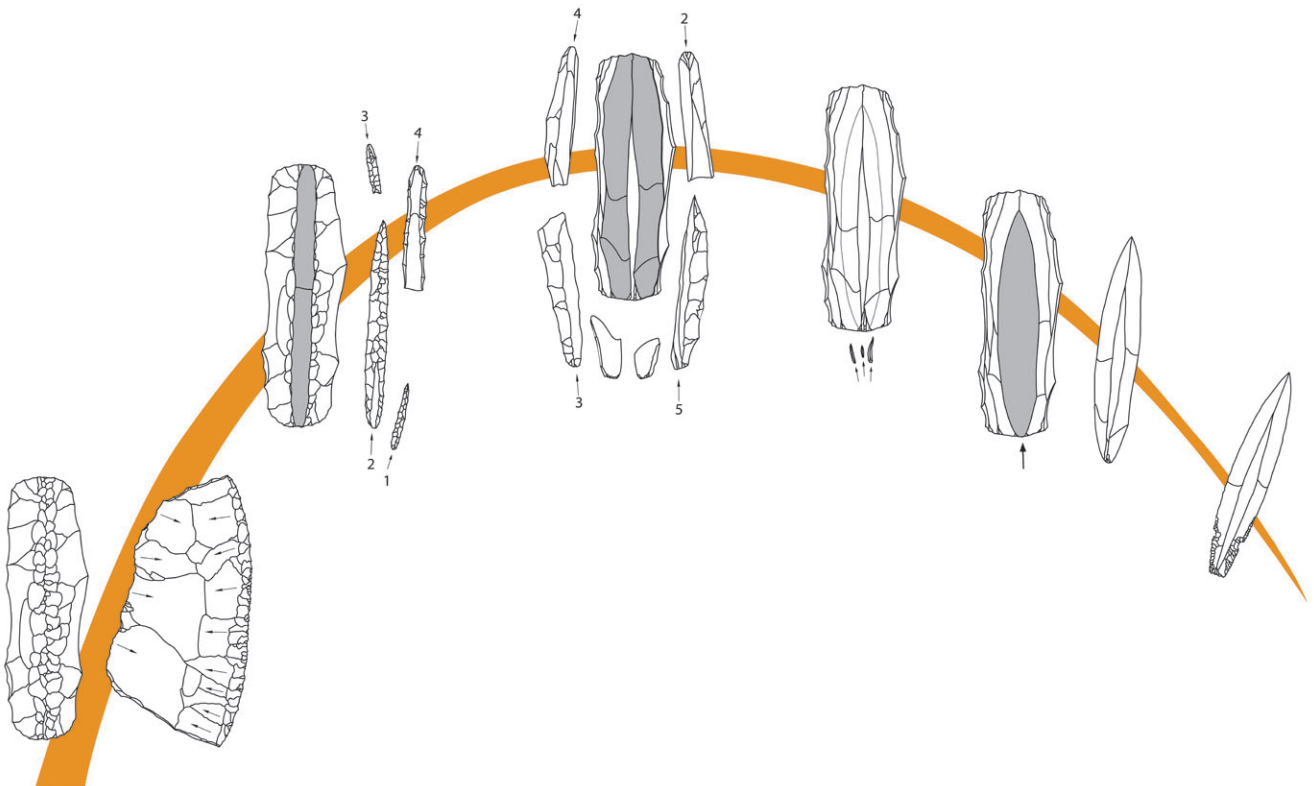
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NICOSIA - UNIVERSITY OF CYPRUS

Abstracts



ABSTRACTS

23RD NOVEMBER

SESSION 1 – LITHICS IN SOCIAL AND ECONOMIC CONTEXTS

Iris Groman-Yaroslavski

Use-Wear Analysis Laboratory, The Zinman Institute of Archaeology, University of Haifa, Israel

A Blade oriented industry of PPNA archaic villagers – a technique embedded in Natufian concepts.

The establishment of sedentary villages during the early Holocene of the Southern Levant seems to parallel a phenomena that was mostly ignored. Considerable attention was given to the new flint tool types that appear during the PPNA, yet the intensification in the production of blades and the build-up of a new concept for shaping tools was thus obscured. Systematic comparison between Natufian and PPNA assemblages demonstrates the emergence of a blade oriented industry, in which blades are the most frequent product to be used for shaping tools. Multi-attribute analysis combined with use-wear analysis of four blade samples from sites in the Salibiya Basin (including Salibiya I, Salibiya IX, Gilgal I and Netiv Hagdud), Southern Jordan Valley, Israel, dated to the sequence of the Late Natufian and through the PPNA, provide a case study used to elucidate the nature of this technology and its implication on daily activities. It is demonstrated that PPNA blades are produced by the same technology used by Natufians to produce bladelets (and blades), but PPNA blades are larger, sharper and more regular in shape. Blades are used for various purposes throughout the period as indicated by the use-wear analysis, but during the PPNA they are used more intensively and for a greater variety of tasks. This PPNA blade oriented technology is thus embedded in Natufian concepts, representing technological and conceptual traits of the earliest villagers of the Southern Levant. This was the foundation that enabled the receiving of Naviform technology that prevailed throughout the area later during the PPNB, where Naviform blades were used for shaping all formal tool types.

Michal Birkenfeld¹ and Lena Brailovsky-Rokser²

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‘Ein Dishna: a new PPNA site in the eastern Galilee, Israel

During the summer of 2012, an extensive survey and surface collection were carried out at the Neolithic site of ‘Ein Dishna. The site is situated on a high terrace above Nahal Tzalmon, a robust watercourse running to the Sea of Galilee, ca. 2 km to the east. Although discovered many years ago by local Kibbutz members, this was the first methodical exploration of the site. It involved the systematic survey and collection of ca. 0.25 hectares as well as the excavation of both mechanical and manual test trenches.

Both flint and ground stone tool assemblages were collected, comprising various stages of production and use. Indicative items within the flint tool assemblage, such as el-Khiam and Salibiya points, suggest the site should be dated to the PPNA. The ground stone tool assemblage is also typical of that period and includes processing tools, containers as well as a large number of fishing weights. The collected finds suggest an economy based on hunting and fishing as well as the exploitation of vegetal resources. The local production of ground stone tools is implied by both the assemblage and site location choices.

In general, PPNA presence in the area is scant, and the few known sites are located along the Jordan Rift Valley. The recent research at ‘Ein Dishna, though limited in scale, adds important data and contributes significantly to our understanding of the settlement pattern during the PPNA period. This paper will present the results of the lithic and ground stone tool analyses as well as a preliminary discussion of site location and settlement patterning during the period.

Sam Smith¹, Zoe Robinson¹ and Bill Finlayson² [Proceedings]

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What does it all mean? Taphonomy, space and chipped stone at PPNA WF16, southern Jordan.

WF16 is a relatively small (c 0.5 ha) settlement, located in the Wadi Faynan, southern Jordan. There is no evidence for either later (PPNB) or earlier (Late Natufian) occupation of the site. A suite of >50 radiocarbon dates suggest that the site was occupied at least throughout the commonly accepted time span of the PPNA (c.11, 600- 10,200 cal BP). Open area excavation has revealed more than 20 buildings tightly packed within the 600m² excavation trench. These buildings provide evidence for a variety of construction methods, take a wide range of forms and sizes and demonstrate a diverse range of life histories. Excavation of the site has also yielded a diverse array of material culture, including a large assemblage of chipped stone, aspects of which show both spatial and chronological patterning. In this paper we document the inter-site distribution of the assemblage, investigating the formation processes responsible for these patterns and evaluating the extent to which material deriving from individual contexts or buildings might shed light on the spatial structure of PPNA life.

Dörte Rokitta-Krumnow
German Archaeological Institute

The chipped stone industry of Mushash 163 – A PPNA/EPPNB site in the Badia, north-eastern Jordan

Mushash 163 is a late PPNA/EPPNB site located in the semi-arid desert steppe on the western edge of the Badia region in north-eastern Jordan. The site is only visible on the surface as a dense lithic scatter measuring about 60m E-W x 45m N-S. The lithic assemblage consists mostly of chips and flakes, although bladelets, blades and long blades are also common, as are flake cores. Naviform cores have thus far only been found on the surface. A range of projectile points have been recovered, many of which are el-Khiam and Helwan types. In addition, the assemblage includes a few leaf-shaped points made on flakes, as well as half-finished 'Amug' points with regular steep parallel retouch. Drills are also common among the tools, and some bifaces have also been found.

According to stratigraphic, C-14 and surface observations the site can be dated to the PPNA/EPPNB transition, through there are also indications that there may have been a later PN component as the site as well. The site is of special interest since the early PPN is a hitherto little known period in this area and it provides information on the development of the lithic tool-kit in a semi-arid region.

Vardi, J.¹, Paz, I.¹, Caracuta, V.², Boaretto, E.², Aga, N.,¹ Rice, E.³, Shemer, M.¹, Brun, E.¹, van den Brink, E.¹.

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The Early Pre Pottery Neolithic B occupation of Ahihud

During the winter of 2013 a newly discovered Early Pre Pottery Neolithic B site (hereafter EPPNB) was excavated in the Galilee. The settlement is situated in the Acre valley where it was built on the Ahidud hill overlooking Nahal Hilazon. The area is at the intersection between the lower and upper Galilee. In addition, the excavation uncovered the remains of a Late Pottery Neolithic – early Chalcolithic village that relates to the Wasi Raba culture.

The excavation uncovered several habitation units. Two storage pits, both EPPNB, but from different phases, were excavated in two separate structures. One of the storage pits yielded a profusion of broad beans (*Vicia faba L.*) and few lentils. This is the largest concentration of *Vicia faba* beans that was discovered so far. The second storage pit is smaller, but more diverse; it contained several types of legumes including broad beans, lentils and several types of pea. The radiocarbon dates on seeds from both storage pits place the site duration at the last century of the EPPNB 10,235-10125 cal. BP. The lithics from the EPPNB contexts include arrowheads such as Helwan and El-Khiam as well as other types such as Byblos and Jericho, sickle blades and bifacial tools. The size of the lithic assemblage is small in comparison to Middle PPNB sites from the Galilee. The fauna from Ahihud is dominated by *Gazelle* and *Sus Scrofa*. The lithics include also a small assemblage of obsidian artifacts whose provenance is most likely Göllü Dağ. The site of Ahihud is unique in its sub-region of the Acre valley. The closest parallels are Horvat Galil from the upper Galilee and Motza in the Judea Mountain region.

Denis Štefanisko¹ and Christoph Purschwitz²

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Chipped stone industry of 'Ainab 1A, Early PPNB site at Jabal 'Ainab (South-East Badia)

'Ainab 1 is a small open air campsite near Jabal 'Ainab 1A at the modern Jordanian-Saudi-Arabian border. The campsite consists of 11 structures out of which one (structure A) was excavated in 2014. More than 4000 pieces of chipped lithics have been found during the excavation, among them several chipping floors. According to the presence of numerous Helwan-Points, 'Ainab 1A can be dated to the EPPNB - a period which is poorly attested and investigated in the southern Levant. This presentation provides the preliminary results on the typo-technological analysis and therefitting studies carried out.

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Typo-Technological Changes in the Lithic Industries at Nahal Zippori 3: From the Pre-Pottery Neolithic B to the Early Bronze Age I

Nahal Zippori 3 is a multi-period prehistoric site located in the Lower Galilee region with settlement remains dated to the Pre-Pottery Neolithic B, Pottery Neolithic, Chalcolithic and Early Bronze I periods. The current study attempts to examine synchronic and diachronic changes in the lithic industries at the site. The approach used in this research is that all typo-technological elements in the assemblage are important, thus it emphasizes formal and non-formal technologies. In addition to the study of the diagnostic tool categories (e.g. bifacial tools, arrowheads, sickle blades) and specialized technologies (e.g. Bidirectional blade technology, Canaanite blade technology), an emphasis is made to characterize the non-formal '*ad hoc*' production for each period. The main aspects that will be examined and discussed are – raw material exploitation, blank preferences, and on-site/off-site production.

SESSION 2 – LITHICS IN SOCIAL AND ECONOMIC CONTEXTS

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Persistent Places: Assessing chronological change and cultural groups at Kharaneh IV

Kharaneh IV is an exceptionally large Epipalaeolithic site, approximately 20 000 m² in size, making it one of the largest Terminal Pleistocene occupations in the Levant. The site served as an aggregation area for Early and Middle Epipalaeolithic groups, who congregated at the site on a repeated and multi-seasonal basis, attracted to a local habitat rich in fauna and flora. Recent excavations have uncovered evidence of habitation including hut structures, numerous hearths, postholes, caches, and middens. High densities of marine shell and patterns in microlith technologies suggest extensive and wide-ranging trade/exchange networks at a very early date for the southern Levant. The most abundant artefacts at the site are chipped stone tools, with several millions excavated to-date. This paper will discuss changes in lithic technology at the site from the Early to the Middle Epipalaeolithic, exploring the lithic assemblage recovered from a deep sounding at Kharaneh IV. These changes will be examined through the conceptual framework of the *chaîne opératoire*; where the entire production, use and discard sequence is considered as integral to understanding how stone tools were developed and maintained at such a unique aggregation site. Changes in the *chaîne opératoire* from the Early to the Middle Epipalaeolithic illuminate the different strategies employed by the inhabitants of Kharaneh IV, and when paired with other aspects of material culture highlight changes in these communities over time.

Lisa A. Maher¹ and Danielle A. Macdonald²

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² *University of Tulsa*

Communities of Interaction: Implications and motivations for hunter-gatherer aggregation through the lens of Kharaneh IV

The multi-component Epipalaeolithic site of Kharaneh IV, located in the Azraq Basin of eastern Jordan, documents just over 1000 years of occupation by hunter-gatherer groups during the end of the Last Glacial Maximum. Palaeoenvironmental reconstructions suggest a warmer and moist micro-climate here, in contrast to the cool, dry surrounding Levantine region. Multiple lines of geomorphological, faunal and archaeobotanical evidence indicate that the environs around the site were well-watered, lushly vegetated and rich in a wide variety of animal species, clearly drawing human populations to the area. Early and Middle Epipalaeolithic groups congregated repeatedly and for prolonged periods in this verdant landscape, perhaps coming from as far as the Mediterranean and Red Seas. Focusing on lithic technology, we explore some of the strategies of these eastern Jordanian groups that resulted in particular patterns of settlement, subsistence and interaction, including the re-occupation of a substantial aggregation site at Kharaneh IV. Seven years of excavation at Kharaneh IV, most recently focusing on activities inside and outside of several hut structures, suggest some very intriguing technological and social on-site activities, as well as adaptations to a dynamic landscape unlike that of today

Bill Finlayson¹, Sam Smith², and Cheryl Makarewicz³

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A Late PPNA phase identified in southern Jordan

Research on the early PPN of southern Jordan at WF16, el Hemmeh and Zad2 suggests that a distinct Late PPNA phase develops in this region. It is most readily visible in changes in architecture and lithic assemblages. At WF16, the one site that appears to be occupied throughout the PPNA, the chipped stone assemblage appears to evolve during the later stages of the occupation, confirming that the process of transition is locally derived. The chipped stone from this Late PPNA phase is sufficiently similar to the preceding PPNA, and dissimilar to the EPPNB elsewhere to continue to describe it as form of PPNA, although initial analysis suggests that this Late PPNA may continue beyond the conventional chronological end of the PPNA elsewhere in the Levant. Some of the distinctive traits of this phase, especially in blade production, parallel EPPNB developments elsewhere, and indicate that the southern Jordanian trajectory does not occur in isolation, but is informed by wider processes. We argue that this Late PPNA develops, with influences from elsewhere in the Levant, in particular the incorporation of naviform technology, into the distinctive MPPNB of southern Jordan and that very early MPPNB dates from Beidha and Shkarat Msaiaid support this local trajectory.

Sumio Fujii

Kanazawa University, Japan

Harrat Juhayra 202: Early PPNB Flint Assemblage in the Jafr Basin, Southern Jordan

Our long-term research project in southern Jordan aims to trace the process of pastoral nomadization that led to the far-reaching reorganization of the prehistoric society in the Near East. Towards this goal, we have investigated a dozen sites varying in both date and character from the M-LPPNB remote outposts such as Wadi Abu Tulayha to the EBA burial cairn fields such as Wadi Burma and Tal'at 'Ubayda. The series of research outcomes was recently synthesized in the form of the *Jafr chronology*, which has enabled us to outline the key episodes in a sequential way. However, the lack of information on pre-MPPNB sites makes it still incomplete.

Though still in progress, our recent excavation at Harrat Juhayra 202 has provided a specific dataset addressing this issue. The site included a ground-type masonry structure *c.* 6 m in diameter, where an EPPNB flint assemblage represented by Helwan points was recovered together with several basalt pestles and a limited amount of faunal remains. This paper discusses the techno-typology of the assemblage, especially the Helwan points, and sheds new light on the EPPNB culture in the southern Levant; the presence of which has been previously questioned.

Keywords: Harrat Juhayra, EPPNB, Helwan point, Jafr Basin, south Jordan

Christoph Purschwitz

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Socio-economic changes in flint production and consumption in the PPNB period of the Greater Petra Region

This presentation is the outcome of a Ph.D, which recently was completed at the Freie Universität Berlin (Purschwitz 2016). It presents the results of the chipped lithic analysis from four middle to late PPNB sites (Ba'ja, Basta, Beidha and Shkârat Msaied), which all are situated at the Greater Petra Region. Major changes in the organization of flint production and blank consumption are in evidence with the emergence of the large mega-sites during the late PPNB. An increasing number of bidirectional blade consuming households are opposed to few producing workshops, which operate beyond their own demand and produce on a regional supply level. Households which have restricted access to the late PPNB bidirectional blade network respond with self-supply strategies by using alternative blade technologies. This phenomenon or "technological dualism" between inter-site production and household consumption rises with increasing specialisation in crafts and comprises all levels of production from raw material procurement to exchange.

I argue that the emergence of the dualistic lithic economy (in the Greater Petra Region) is the result of changes in the network structure of households. While MPPNB sites of the Greater Petra Region are small and only seasonal used, LPPNB mega-sites can be huge and were permanently occupied by several hundreds to thousands of inhabitants. According to general network theory, the personal network (family, relatives, friends) of a MPPNB household is likely to be distributed over several more or less distant sites, while the personal network of a LPPNB household appears to be restricted to the mega-site itself. Additionally, it is likely that at mega-sites such as Basta or 'Ain Ghazal an increasing number of inhabitants did not share in the household personal networks and did not have social relations to each other. I expect that the lack of social control within the late PPNB mega-sites promoted profit-oriented thinking (negative reciprocity, surplus production) and created increasing social inequality.

Purschwitz, C. 2016, *The Lithic Economy of Flint during the Early Neolithic of the Greater Petra Region. Geological Availability, Procurement, Production, and Modes of Distribution of Flint from the Early to Late PPNB-Period*. Ph.D.-Thesis, Freie Universität Berlin. (in german).

SESSION 3 – LITHICS IN SOCIAL AND ECONOMIC CONTEXTS

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New Thoughts on Neolithisation at Boncuklu: An Obsidian Sourcing Perspective

This study engages with current debates concerning processes of Neolithisation (local developments, migrant farmers, ideational flow *inter alia*) through reference to the community of Boncuklu in the Konya Plain of central Anatolia (9th millennium cal BC). Here, recent excavations and related studies have documented a population of indigenous foragers who adopted small-scale cultivation and possibly experimented with animal herding alongside substantial traditional foraging practices.

These themes are discussed through reference to an obsidian sourcing study that sought to reconstruct the raw materials and modes of procurement / consumption attested at the site through a non-destructive elemental characterisation study using EDXRF.

The logic behind this study concerns the long-held notion that, following the arguments of Jacques Cauvin, an increased supra-regional circulation of Anatolian obsidian during the Early Holocene was partly initiated by increased exploitation of these resources by early Levantine/Mesopotamian farmers. It thus follows that the sources can be viewed as cosmopolitan arenas within which a network of social relations may have been constituted amongst disparate populations, some of which may have led to the spread/adoption of novel practices, not least reconfigured human: plant/animal relations.

Our analyses allow us to document which specific Anatolian sources were being exploited by the people of Boncuklu (and whether procurement was likely direct, or mediated by others), and how their raw material/technical choices fit into broader regional lithic traditions as an index of connectivity with others using these resources at the same time, as for example the community of Aşıklı Höyük and contemporaries in the northern and southern Levant.

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The Chipped Stone Evidence from the Early Neolithic site of Boncuklu Höyük, Turkey: Preliminary Findings

The transition from the Epipalaeolithic to Neolithic in Turkey was marked by significant economic and cultural transformations. Of particular interest is the emergence of phenomena such as cultivation and herding. The Central Anatolian site of Boncuklu Höyük is ideally situated to examine this transitional phase as it was occupied in the very earliest part of the Neolithic, and immediately precedes the nearby agricultural site of Çatalhöyük. We report on the lithic analysis conducted on the predominately obsidian assemblage from Boncuklu, and explore how the beginnings of the transition to cultivation and herding in the region are manifest in the chipped stone assemblage. The ongoing classification and quantitative analysis of this assemblage offers a chance to examine the technological complexity of this transitional site. The broad-spectrum diet at Boncuklu required complex and varied technological adaptations, which are visible through the stone tool assemblage. We offer new insights into manufacturing and subsistence activities at the site, with particular emphasis on the strategies of retooling, repurposing and recycling of stone tools owing to the raw material scarcity in the area. These technological adaptations can inform broader questions of social, cultural and economic transitions in the Neolithic of Turkey.

Çiler Altınbilek-Algöl, Nurcan Kayacan, and Mihriban Ozbasaran [Proceedings]
Istanbul University

**Contribution of obsidian studies to the social changes and the shift in use of space at Aşıklı Höyük –
Central Anatolia/Turkey**

The main goal of the Aşıklı Höyük Research Project is to document one of the earliest sedentary communities in Central Anatolia/Turkey. The on-going research at the site, carried on by an international team led by Istanbul University, showed that the site was first founded during the mid of the 9th mill BC, and was inhabited for more than 1000 years. Recent research at the site focuses on the social, technological and economic changes of the community through the uninterrupted sequence of a thousand years.

Excavations revealed a variety of obsidian assemblages in different contexts, such as knapping areas, indicating changes in use of space over time. Our paper aims to present selected examples of such finds and to discuss how they contribute to the already suggested shift in the use of space, as well as providing data for the interpretation of social changes in the community.

Semra Balcı, Nur Balkan-Ath [Proceedings]
University of Istanbul – Faculty of Letters, Prehistory Section

Obsidian Industry of Tepecik-Çiftlik Pre-Pottery Neolithic Period in Central Anatolia

Tepecik-Çiftlik is located in southwestern Capadocia. Excavations since 2000, displayed a continuous settlement from the Pre-pottery Neolithic Period till the Early Chalcolithic period. Tepecik-Çiftlik is one of the most important settlements that give information about these periods in this region. Obsidian was used extensively in the Tepecik chipped stone industry since the settlement is very near to the Central Anatolian obsidian sources. This paper presents an observation of the Tepecik-Çiftlik obsidian industry from the Pre-pottery Neolithic Period period. The obsidian finds are analysed with raw material separation, and with typological and technological approaches. Macroscopic analyses shows that obsidian was used from Göllüdağ (Kömürcü, Kayırlı) and Nenezi sources. Debris that was found at the site indicates that the obsidians were brought to site as blocks and knapped on site.

Güner Coşkunsu [*Proceedings*]
Mardin Artuklu University

Children's and Women's Participation in Prehistoric Stone Knapping Activities.

Lithic knapping techniques derive from the learned and sequential behavior of knappers. Through technological analysis, we can thus observe the behavioral and cultural patterns of prehistoric knappers. Moreover, several technological characteristics may convey the knappers' age, gender and the level of expertise.

Some specific features of knapping products and cores, such as impact marks, differ between those produced by the master and those of the apprentice or unskilled knappers. Hence, differences should be detectable in cores and blanks. Flint and obsidian lithic assemblages from the Late Pre-Pottery Neolithic, Early Pottery Neolithic and the transitional phase between these two (a.k.a. Final PPNB, PNNC or PPN-PN Transition) in the Near East offer an excellent opportunity to read fossilized behaviours of knappers in this manner.

I will elaborate this by focusing on several Near Eastern Neolithic sites, but particularly concentrating on Mezraa Teleilat in Urfa, Southeast Anatolia. My motivation is to seek evidence in prehistoric societies for two very important and active agents who are typically ignored by archaeologists, namely, children and women and their roles in stone knapping. Because, to my mind, they marked the above mentioned Neolithic times with their ample signatures in addition to household knapping activities, they are worthy of exploration in archaeological contexts.

24TH NOVEMBER

SESSION 1 - CYPRUS FOCUS

Alan H. Simmons

Department of Anthropology, University of Nevada

No Chipped Stone is an Island: A Reimagining of the Role of Early Cypriot Lithic Assemblages within the Neolithic World

For many years, Neolithic chipped stone assemblages in Cyprus were largely considered as expedient and unsophisticated. Indeed, these early views fed into the clearly incorrect concept of the Cypriot Neolithic being “retarded.” This perspective was fueled by the belief that the earliest clear evidence for humans in Cyprus dated to the relatively late (ca. 7000 cal BC) aceramic Khirokitia Culture. The past few decades, however, have dramatically challenged this perspective, and we now have complete chipped stone assemblages that span the late Epipaleolithic through the PPNA and PPNB up to the Khirokitia Culture. These show mainland similarities in both technology and typology, although they also clearly have an island imprint to them.

This contribution offers a comparison of chipped stone from three major sites representing three distinct phases: the Epipaleolithic Akrotiri Phase (Akrotiri *Aetokremnos*), the middle Cypro-PPNB phase (*Ais Giorkis*), and the Khirokitia Culture (Kholetria *Ortos*). All of these assemblages were analyzed using a consistent methodology, and all offer insights into early chipped stone usage on the island. The assemblage from *Ais Giorkis* is particularly important given its enormous size and mainland similarities. This presentation concludes with a summarization of the current state of knowledge on the early chipped stone of Cyprus, and offers suggestions for improving consistent analysis strategies. It also shows how the island must now be considered an integral part of the broader circum-Mediterranean Neolithic world rather than a footnote to it.

François Briois

Ehess, UMR TRACES Toulouse, France

**Introduction, adaptation and development of the first Pre Pottery Neolithic communities in Cyprus:
The contribution of lithic industries in the Amathus area**

The Amathus region is a vast territory located to the east of Limassol, in the south of Cyprus, between the foothills of the Troodos Mountains and the coastal hills. Intensive research based on the results of a survey, carried out as part of the “Neolithisation” mission, revealed a high density of Neolithic occupations in the heart of a region with abundant good quality flint resources. Two settlements, Shillourokambos, excavated between 1992 and 2004, and Klimonas, excavated since 2011, shed light on the first stages of the Neolithisation of Cyprus and its long-term development. The very abundant lithic assemblages found in chrono-stratigraphic position portray the evolution of lithic industries over more than two millennia. The first village communities were durably established at the site of Klimonas at the end of the 10th millennium BP. They produced a laminar industry and a PPNA type toolkit linked mainly to hunting activities and agricultural practices. The village was abandoned at around 8600 BP. After a hiatus of two centuries, the communities that founded the village of Shillourokambos introduced new technical practices to Cyprus, namely, bipolar debitage with predetermined blades intended for the fabrication of large projectile points. Good quality local flint was used for these productions, as well as some obsidian imported from Anatolia. This early Cypriot PPNB phase was followed by several other episodes of lithic transformation, resulting in the emergence of a very different techno-cultural method to those applied on the continent at the end of the 8th millennium.

Carole McCartney

Archaeological Research Unit, University of Cyprus

Lithic contexts at the site of Ayia Varvara Asprokremnos, evidence for specialisation and island-mainland interaction.

The site of Ayia Varvara Asprokremnos in central Cyprus, currently dated to the beginning of the 9th millennium BC (8,900-8,600 cal BC / 10, 749-10,579 cal BP), provides material evidence of late PPNA occupation. Unlike contemporary Ayios Tychonas Klimonas, however, Asprokremnos does not offer evidence of village settlement as predicted by the Neolithic island colonization model. Instead, the choice of site location, evidence for repeated abandonments and a focus on lithic and ochre processing, document the use of the site as a place for raw material exploitation rather than permanent habitation.

This presentation will provide an overview of the site location, contexts and preliminary sequence of abandonment events then outline the results of the examination of lithic samples from both primary and secondary lithic contexts that define the activities carried out at the site. Though this research is still at an early stage, both aspects provide a unique record of intensive and systematic raw material utilization that provokes questions about craft specialisation. In addition, the paucity of evidence for the use of the ochre materials processed at Asprokremnos, or elsewhere on the island, compels enquiry into potential interaction further afield between Cyprus and the Eastern Mediterranean mainland.

Laurence Astruc [*Proceedings*]
VEPMO, ArScan, UMR CNRS 7041, Nanterre

Khirokitia and the late aceramic neolithic in Cyprus: lithics in context

The late aceramic Neolithic of Cyprus is dated from the first half of the 7th to the middle of the 6th millennium cal. BC. This period is known from several sites located in all parts of the island. Among them is the ancient village of Khirokitia, in Larnaca district. It was discovered in 1934 by P. Dikaios, director of the Department of Antiquities. The discovery was immediately followed by soundings and excavations from 1936-1939 and again until 1946. The so-called Khirokitia Culture or Khirokitian was defined on the basis of these investigations. From 1977 to 2009, new excavations conducted by Alain and Odile Le Brun have produced a lot of new data and led not only to the establishment of a detailed stratigraphy, but to a complete re-interpretation of the village itself.

The aim of this presentation is to show the ways that the study of lithic artefacts from the acquisition of raw material to the discard of the tools, and the contextualization of the results, notably with the help of the spatial analysis, is central to the reappraisal of the later phase of this insular Aceramic Neolithic.

Laurence Astruc¹ and Sylvie Philibert² [Proceedings]

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Lithic use-wear analysis in Cyprus: an assessment for the aceramic Neolithic

Eric Coqueugnot published in 1984 the first use-wear analysis on Cypriot chipped stone artefacts using a sample of lithics from Khirokitia. Since then, several researchers (S. Philibert and L. Astruc) have developed new approaches in Klimonas, Shillourokambos and Khirokitia. Thus, we have characterized different assemblages dated from the Early and Middle phases of the pre-ceramic Neolithic and the recent aceramic Neolithic.

We will present here a short evocation of the available data. According to our research aims and post-depositional damages, we are adopting different sampling strategies for the analysis of both flint and obsidian artefacts. All of these strategies are complementary and lead to various kinds of results. These results are then fully integrated with other archaeological data (chronological seriation, botanical and fauna remains, technological data collected on diverse kinds of artifacts, spatial analysis). They give, in this way, diverse additional information enhancing interpretations including; of the reconstruction of diverse activities, site function, the role of lithics in subsistence activities, the level of specialisation in craftsmanship, and the spatial organization of daily life. From a chronological point of view, it is clear that such studies can determine whether technological evolutions of the assemblages are due to the transformation of functional needs and/or socio-cultural changes. Last but not least, the future development of use-wear analysis will allow comparisons between the developments of technical traditions in the mainland and in the island of Cyprus.

Andrew McCarthy
CAARI

Intercommunity feasting in the Neolithic: a stone lined pit oven from Prasteio *Mesorotsos*, Cyprus

A large hemispherical stone-lined pit was found in sealed pre-ceramic deposits at the site of Prasteio *Mesorotsos* in the west of Cyprus. The pit's igneous lining-stones showed signs of *in situ* burning, and the layers of igneous stones found filling the pit showed evidence of heat-cracking as well. The pit was finally abandoned after having been filled to the top with ash, stones and little else. Our interpretation quickly turned toward this being a pit oven, but it was huge by any measure, c.3m diameter and more than 1m deep. In the Neolithic period, it would be hard to imagine any community larger than a few score individuals of regularly using this substantial stone feature. If it was an oven, it was not for a simple daily meal, but was likely for inter-community feasting. In 2015 and 2016 experimental archaeology projects were conducted to replicate this pit oven in order to test whether it was viable for Neolithic inter-community feasting as suspected. If the replica worked as an oven and if it was possible to feed many more than we would expect in a single Neolithic community, then it was likely that it was built for large-scale, probably seasonal gatherings of groups from across the landscape. This paper will describe the archaeological evidence for the pit oven and provide a discussion of the experimental work conducted to test its function.

SESSION 2 - CYPRUS FOCUS

Jerome Robitalle

Ecoles des Hautes Etudes en Science Sociales

Ground Stone Tools from PPNA Cyprus: Ayios Tychonas Klimonas

This study analyzes and compares macro-lithic tool assemblages, dating to the PPNA, from several sites of the Near East. It also examines the macro-lithic tools from Ayios-Tychonas Klimonas, analyses the technology and everyday life activities at this site, and contextualizes this site within the PPNA. This analysis explores existing correlations between specific types of macro-lithic tools and other elements of the technological system, for example, the use raw materials, the context of use, and the final deposition of tools. A primary functional analysis is later performed to define the function of tools. Such an approach, however, is incomplete unless it reconstructs the cycles of the tools utility, taking into account the functions for which the tools were originally made, their possible reuse, and their final disposal or deposition. This exploration shows the 'chaînes opératoires' of transformation and re-use within which the tools were integrated. Lastly, it "reinserts" the tools in their archaeological context of discovery, and examines them within that final context of deposition or discard and offers an additional layer of analysis and interest. General initial results discuss the status of the tools within the tool management system of the PPNA. The analysis of adjacent activities, other than grinding grain, allows people to understand the equipment used at Klimonas from a social perspective and sheds light onto the social organisation of the community which occupied this site. With this approach, this study will contribute to knowledge of stone tools and understanding of their status in the lives of the first farmers of Cyprus, within a PPNA context.

Renee Kolvet

Bureau of Reclamation, Lake Havasu, Arizona, USA

Ground stone artifacts from *Ais Giorkis*, an unusual upland Cypro-PPNB settlement

While ground stone from Neolithic assemblages has long been assumed to have been nondescript, the ground stone assemblages often contain elaborate vessels. These are best known from the aceramic Khirokitia Culture, long assumed to have been the earliest human presence on the island. More recent research, however, has demonstrated a much earlier Neolithic, one that is contemporary with the mainland. This includes both PPNA and PPNB phases, and the chipped stone from these sites is more sophisticated than that from the Khirokitia Culture. Far less is known, however, about the ground stone assemblages.

This contribution presents a summary of the large ground stone assemblage from *Ais Giorkis*, a middle Cypro-PPNB settlement located in the foothills of the Troodos Mountains. Unlike contemporary sites, *Ais Giorkis* stands out because of its upland rather than coastal location, and its huge faunal and chipped stone assemblages. It also contains a large ground stone assemblage. This includes an array of types that likely reflect several activities. Included in the assemblage are large and elaborate, but fragmentary vessels. These could represent specialized activities, such as feasting, due to their size. This presentation summarizes the ground stone from *Ais Giorkis*, and offers various interpretative scenarios.

Theodora Moutsiou

Archaeological Research Unit, University of Cyprus

Social Networking and Raw Material Selectivity in Early Prehistoric Mediterranean Seascapes: The European Programme PRENET

This paper presents the initial findings of a two-year research programme that investigates the extent and directions of social communication in the early prehistory of the Eastern Mediterranean seascape – special focus on Cyprus – and the cognitive/behavioural factors behind the observed patterns. Based on the premise that human behaviour can be inferred through the movement of raw materials, the project focuses on the rare raw materials found in lithic assemblages (along with stone tools and beads) of Epipalaeolithic and Aceramic Neolithic Cypriot sites to address a) the scale/direction of human interactions in the area of concern, and b) the reasons behind the choice of particular raw materials over other available options. The work so far demonstrates that obsidian, carnelian and picrolite are the three rare rocks that found their way to early prehistoric Cypriot assemblages. Interestingly, two of them reached the island via a sea-crossing, whereas picrolite, albeit insular, is a rare resource. More importantly, these three raw materials exhibit visual characteristics that set them apart from other locally available lithic sources. This begs the question, then, as to whether an ‘aesthetic sense’ was at play behind prehistoric raw material choices rather than factors of a purely functional or economic nature.

POSTERS

- **J erome Robitalle**

Ecoles des Hautes Etudes en Science Sociales

Retouchoir/Compressor made of Stone

At Klimonas, a strong representation of the stone retouchoir/compressor in the domestic assemblages is observed, while this is lacking from PPNA sites in the Middle East. Because of the absence of deer antlers in PPNA Cyprus, one could adapt a form of a small retouchoir/compressor made of stone for use, similar to those that exist at Klimonas.

The term retouchoir/compressor is employed here to explain the use of the tool in the activities of flint manufacture and retouching. It refers to a tool having been used as a puncture percuteur or as a compressor or both. A series of experiments have been carried out and the stigma on the tool have been studied in order to verify if this tool served as a retouchoir/compressor within the chipped stone industries, and at what stage it enters the cha ne op ratoire.

- **Carole McCartney¹ and Nikos Efstratiou²**

¹*Archaeological Research Unit, University of Cyprus*

²*The University of Thessaloniki*

The lithic assemblages of Vretcha-Roudias an upland early prehistoric site in Cyprus.

The site of Vretcha-Roudias rests on the upper reaches of the Xeros River in western Cyprus, providing a unique perspective of late Pleistocene/early Holocene activity away from the coast. The focus of research led by Nikos Efstratiou of Thessaloniki University, Roudias provides a deep stratigraphy with clearly separated episodes of occupation. Geomorphological analysis shows that upper colluvium sediments seal a grey organic rich layer with a dense stone layer laid at its base. Below the latter, an older reddish-brown layer associated with a well preserved Palaeosol (related to Maturity stage 3 Mediterranean palaeosols - 10-15 kyr) contains an earlier lithic assemblage. Though these assemblages have yet to be dated by radiocarbon, the colluvium below which they are stratified shows clear LPPNB characteristics comparable to the assemblages from Tenta (periods 4-2) along the southern coast or Ayis Yeorkis situated in an upland position like Roudias.

Differences in the lithic assemblages belonging to Roudias will be documented according to typological and technical characteristics. The cha nes op ratoires defined by these observations will be contrasted with other early Cypriot materials and evaluated according to the prevailing colonization models currently used to explain late Pleistocene/early Holocene Cyprus.

- **Carole McCartney¹ and Ian Todd²**

¹*Archaeological Research Unit, University of Cyprus*

²*The Vasilikos Valley Project, Cyprus*

The ‘lithic’ deconstruction of Tenta and reassignment of phases 5 – 2 to the PPN

The excavation of the Aceramic Neolithic site of Kalavassos-Tenta (hereafter Tenta) occurred when long held assumptions and the evidence record restricted the Cypriot Aceramic Neolithic to the 6th millennia BC,

a late phase now termed the Khirokitian. With the excavations conducted by Dikaios at Khirokitia in the 1950-60's, the site became not only the type site of the Cypriot Aceramic Neolithic, but also a boundary that restricted the interpretation at other sites. Thus it was that excavations in the 1970-80's at Tenta were constrained by the prevailing interpretive model of the time despite contradictory evidence, not the least of which were a number of radiocarbon dates from *in situ* contexts assigned to the 8th and 7th millennia BC (Todd 2001: 100-102). Though these dates were criticised as being 'too early', Todd (1987, 174-178) included them in the first volume of the excavation report and, importantly, left the door open for their acceptance on the basis of new evidence. New evidence came in two forms, namely, the excavations at Shillourokambos and Mylouthkia that substantiated the previously dismissed early Tenta dates, and secondly, the detailed analysis of the Tenta (chipped) lithic assemblage.

The effects of recent evidence on the interpretation of the Neolithic colonization of Cyprus generally and the occupations of the site of Tenta specifically have been dramatic. This presentation will provide detail of the chronology, contexts and lithic evidence belonging to periods 5 to 1 at the site of Tenta. This evidence confirms an initial occupation during the E/MPPNB (period 5), the main LPPNB phase of occupation (periods 4 to 2) and the limited and heavily eroded Khirokitian phase (period 1). This revised chronology places the principal time of occupation at Tenta firmly in the LPPNB and overruling the earlier assignment of the site to the Khirokitian.

I. Todd (1987) *Vasilikos Valley Project 6. Excavations at Kalavassos-Tenta I*, Studies in Mediterranean Archaeology 71:6. Paul Åströms Förlag, Göteborg.

I. Todd (2001) "Kalavassos-Tenta Revised", Pp. 95-107 in S. Swiny (ed.) *The Earliest Prehistory of Cyprus: From Colonization to Exploitation*, Cyprus American Archaeological Research Institute Monograph Series, vol. 2, American Schools of Oriental Research, Boston.

- **Carole McCartney¹ and Patricia Anderson²**

¹*Archaeological Research Unit, University of Cyprus*

²*CNRS, CEPAM, UMR 7234, Nice*

Accessing the origins of threshing in Cyprus

An important means of examining agriculture is to focus on the appearance of agricultural techniques. Here we examine data showing the presence of the threshing sledge in Syria and Cyprus. This is based on ethnoarchaeological studies of threshing tools and threshed plants in villages which still use the threshing sledge, in Syria, carried out between 1994 and 2004, and in Northwestern Tunisia, between 2005 and 2010. The threshing sledge as described in Bronze Age texts from Iraq, and data from the archaeological tools and from ethnography, were the basis for experiments with a reconstructed Bronze Age threshing sledge thought to be relevant also for the Neolithic and Chalcolithic, and compared with sickle-harvesting each year between 1994 and 2016. 2 sets of data have emerged for showing threshing sledge use: characteristic but very slow- forming traces on blades, and special cut patterns of phytoliths produced by the sledge blades as the plant material turns on threshing floors. Neither data is found for other kinds of threshing or for harvesting. Data for threshing during the Early Bronze Age is abundant in northern Syria, mostly based on microwear patterns on blades but also on phytolith analysis, and there is growing data on use of the threshing sledge from blades and phytoliths found in Chalcolithic and late PPNB sites in Syria.

The question of the relationship of the use of the threshing sledge in Syria to that in nearby Cyprus, can address questions of mechanisms of possible diffusion or independent development of techniques. Numerous studies have been done focusing on the historic use of *Dhoukani* threshing boards in Cyprus

using both functional and ethnographic analyses. Based on familiarity with the Cypriot threshing sledge and functional analyses used to distinguish threshing from sickle polishes on archaeological samples in the Levant done by Anderson, we present here an extended look at the types of polish found on glossed tools throughout prehistoric Cyprus. The characteristics used to distinguish sickle gloss from threshing gloss are defined and the role that Cypriot *Dhoukani* 'teeth' have played in functional analyses is examined.

Evidence from 90 artefacts gathered from sampling 14 assemblages dating from the Late PPNA through the Late Bronze (Late Cypriot) periods are presented. This broad sample also encompasses considerable variety in terms of site type and location. Variability in terms of chert type is considered as well as issues of polish development having an effect on the results of this analysis. The evidence present here shows the presence of sickling polishes from the earliest Neolithic, which persists through the Late Bronze period. As in Syria, the development of threshing in Cyprus appears to be initiated during the LPPNB and to have been significant through the Chalcolithic. Unlike Syria however, in Cyprus Early and Late Bronze Age samples are less equivocal, perhaps a function of sample size, but continue to show that both harvesting and threshing polishes were present. These results contribute to the investigation of the development of agriculture on Cyprus as well as the wider Eastern Mediterranean.

• **Shaun Murphy, Peter Bikoulis and Sarah T. Stewart**

University of Toronto

Chert Sources, Stone Tool Scatters and Prehistoric Land Use in Cyprus

We use GIS spatial and predictive models to examine how existing environmental and cultural data from survey in central Cyprus can support assumptions about sites, artifacts and the landscape around them. Specifically, these models yield new information about those relationships, where yet unknown sites may be found, and how early settlers explored this region, thus creating a better understanding of place. Our data focuses on numerous chert sources, stone tool scatters and sites located along the Pillow Lava and sedimentary interface from the village of Perachorio south to Ayia Anna.

SESSION 3- TECHNOLOGY AND SPECIALISATION

Maya Oron

Israel Antiquities Authority

The lithic assemblage from the Flint Quarry in Mitzpe Ramon, southern Israel

During November 2015 a salvage excavation was conducted at a flint quarry site from Mitzpe Ramon in the Negev desert, southern Israel. The site is located in the northwest corner of the town of Mitzpe Ramon, on a moderate spur built of sedimentary rocks with an outcrop of fine grained flint lenses from the Zafit Cenomanian formation. The excavation took place in three excavation areas where different flint assemblages were uncovered. It revealed that flint quarrying and knapping activity took place at the site over several archaeological periods, from the Mousterian period through proto-historic times. The best preserved finds, however, were from area A, which were associated with a blade production industry that may be dated to the Neolithic period, and will be dealt with in this work.

Area A was located at the bottom of the spur's north-east slope, where the excavation revealed a large pile of angular limestone rocks in association with a rich assemblage of knapped flint. The pile of stones is the waste of systematic quarrying conducted by cutting into the limestone layer, up to 0.5 m thick, in order to reach the flint lenses laying in its bottom. The knapped lithic assemblage is mostly comprised of waste products and cores, almost without tools or target items, and shows both unidirectional and bi-directional blade production. The ongoing study of the material shows a great potential for a detailed technological analysis and refitting work. The good preservation state of the quarry, including quarrying waste, natural *in situ* lenses and knapped lithic assemblage, allows a rare glimpse into quarrying processes during the period, and holds also radiometric dating possibilities.

Imad Alhussain

Independent Researcher, France

Les débitages laminaires unipolaires au Levant néolithique

Il est courant d'utiliser des termes tels que : simple, frustré, expédiant, rapide, sans savoir-faire particulier... pour qualifier certaines industries lithiques. Pour Les débitages laminaires du Néolithique du Proche-Orient, les critères de distinction et de qualification sont parfois aussi arbitraires et subjectifs estimant ainsi que seul le débitage laminaire prédéterminé peut être « jugé » comme étant un débitage complexe. Ce type de raisonnement et d'appréciation se fit à des apparences et incite à l'interrogation sur la notion même de débitage en tant que système technique et son éventuelle évolution. Or, penser un bloc de matière première, exploité sommairement ou intégralement, comme un volume ayant une capacité évolutive devrait immédiatement modifier notre perception sur l'apparente simplicité. De la même manière, s'il est légitime de comparer des débitages entre eux, il est hasardeux d'émettre des jugements de valeurs reposant sur des conceptions différentes. Ces notions et réflexions peuvent aussi être appliquées aux modes de production.

Ainsi, en analysant les débitages unipolaires sur un plan évolutif, deux systèmes se distinguent : un débitage strictement unipolaire et un débitage à gestion unipolaire. Les débitages à gestion unipolaire peuvent être lamellaires ou laminaires et leur distinction posent un réel problème d'ordre technologique. C'est à travers ces questionnements que nous analysons le matériel du site de Wadi Tumbaq 3 dans le massif du Bal'as en nous interrogeons et nous interrogeons sur les transformations des industries lithiques entre l'épipaléolithique et le néolithique du Levant

Hatem Harrok¹ and Frédéric Abbes²

¹*Qatar Museum Authority, Doha*

²*Maison de l'Orient et de la Méditerranée*

Taille par pression avec bras de levier

Au Proche-Orient le « phénomène des grandes lames » marque les industries de la fin du Néolithique et du début de l'Âge du Bronze. Les études lithiques les concernant sont largement tributaires des recherches expérimentales sur la pression, le bras de levier ou encore le punch. C'est devant l'impossibilité technique de produire ces lames avec des béquilles expérimentales que le bras de levier a été mis au point et largement utilisé. Le punch, si son emploi est fortement supposé pour certaines productions, ne semblait pas convenir pour reproduire la régularité de certaines productions archéologiques. Actuellement les expérimentateurs avancent généralement l'hypothèse de nucléus en silex ou en obsidienne doté de mise en forme complexe et le recours à un levier de grande dimension (autours de 2 m voire plus). Les expérimentations que nous avons menées nous montrent qu'un bras de levier ne dépassant pas 1 m de long était suffisant pour la production de ces grandes lames. De même, que le recours à des mises formes simples ne posait pas de problème majeur pour leur production en série régulière. Ce nouveau type de bras de levier s'avère également très efficace pour la production de lames plus réduites. Nos expérimentations indiquent également que les débitages des lames (qualité, quantité, stigmates) relevaient d'un choix du tailleur. Le débitage peut être « rapide » ou « soigné » à l'image des débitages pratiqués à la percussion directe. Les séries expérimentales obtenues par cette méthode sur différentes qualités de silex posent maintenant un vrai problème d'identification au regard des débitages obtenus au punch. Ces différents résultats expérimentaux soulèvent de nouvelles questions d'ordre technologiques et historiques sur l'identification des techniques et méthodes, sur l'interprétation des productions et sur le statut des tailleurs

Frédéric Abbès

CNRS - Maison de l'Orient et de la Méditerranée

La production de lamelle et de microlithe durant le PPNA à travers les sites du Bal'as, (Syrie)

Lorsqu'au IXe millénaire la culture PPNA se développe dans le nord de la vallée de l'Euphrate en Syrie, ses racines sont manifestement locales, mais aussi intimement liées aux événements du sud-est de la Turquie. Les industries lithiques de sites comme Mureybet, Cheikh Hassan, Jerf El Ahmar ou encore de Tell Abr 3 dérivent directement d'un substrat natoufien où les industries caractéristiques sont réalisées sur des lamelles ou sur des petites lames. L'industrie PPNA est quant à elle foncièrement laminaire. C'est la période où s'élaborent les technologies bipolaires et où une distinction nette entre débitage unipolaire et débitage bipolaire prend naissance. Ce sont ces productions de lame et les industries qui y sont attachées qui caractérisent le PPNA. Le développement de la recherche dans d'autres aires géographiques ; Syrie centrale, zones steppiques nous montre un aspect différent du milieu technique PPNA. Dans les montagnes du Bal'as des villages construits et des campements PPNA ont livré des industries où la composante lamellaire est largement dominante. Les populations de cette région continuent une tradition technique directement héritée des périodes précédentes. Les outillages sont faits sur des lamelles et la tradition des segments de cercle natoufiens se perpétue. Pour autant de nombreuses preuves de contact entre cette région et la vallée de l'Euphrate sont présentes. À l'évidence la néolithisation dès son origine affecte différemment les populations du Levant.

Mohsen Zeidi and Nicholas Conard

Department of Early Prehistory and Quaternary Ecology and Senckenberg Center for Human Evolution and Paleoenvironment, University of Tübingen, Germany

Techno-typology of Microliths at the Aceramic Neolithic site of Chogha Golan, Western Iran

In 2009 and 2010 members of the Tübingen-Iranian Stone Age Research Project excavated at Chogha Golan in the foothills of the Zagros Mountains in western Iran. These excavations revealed a series of occupations from an Aceramic Neolithic village with an economy based on hunting, collecting and cultivation, in the nearby hills and river valley. Our team documented a sequence of exclusively Aceramic Neolithic horizons covering a period of about two thousand years (11,700–9,600 cal. BP). Excavations at Chogha Golan produced rich assemblages of organic and inorganic remains. Chipped stone artifacts are the most common cultural material found at the site. Using macroscopic and microscopic approaches, we have studied about 40,000 stone artifacts. In this paper we examine the technological organization and morphological characteristics of the microliths produced at the site.

Ron Shimelmitz

Zinmam Institute of Archaeology, University of Haifa

Commoditization and Fragmented Solidarity the Late-Prehistoric Communities of the Near East

This paper strives to portray the roots of commoditization more than 10,000 years ago, and its effects on community structure. Using variation in lithic technologies and contextual studies, I will explore the rise of commoditization in the Levant and how it is intimately connected with the emergence of craft specialisation. My focus will be on the organization of production and the distribution of products, which provide ideal venues for investigating the relevant social and economic processes. Tracking the increasing production of commodities and their effect on the social structure will be performed by examining changes in stone tool manufacture, circulation and use in the Levant from the emergence of agriculture and sedentary communities during the Pre-Pottery Neolithic period to the rise of urban societies in the Early Bronze Age (11,500-4,500 years ago).

25TH NOVEMBER

SESSION 1 – AGRICULTURAL PRACTICES AND USE-WEAR

Itay Abadi and Leore Grosman
The Hebrew University of Jerusalem

Sickle Blade Technology in the Natufian-Early Neolithic Transition

Traditionally, in the EpiPaleolithic and the Neolithic periods, a typological straightforward approach was adopted for "monitoring" group style (i.e. group identity). This approach examines the variability in the production technique and the shape of formal complex (hafted) tools (e.g., microlithic tools, sickle blades, arrowheads etc.). By grouping assemblages over time and space, researchers were able to define cultural groups in the Levant. This type of identification is crucial for understanding the dynamics of the social changes in a given area.

In the Natufian lithic assemblages, two types of tools are suitable for these investigations: the microliths (especially the geometric) and the sickle blades. However, only the microlithic tools were subject for detailed studies to date, yet, in contrast, the macrolithic nature of the sickle blade enables the characterization of the blank and not only its shape or retouch.

We present our results from a case study that examined the production of sickles blades during the Natufian-Neolithic transition in the Southern Levant. Detailed analysis was conducted on the assemblages retrieved from four Late Natufian sites (ranging from 13,700 to 12,000 cal. BP). We use attribute analysis for monitoring variability in blank production and style.

We will highlight three general issues following our results: the chronological stages in the Late Natufian, the tempo of these transitions and its implication to the Natufian-Neolithic transition.

Lena Brailovsky-Rokser & A. Nigel Goring-Morris

Hebrew University of Jerusalem

The PPNB sickle blades from Galilee, Israel: typo-chronological and stylistic analysis as a key for understanding ancient agricultural practices and social traditions

Few detailed techno-typological studies of Neolithic sickle blades have been conducted in the Levant going beyond general chronological trends or use-wear studies. Our study focuses on the stylistic and techno-technological analysis of sickle blades from four Pre-Pottery Neolithic B assemblages from a restricted area in the Mediterranean zone, namely Galilee, in the southern Levant.

The sites investigated include the PPNB cult/mortuary site of Kfar HaHoresh as well as contemporary PPNB habitation sites in the region. The sickle blade assemblage (>3,000 items) from Kfar HaHoresh was analysed according to stratigraphic phase, i.e. EPPNB, MPPNB and LPPNB. The results were compared with smaller assemblages deriving from the settlement sites of Yiftah'el, Mishmar HaEmeq and Horvat Galil.

The results demonstrated several chronological trends during the course of the PPNB relating to raw material choices as well as typological and stylistic attributes. While these trends cross-cut site function, other attributes appear to relate to the role of the specific site, i.e. cult area, workshop, habitation and combinations thereof. The results contribute to the understanding of sickle blade uses and life-histories as well as insights concerning cultural connections based on stylistic choices and, in general, early agricultural practices.

Osamu Maeda¹, Leilani Lucas², Fabio Silva², Ken-ichi Tanno³, Dorian Q. Fuller²

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² Institute of Archaeology, University College London, UK

³ Faculty of Agriculture, Yamaguchi University, Japan

Use of sickle blades and cereal crops in the Fertile Crescent: a quantitative approach

This paper examines large-scale quantitative data on the use of sickle blades and cereal crops throughout the Neolithic period across the Levant and Eastern Fertile Crescent. A common conception is that the use of sickle blades reflects, or even promotes, the development of the early cultivation of cereals. A fair number of studies, ranging from typological ones to use-wear analyses, have contributed to the issue of sickle blades and cereal cultivation. However, oddly enough, virtually no previous studies on sickle blades have involved the appropriate analyses of archaeobotanical data, which should be directly compared with the use of sickle blades.

This paper pulls together a comprehensive dataset of sickle blades and archaeobotanical evidence between 12,000 and 5,000 cal. BC. We have collected quantitative evidence of flint/chert sickle blades from 277 sites/phases and an archaeobotanical database of wheats and barley from 65 sites/phases. The results on a regional level show a strong correlation between the increasing use of sickle blades and the increasing reliance on cereal crops; however, at the same time, they indicate adiversity between individual sites, suggesting that it is not a one-to-one, cause-and-effect correlation. In addition, our results also demonstrate a disconnection between sickle harvesting and morphological evolution of non-shattering (domestic-type) cereals, contrary to what has often been proposed. Furthermore, this quantitative comparison clearly shows that, while the slow co-increase of sickle blades and cereal crops over a few thousand years supports the protracted development of agricultural practice, its trajectory is varied across regions within the Near East, particularly between the Levant and Eastern Fertile Crescent.

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Investigating the Process of Cereal Domestication through Texture Analysis of Sickle Gloss

The origins of agriculture in the Near East are currently studied through two domains of research: Archaeobotany and Genetic analysis of extant plant populations. In our research, we put forward a new method for shedding light on this topic: the texture quantification of sickle gloss by confocal microscopy, discriminating sickle gloss from harvesting domestic, wild cultivated, wild gathered (in natural stands) cereals and reeds. This innovative approach represents a major advance in the methodology of use-wear analysis of prehistoric tools, which can be now based on a quantitative methodology. The application of our method to a collection of archaeological sickles suggests that: 1. Cereals were first cultivated in the Middle Euphrates during the Younger Dryas (13th millennium BP). 2. Pre-domestication cultivation took place during two millennia before the first domestic phenotypes appeared around 10.500 BP, supporting and extending the protracted model of cereal domestication. 3. This was an *in situ* and continuous process in the Middle Euphrates, pointing to this area as one zone where agriculture originated. 4. The harvesting of cereals in natural stands persisted up to the 10th millennium BP, suggesting the occasional collection from the wild at times of crop failure. This offers a mechanism for hybridization between wild and semi-domesticated cereal populations, which would explain the long temporal extension of the process of domestication after the first cultivation experiments. In this paper, we extend our previous analysis to some sites located in the Middle Euphrates, showing that the rhythm towards cereal domestication was relatively uneven in the different sites of this region, and in southern Levant, showing that harvesting of ripe/domestic cereals was already present in that region during the MPPNB.

Fiona Pichon [*Proceedings*]
Paris-Sorbonne University

Use-Wear Analysis of the Stone Tools from Dja'de-el-Mughara (Syria): Technical Activities at the EPPNB through Cases Studies of Typological Groups.

The PPNA and PPNB periods (9500-6500 cal. B.C.) mark the beginning of agriculture in the Near East: hunting and gathering were progressively replaced by plant cultivation and animal husbandry as a new form of subsistence. This change can be observed at the site of Dja'de-el-Mughara, in Northern Syria and excavated by E. Coqueugniot, which yielded a continuous stratigraphy from the late PPNA (9310 cal. B.C.) to the early PPNB (8290 cal. B.C.). This site contributes to our understanding of the evolution of technical activities, particularly agricultural practices during this period. Regarding that specific context, a key research direction to improve our knowledge of major technical and economic changes occurring in that crucial period is the functional study of the tools used by the inhabitants.

This contribution presents some preliminary results of functional analysis of different typological groups from Dja'de. The aim of the study is to document the activities made at one of the earliest sedentary communities. The comparison of the technological, typological and functional data allows identification of some of the technical choices made by the villagers and leads to discussion about the fundamental question about links between typology and function. In the end, the comparison of our results with data from the other analyses made on the site (i.e. archaeobotany, anthracology, architecture, beads) will enable us to propose some reconstructions about the operating sequences of working mineral, vegetal and animal materials. Putting our results in perspective at a regional level will provide some elements about the evolution of the Neolithic technical activities.

SESSION 2 – SPECIAL ITEMS

Kazuyoshi Nagaya

Kanazawa University

Arrowhead Manufacturing Technology in the PPNB Jafr Basin, Southern Jordan.

Wadi Abu Tulayha and Jabal Juhayla are small-scale Neolithic settlements in the Jafr Basin in southern Jordan, dated to the middle-late PPNB period. A series of excavations at the two sites have yielded a number of chipped stone artefacts principally represented by several types of arrowheads. While these are dominated by Jericho, Byblos or Amuq points, there are a certain number of arrowheads manufactured from poorly made blanks, *i.e.* irregular naviform blades showing an asymmetric planner shape, which causes a difficulty in applying them to the existing arrowhead typology.

This paper will deal with a refitted naviform core and blades found from Wadi Abu Tulayha and arrowheads and their by-products from Jabal Juhayla, and will discuss a regional tradition of arrowhead manufacturing technology in Southern Jordan.

Dana Shaham and Leore Grosman

Institute of Archaeology, The Hebrew University of Jerusalem

Engraved stones from NEG II – portraying a local style, forming cultural links

Nahal Ein-Gev II (NEG II) is a Late Natufian site (ca. 12,000 years ago) next to the Sea of Galilee, Israel. Recent excavations revealed thick archaeological deposits, architectural remains with multiple occupation sub-phases, burials, rich chipped stone and fauna assemblages, bone tools, a ground stone industry, art manifestations and other material remains. Together, the finds reflect a sedentary community living in a large village. The data obtained suggest that apparently sedentary populations of the Early Natufian did not revert back to a nomadic way of life in the Late Natufian in the Jordan Valley as generalized before. Additionally, although the NEG II lithic tool kit lacks the attributes typical of the succeeding PPNA, the artistic style is more closely related to the early PPNA world, while clearly rooted in Early Natufian traditions.

We will present an aspect of this phenomenon, as observed on a group of engraved stones from NEG II. The description of the incised geometrical patterns is based on methods derived from the discipline of *art-history*. The comparative approach for the study of these art-pieces reveals their artistic qualities; both, their inherent specific attributes as well as shared characters. Accordingly, we find three style-components: (1) local (site-specific) characters, (2) several artistic qualities known from the Early Natufian art traditions and (3) some qualities which will be further developed in the following PPNA decorative schemes.

The comparative analysis of these examples suggests a number of 'style sequences' from Early Natufian precursors through the 'art' of NEG II towards that of the PPNA. Interestingly, the nature of these trends is varied, i.e., different style sequences can be traced, and they seem to reflect different 'directions' (in terms of artistic style). One observed trend is from a less formal to a more formal decorative approach, while another style sequence shows a trend from more complex and dense composition in the Early Natufian towards a simplification of similar compositions on incised stones from the PPNA. Apparently, we can infer several style sequences, which also portray geographic aspects regarding areas and sub-regions of the Levant. Thus, it is possible to describe artistic phenomena within their cultural context in time and place. Two faces of an engraved limestone object, NEG II 2012 Cat. No. A/0008, Area A, sq. RP40a, 57*38*24 mm. (Photo by Gabi Laron).

Daniella E. Bar-Yosef Mayer¹ and Iris Groman-Yaroslavski²

¹ Department of Zoology and The Steinhardt Museum of Natural History, Tel Aviv

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Carnelian Bead Analysis from Nahal Hemar Cave, Israel

Nahal Hemar Cave, a Middle Pre-Pottery Neolithic B site in the Judean Desert, yielded 33 stone beads, as well as beads made of plaster, wood and shell. Two of the stone beads were made of carnelian, the hardest material in this group. Use-wear analysis revealed the manufacturing procedure that corresponds to genuine lapidary technologies of contemporary traditional societies, especially in the Indus valley. Based on ethnographic observations combined with experiments in working carnelian, wear patterns were interpreted to be produced by a multi-stage manufacturing sequence that began with heating the raw material followed by abrasion against varying abrasion surfaces, drilling probably with a pump drill equipped with a splinter set into a rod and finally, tumbling. These beads are an early example of carnelian lapidary technology with roots from over 9,000 years ago that may have originated in the northern Levant and spread from there to other regions of Eurasia.

Hala Alarashi

CNRS, CEPAM, UMR 7234, Nice

The PPNB hard stone bead technologies in Northern Mesopotamia: or how craft specialisation triggers socio-cultural changes

The use of hard stones for bead manufacturing is attested since the early PPNA in Northern Mesopotamia. None of these hard stones, however, include siliceous knappable rocks. Indeed, the latter materials appeared only during the PPNB for this kind of artifact corresponding with the development of the first farming communities and the intensification of long-distance networks of circulation in the Near East.

This paper focuses on the technological advances occurring during the PPNB in Northern Mesopotamia that enabled bead manufacturing from hard but fragile siliceous rocks such as carnelian, agate, quartz crystal rock, obsidian and amethyst. It shows, in particular, the extraordinary technological mastery needed to create an emblematic bead type, the so-called “butterfly bead”, and points to the emergence of stone bead craft specialisation during the Middle and Late PPNB. Finally, it argues that this technological shift caused important changes in the social organization and probably triggered the birth of new socio-cultural status related to bead-makers.

David Eitam

Independent Researcher, Israel

Feeding the Dead with Bread in a Personal Dish in the Late Natufian: Boulder Pipe Mortar and Rock Cut Box-Like Basin in Mortuary Centexs

Two rock-cut utensils, among dozens Natufian installations, have been recognized as ritual devices due to their locations and contexts of recovery, an exclusive Late Natufian pierced boulder narrow conical mortar ("pipe mortar") and a box-shaped small basin. Most of the narrow conical mortars (n=222) were discovered in domestic contexts and used for producing wild-barley groats and flour for bread, as demonstrated in experimental studies. Fourteen boulder narrow conical mortars left intentionally pierced (contra the more often repaired domesticate mortars) were found in six, possibly seven, Late Natufian burial complexes (Jabel Saai'de 2, el-Wad Cave, Nahal Oren Terrace; Raqefet Cave, Jericho, and perhaps Huzuq Musa). We suggest that the last were metaphorically feeding the dead with barley bread, as well as being monolithic stones in graves, reflecting some Natufian belief in the afterlife as proposed by Stekelis and Yizraeli. The second ritual rock-cut utensil, a small, round, box-like basin, has no signs of wear on its straight sides and bottom, and is too small for use as a storage vat. Identical basins first appear in the Early Natufian and continue to the Late Natufian. As it is the only Natufian utensil with no surface finish, we believe that it served as a mold for a disposable dish made of bark, or a woven vessel made of green cereal stalks. In the Early Natufian, box-like basins were cut in bedrock near burials (n=9). The basins were presumably used as receptacles for gifts intended for the dead, possibly barley groats or porridge, if we assume that the dead were given the same plant food in the same type of receptacle as the living.

The position of the box-like basins changed in Late Natufian. Three such items have been found in isolated, hard to reach, composite complexes with accompanying small installations in the vicinity of a cemetery. The first and second ritual complexes were found in Raqefet burial cave. One box-like basin was cut into the floor of a high, small alcove and was accompanied by five cup-marks. The other was cut on top of a huge boulder at the back of the first chamber accompanied by some shallow cup-marks. In Nahal Oren Cave a small box-like basin was carved on top of a trapezoid-shaped rock protruding from the cave wall near the entrance two m above the basal rock surface. The accompanying installations, four small conical mortars, were cut in the cave bedrock at the foot of the box-like basin. The two kinds of accompanying utensils, the conical mortar and cup-mark were both food processors and ritual devices. Cup-marks cut into limestone slabs also served as mortuary utensils, being found frequently on or in human burials from the Early Natufian onward. All three composite complexes with box-like basins were situated above human burial plots in hard-to-reach locations and were not suitable for daily human use. These modifications for burial rituals imply changes in the value of plant food provided for the dead. This happened when the production of large-seeded cereals became staple foods during the course of the Natufian.

Patrick Nørskov Pedersen and Tobias Richter

Department of Cross-Cultural and Regional Studies, University of Copenhagen,

A Ground Stone Perspective on Early- to Late Natufian transition at Shubayqa 1, Jordan

Shubayqa 1 is a late Epipalaeolithic site in the Harra desert of north-eastern Jordan, which features buildings and artefacts associated with both the early and late Natufian. Ground stone tools are an important feature of the Natufian period and their proliferation has been perceived as being associated with an increased dependence on wild plant foods. The abundance of ground tools during a period closely preceding the Neolithic has often been viewed as evidence for a shift towards more cereal based diets, ultimately culminating in the first agricultural societies. This seems to have been mirrored in the move towards more grinding tools at the expense of pounding tools in the late Natufian.

This paper examines how the transition from the early to the late Natufian is articulated in the Shubayqa 1 ground stone assemblage. It aims to contextualize the assemblage in relation to general ground stone trends in the Natufian. It also offers suggestions as to what materials might have been processed using these tools and provides a critical view of the importance of cereals in the Natufian of eastern Jordan.

SESSION 3 – CONTINUITIES AND DISCONTINUITIES

H. Ashkenazy, A. Belfer-Cohen, A.N. Goring-Morris and L. Grosman

The Hebrew University of Jerusalem

Technological choices in the Late Natufian of the Core Area and the Periphery in Israel: A comparative analysis

The Natufian culture bridges the preceding Paleolithic mode of existence, namely mobile hunting-gathering, and the succeeding Neolithic cultures of sedentary agro-pastoralists. It was first defined in the early 20th century by D.A.E Garrod after her excavations in Shukba cave in Wadi el-Natuf in the Judean hills. Since then other sites were found in a variety of locations as far distant as the Middle Euphrates in the north, the Azraq basin in the east, and the deserts of southern Jordan and the Negev and Sinai in the south.

The differences in the material culture between sites were the basis of a geographical division – a 'core area' (where the full Natufian repertoire is present in almost every site) and the 'periphery' (where most finds comprise lithics). The evidence in the 'core area' sites hints at a more sedentary way of life, with intense exploitation of plants and complex social behaviors, in comparison to the Natufian predecessors. A lack of these finds from most of the periphery sites hints at a more mobile way of life. The lithic component is equally common in both the 'core area' and the 'periphery area', but due to the size of the assemblages as well as the stage of the research when the sites were discovered, the lithic assemblages of the core area and the periphery were studied differently.

In this presentation, the impact of mobility patterns/ subsistence strategy on the technological choices will be dealt with through an analysis of four case studies from Late Natufian contexts, two from each area. Those of Hayonim and Hilazon Tachtit caves derive from the 'core area', and Saflulim and Givat Hayil I from the 'periphery'. The samples include all the components of the lithic repertoire. Similarities between the four assemblages show that they all belong to the same 'larger' technological tradition. The difference between the 'core' and 'periphery' assemblages is due to the different environments and corresponding life styles. The core area sites portray a high variety of raw material types and nodule shapes, while the periphery sites exhibit fewer types, usually chalcedony, though the original nodules found there generally lack the initial nodule reduction stage on-site. One can actually suggest that the differences reflect the state of mind and attitude of groups trying to adjust and prosper under different environmental conditions. It seems that the periphery assemblages show a more 'traditional', conservative approach, while the core area ones show a more innovative, open-minded approach. Indeed, it is tempting to tie these different attitudes to the observation that a more sedentary life style and, especially, a rich resource environment allowed for a more innovative, expedient state of mind.

Tobias Richter and Maria Mawla

Department of Cross-Cultural and Regional Studies, University of Copenhagen

Continuity and Discontinuity in the Late Epipalaeolithic (Natufian) Lithic Industry from Shubayqa 1

In this paper we report and discuss some initial results of the analysis of the early and late Natufian chipped stone industries from Shubayqa 1, focusing especially on patterns of core preparation and reduction. Shubayqa 1 is a late Epipalaeolithic settlement that was occupied from the early to the late Natufian. It is situated in north-eastern Jordan's Harra basalt desert and has been excavated by the University of Copenhagen from 2012-2015. The settlement features well preserved early and late Natufian buildings, burials and rich assemblages of botanics, fauna and various artefacts.

While lithic production in the Natufian shares some similarities with the preceding Geometric Kebaran, scholars have also noted a move towards more expedient and less careful core reduction as indicated by a decline in core-preparation elements (e.g. crested blades) and more amorphous cores, as well as a switch from bladelet to flake and informal bladelet production. This pattern of expedient lithic production has been linked to higher degree of sedentism at Natufian sites in the Mediterranean zone.

In this paper, we compare the lithic production sequence of the early and late Natufian phases at Shubayqa 1. Our data suggests that while a higher percentage of core trimming elements and more formal cores, as well as proportionally larger debitage, is evident during the early Natufian phase at the site, late Natufian lithic production is characterized by an increasing amount of small-sized flake debitage, the lack of core trimming elements, and small, amorphous cores. An increase in the amount of splintered pieces, burins and burin-cores during the late Natufian phase, appears to reflect a higher degree of recycling, which may be related to extended periods of residence or reduced mobility.

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Bridging the gap: Shubayqa 6 and the Epipalaeolithic-Neolithic transition in the Southern Levant

The succession from the late/ final Natufian to the early PPNA in the southern Levant has been the source of considerable frustration for archaeologists. Few final Natufian or transitional Natufian-PPNA sites have been excavated, resulting in a lack of well-dated and clearly defined lithic assemblages. We present new evidence from recent excavations at Shubayqa 6, an early PPNA site situated in the Harra desert of north-eastern Jordan. Investigations at the site suggest that Shubayqa 6 is a multi-phased, substantial settlement with architecture, art, and large-scale on-site greenstone bead production. The non-lithic elements of Shubayqa 6 give the impression of a fully developed (Sultanian) PPNA culture-complex, but the lithic assemblage indicates otherwise. Lacking any of the “developed” PPNA tool-types, such as tranchet axes and Beit ta’amir sickles, the lithic assemblage of Shubayqa 6 is surprisingly Epipalaeolithic in character – even more so than other known early (Khiamian) PPNA sites. Through an analysis of both lithic and non-lithic elements from Shubayqa 6 we will examine issues surrounding chronology, terminology, cultural continuity and socio-economic developments during the Epipalaeolithic-Neolithic transition in the southern Levant.

Yoshihiro Nishiaki

The University of Tokyo, The Museum of Tokyo

The emergence and development of the Mlefaatian lithic industry in the Iranian Zagros

This paper presents new evidence on the emergence and development of the Neolithic lithic industry that was peculiar to the Iranian Zagros and known as the Mlefaatian. The basic temporal framework for this industry was a tripartite model proposed by Stefan Kozłowski in the late 1990s, which comprised the following phases: Early Mlefaatian, Late Mlefaatian, and Post-Mlefaatian. While his model emphasized pressure blade/bladelet production as the most common and important feature of this industry, he distinguished temporal phases based on technological and typological details. The Early Mlefaatian phase saw a flourishing in the manufacture of backed bladelets of various forms. This phase was replaced by the Late Mlefaatian, whose tool inventory included not only backed bladelets but also geometrics made on bladelets. The Post-Mlefaatian emerged next with the advent of the more common production of pressure blades rather than bladelets. In addition, the manufacturing of geometrics declined and sickle elements became the major tools in the tool inventory, most likely suggesting a subsistence shift to a greater emphasis on farming from the Mlefaatian to the Post-Mlefaatian.

Recent field campaigns and re-analyses of the extant collections since the early 2000s have shown that the above framework, covering the long period from the 10th to 5th millennium BC, is mainly applicable to the wide regions of the Zagros Mountains. At the same time, spatial-temporal variations have become evident in terms of the techno-typology, suggesting the necessity for refinement of the framework.

Based on stratified lithic assemblages, that were not available in the 1990s, this paper compares the chronological developments of the Mlefaatian industry in two regions of the Zagros: western Iran (Kermanshah) and southern Iran (Fars). The results show the almost coincident emergence of pressure bladelet production, probably indicating the presence of social contacts across the vast regions. However, the timing of the changes from one phase to another apparently differed region by region. Most importantly, a complete set of Mlefaatian elements appeared earlier in western Iran. Its late appearance in the southern Zagros probably represents a phenomenon involved with the introduction of a farming socio-economy from other regions.

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The PPNA and PPNB Knapped Industries from Khraysin (Zarqa, Jordan)

Kharaysin is a Pre-Pottery Neolithic site located in the village of Quneya, in the Zarqa River valley, over 25 ha in size and dating from the 9th millennium cal BC. Three fieldwork seasons have been carried out on the site: 2014, 2015 and 2016. Two occupation levels have been documented, the older one corresponding to the late phase of the PPNA, dated from the beginning of the 9th millennium cal BC, and the younger one dated to the beginning of the Middle PPNB, at the end of the 9th millennium cal BC. Bipolar technology, Jericho and Amuq points and bent sickle blades are observed in the Middle PPNB occupation phase. The PPNA material culture, which is still poorly documented, seems to be characterized by unipolar knapping, blades with double pairs of notches and decorated grooved stones.

SESSION 4 – TOWARDS THE END OF THE PPN

Theresa M. Barket

University of California

Flaked-stone assemblage variation during the Late Pre-Pottery Neolithic B at 'Ain Ghazal: What could it mean?

The Late Pre-Pottery Neolithic B period (LPPNB) at the Neolithic site of 'Ain Ghazal was marked by changes in settlement size, population size, architecture and subsistence practices. Accompanying these transformations were changes in the flaked-stone technology and lithic economy. Specialized production of naviform cores and blades still occurred, and households still commonly used products from naviform technology in tool production. Quintero (2010) observed, however, that naviform cores and blades from the LPPNB appear less regularized in form, implying some changes to the specialized economy. A distributional analysis of a sample of debitage, cores, and tools from LPPNB domestic-related loci, examined here, shows change through time in household-level flaked-stone production also occurred. Specifically, during the LPPNB, some deposits could be assigned to early and late phases, and a comparison of tool types, resource material, and blank technology between the phases suggests that high-quality resource material and products from naviform cores became less available for tool production during the LPPNB. Additionally, domestic-related loci with large assemblages of flaked-stone material, percentages of Huweijir-type flint and blades from naviform cores were compared between some excavation squares and excavation areas (North Field, East Field, Central Field, and West Field) from each chronological period, but marked differences across the site are identified only in the LPPNB sample. This paper discusses the preliminary findings of this analysis and examines the potential causes of the flaked-stone assemblage variation during the LPPNB at 'Ain Ghazal.

Kathleen Bennallack, Mohammad Najjar, Thomas E. Levy

University of California, San Diego

**Regional Connections among PPNC/PN Assemblages: Preliminary Evidence from the Faynan
Copper Ore Region of Southern Jordan**

The Pottery Neolithic of the Southern Levant has long been a bit of a “redheaded stepchild” in Neolithic studies; part of the family, but not really loved. Recently, new interest has sprung up around the PN in Jordan, including zones that are today environmentally marginal. These sites are often rightly attributed to pastoralists due to their marginal nature (as well as the precedent of archaeological theory regarding the PN), and sites in more climatically favorable conditions like the Jordan Valley that are often attributed to farmers. Of course, this is an oversimplification of the literature, but it is interesting to discover that these regions, uninhabitable today due to the scarcity of water, once supported large populations particularly in the PN - and not only pastoralists or hunters. The question of where the people from the PPN “megasites” went after the collapse of those sites may have bearing on these discoveries as well.

This talk will address a recently excavated PPNC/PN site in the now-arid Faynan region of southern Jordan and the implications of its small lithic assemblage for the site and its regional and chronological context. The assemblage includes both ad-hoc and formal worked stone types, including denticulated sickle blades, arrowheads, loom weights, and hundreds of borers. Also of interest is one particular raw material present at the site; copper ores brought from other parts of Faynan. In the PPN, the copper ores of Faynan were used to make beads and possibly makeup, for which there are hints of trade found in other areas. During the PN, the presence of ore at the site presents a tantalizing unknown quantity.

The location of the site – at the edge of Wadi Arabah, between the Transjordan Plateau, Dead Sea, and Negev desert – places it in an ideal spot for interactions between those regions, as well as the Jordan Valley, the Sinai and Arabian Peninsulas, and the Eastern Desert of Jordan. Comparison of the Faynan chipped stone assemblage with assemblages from these regions will be presented and the implications for what we know about the PPNC and PN will be addressed.

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Final PPNB hunters' campsites and lithic productions: latest results of the South Eastern Badia Archaeological Project (Jordan)

During recent investigations in southeastern deserts of Jordan in the framework of the South Eastern Badia Archaeological Project, several sites of surface lithic scatters demonstrating a homogeneous techno-cultural entity have been identified. They are characterized by exceptionally rich assemblages dominated by blade and bladelet productions. Amongst the retouched tools, bifacial foliates and small projectile points on laminar blanks provide elements of comparison with other techno-complexes of the southern Levant's arid margins, especially with the Tuwailan industry of the Negev and those from the basalt Black Desert of northeastern Jordan.

A test sounding excavation (4 x 2 m) carried out during the 2015 season in one such site provided remains of a well-preserved dwelling structure with standing stones delimitating partitions, storage compartments, hearths etc., indicating that the knapping activities were achieved in a broader campsite occupation context. The excavation produced significant amounts of lithic artefacts in a securely stratified context, allowing a detailed analysis and a better characterization of this industry.

Radiocarbon dating confirmed the chronological attribution of the site to the Final PPNB (beginning of the 7th mill. cal. BC). The lithic assemblage is, therefore, of major interest as it allows one of the first chrono-cultural comparisons to be made for southeastern Jordan – a key region at the gates of the Arabian Peninsula – with neighboring arid regions across the southern Levant.

Strong evidence supports a direct chronological relationship of the campsites with hunting mega-structures known as "Desert kites" identified in close spatial connection. The significance of this lithic assemblage is, therefore, all the more important, as it constitutes a unique and unprecedented occurrence of defined material culture in such an occupational context.

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Chipped stone production at Beisamoun during the first half of the 7th millennium cal BC

The first half of the 7th millennium cal. BC has traditionally been considered to be a poorly understood period in the archaeological record due to the lack of data, leading to some authors to term that period the *Hiatus Palestinien*. Some decades after in light of new data, the term Pre-Pottery Neolithic C (PPNC) was proposed to define a period that represented a major cultural shift heralding the Pottery Neolithic (PN). Other authors considered the material culture of this phase to be directly inherited from the Pre-Pottery Neolithic B (PPNB) period and refer to that period as the Final PPNB. The issue has received continued attention during the last decades in light of new discoveries dated or attributed both to the first half of the 7th millennium cal. BC (e.g. Tel 'Ali Layer 2, Ashkelon, 'Atlit Yam, Hagoshrim Layer VI and Ashkelon) and to the early Pottery Neolithic (e.g. Yarmoukian sites such as Sha'ar Hagolan, Tel Ro'im, Munhatta IIB, Tel Te'o, etc). Despite the growing number of sites excavated, the lack of well-stratified and radiocarbon-dated contexts and the fact that some of these sites might be multi-phased sites (PPNC/Final PPNB-PN) has hindered a clear separation (especially through the chipped lithics) of these 'cultures' (PPNC/Final PPNB and Early PN).

Long-term extensive excavations (*ca* 300 m²) undertaken at Beisamoun, the major Neolithic site in the Hula basin (Galilee, Israel), have uncovered a series of occupation levels that have been radiocarbon-dated to different moments of the first half of the 7th millennium cal. BC. Beisamoun thus becomes a key site for characterizing the PPNC/Final PPNB and better understanding the PPN to PN transition in the region.

The study of the large chipped lithic assemblage from the 2007-2014 seasons (over 100,000 artefacts) has offered an excellent opportunity to develop a clear definition of the lithic industries dated to the end of the Pre-Pottery Neolithic period in the Hula basin, providing a solid base for further comparison with earlier and subsequent lithic industries in order to evaluate the degree of continuity and innovation in lithic production. Results of the techno-typological study of the lithic assemblage reveal elements of continuity (bidirectional technology, production of bifacial tools, abundance of projectiles and sickle blades, etc), but new ones were incorporated into later lithic traditions (e.g. bladelet production, Amuq points with denticulated flat retouch and very denticulated sickle blades). It was thus the complexity of lithic production and the co-existence of new and old traditions that seems to define the PPNC/Final PPNB in the Hula basin and becomes a criterion for clear differentiation.

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The Neolithic water well of 'Enot Nisanit: the flint and groundstone finds

The site of 'Enot Nisanit is located at the margins of Jezreel Valley, Israel, in proximity to a major group of springs. A salvage excavation at the site conducted by the Israel Antiquities Authority exposed a living surface that surrounded a water well. The well, ca. 8.5 meter deep, was hewn into the soft limestone bedrock. Stone installations were built both around its opening and above its bottom to facilitate convenient access to clear water. The fills from within the well-shaft contained rich material culture remains. The present paper focuses on the flint and ground stone finds.

The flint industry focused on the production of flakes, but contained a substantial blade component as well. The tool types included chrono-cultural markers such as deeply denticulated sickle blades. In the absence of pottery, these strongly suggest dating of the well to the PPNC period. The well of 'Enot Nisanit is thus among the earliest wells currently known in the southern Levant.

The ground stone finds may be divided into two distinct groups. The fill from the upper part of the well shaft yielded damaged grinding and pounding tools, such as are common at contemporary sites. The lower fill, however, yielded a unique set of artefacts: two bifacial *mazebbot*, a dome-shaped anvil and two hammer-stones, all complete and made of the same variant of chalk. The homogenous appearance of these items, their location within the shaft, and the presence of several flakes of the very same raw material, suggest that they were all made, used and discarded in a single event. They may be related to a human burial that was uncovered at the lower part of the well shaft, too. The discovery contributes to our knowledge of PPNC mortuary practices and symbolism, and of the role that water wells played within them.

26TH NOVEMBER

SESSION 1 – INTERACTION AND DIFFUSION

Anna Belfer-Cohen & Nigel Goring-Morris

Hebrew University of Jerusalem

Packaging the Levantine Epipalaeolithic

The Levantine Epipalaeolithic (ca. 25,000-9,650 cal BP) is chronologically sub-divided into Early, Middle and Late phases. Yet, it is also possible to divide the region during the Early and Middle phases into three distinct cultural sequences, corresponding to the geographical provinces of the northern, southern and eastern Levant.

At times, the sequences were identical, i.e. all three included the same cultural entity, distributed across all three provinces. Thus, the Middle Epipalaeolithic (ca. 19,000-15,000 cal BP) Geometric Kebaran entity is similarly found throughout the Levant, though differing somewhat in duration and intensity. However, other cultural entities are restricted to a particular region and are rarely, if at all, present in others, e.g. the Nebekian or the Mushabian. Indeed, the various cultural entities in the different regions as evidenced from the archaeological data converge and diverge throughout time – what caused these fluctuations?

Of particular interest is the picture emerging during the Late Epipalaeolithic (ca. 15,000-9,650 cal BP), as there is but one cultural entity, namely, the Natufian complex, albeit portraying regional variations. As research progresses, it transpires that the Natufian comprises an amalgamation of traits deriving from all three regions – in our talk we shall propose a scenario as to the ‘why and how’ this may have come about.

Omry Barzilai and Hamoudi Khalaily

Israel Antiquities Authority

Itinerant flint knapping specialists in the Pre-Pottery Neolithic B period in the southern Levant

The Pre-Pottery Neolithic B (PPNB) period corresponds to the apex of the 'Neolithic Revolution', in the Near East. The lithic industries are dominated by the bidirectional (naviform) blade technology, which was the common method for making formal tools such as arrowheads, sickle blades, burins and perforators. Recent studies have identified several technological variants that involved different degrees of specialisation (Barzilai 2010). The most elaborated variant, termed "one-on-one", is the earliest form of the bidirectional (naviform) blade technology in the southern Levant.

The comprehensive techno-typological study, including refitting of a cache of 58 blades, of the assemblage from Motza in the Judean Hills region demonstrates an extremely high expertise in flint knapping (Khalaily et al. 2007). The knapping process included even extractions of exceptionally symmetric blades from both platforms. The blades exploited ca. 90% of the removal surface averaging 15 cm in length. The reduction was not subjected to maintenance at all. Blade productivity is estimated at 50 blades per sequence. This knapping mode termed "one-on-one" was also identified at Beidha in the greater Petra region (Mortensen 1988). These blades are much smaller but followed a similar knapping scheme. Like Motza the reduction was not subjected to maintenance at all and did not include use of epsilon blades. Blade productivity is estimated to 30 blades per sequence (20 refitted).

In both cases the one-on-one blades are more elaborated than the rest of the bidirectional blades in the assemblages that were produced by another knapping method known as "predetermined-epsilon" (Barzilai 2010). The presence of very few high quality blades in these two cases seems to be related to the appearance of this technology in these regions - possibly by itinerant flint knappers.

Barzilai O. 2010. *Social Complexity in the Southern Levantine PPNB as Reflected through Lithic Studies: the Bidirectional Blade Industries* (BAR International Series 2180). Oxford: Archaeopress.

Khalaily, K., O. Marder and O. Barzilai 2007. An Early Pre-Pottery Neolithic B Blade Cache from Motza, West of Jerusalem, Israel. In *Technical Systems and Near Eastern PPN Communities*. Edited by L. Astruc, D. Binder and F. Briois, pp. 269–277. Antibes: Editions APDCA.

Mortenson, P. 1988. A Note on a Small Box with Flint Blades and Arrowheads from Beidha and its Implications. In *The Prehistory of Jordan. The State of Research in 1986*. BAR Int. S. 396. Edited by A. N. Garrard and H. G. K. Gebel, pp. 199–207. Oxford: BAR International Series.

Michal Birkenfeld¹, and Nigel Goring-Morris²

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² *Hebrew University of Jerusalem*

Intra-Regional Systems during the Pre-Pottery Neolithic B: Settlement Systems in the Lower Galilee, Israel.

Much has been said about the large-scale, inter-regional parallels and affinities evident throughout the southern Levant during the PPNB (i.e. the 'PPNB interaction sphere' *sensu* Bar-Yosef and Belfer-Cohen 1989). This is manifested in material culture aspects such as lithic traditions as well as in the adoption of sedentary life-ways and the shift to food production. Nonetheless, when settlement and associated subsistence patterns are closely examined, considerable regional and micro-regional variability emerges.

In the lower Galilee region of northern Israel numerous archaeological locales dating to the PPNB have been documented through excavations and extensive surveys. These form the base for an integrated study focusing on regional-scale settlement patterns, subsistence modes and economic organization.

Using GIS applications, spatial and locational analyses are conducted employing several scales of reference, ranging from the intra- to inter-site levels. Different material culture aspects such as architectural remains, burials and small find catalogues are explored in-tandem with aspects of site location within the landscape and land-use strategies employed. The results are then compared on a regional scale to address issues of socio-economic organization during the period.

The results presented discuss how communities were organized within the region and how they interrelated with one another. We raise issues of territory-size and exploitation, of subsistence modes and of economic and social flows within the region. The synthetic approach, collating site-based data, which has amassed in the lower Galilee for more than thirty years of archaeological research, allows for a new, more complex perspective of the PPNB dynamics in the region.

Ofer Bar-Yosef
Harvard University

Neolithic Interactions across the Fertile Crescent

The traditional geographic definition of the Fertile Crescent created long ago is a limiting concept, while the term “interaction sphere” is more comprehensive. The latter means that we incorporate related archaeological phenomena within a reasonable distance of human movements, bearing the same or very similar cultural markers, in a given region. Including Cyprus as an integral part of the Neolithic Interaction Sphere is undoubtedly needed. When considering the role of sea and river vessels as communication devices in addition to walking, we can incorporate a larger region within the same interaction sphere. Neighboring spheres do exist and sometimes overlap. When we employ the same criteria to recognize the interactions between two or more spheres, we strengthen our understanding of the dynamic history of a larger region such as Western Asia and beyond.

In this presentation, I will demonstrate how we can test the role of boats that were employed for transportation along the Euphrates and the Tigris rivers. The spring snow melting in the mountains of eastern Turkey - the source area of the water - caused rapid flow and sometimes flooding that resulted in major alluviation events within the Mesopotamian basin. However, these two rivers also served as major highways for communication over a distance of about 2800 km for the Euphrates and 1800 km for the Tigris River. Floating and rowing in small boats made of reeds and covered with hides of hunted animals would not take more than a month or two to reach southern Mesopotamia. By contrast, the Orontes (570 Km), Litani (150 Km) and Jordan (250) rivers being much shorter and narrower, do not have the advantages of the big rivers. Although hypothetically the three short rivers hindered fast transmissions in both north and south directions, they created a challenging environment for prehistoric people, enhanced interactions between different tribes of foragers, and allowed for new inventions such as plant and animal domestication in the northern Levant earlier than in the Mesopotamian basin. Several examples will illustrate the different roles played by the prehistoric routes in the transmission of goods, animals and knowledge across the Neolithic Interaction Sphere.

Bastien Varoutsikos,
CNRS, VEPMO

Understanding mobility, structure, and hierarchy of obsidian diffusion networks during the Near Eastern Neolithic

Obsidian studies have been a long-standing feature of archaeological researches in the Near East. The combined geological studies, geochemical analyses and archaeological analysis carried out over the past 60 years especially focused on the Near Eastern Neolithic, provided an unprecedented magnitude of quantity and precision of available obsidian information. This, in return, contributes to the depiction of a region much more integrated and interactive than previously thought.

Yet, this perception of ubiquity is limiting our understanding of the scale and nature of inter-community interactions and raises several issues regarding the limited amount of obsidian items studied per site and the lack of interactions regarding geochemical information and other culturally relevant variables such as typology and technology. As progress in methodology have allowed to increasingly precise geochemical results, the development of a more inclusive theoretical framework is needed to better reconstruct processes happening between the source and the site of discovery.

In this paper, we present a methodology developed in the context of the GeObs project. By systematically associating geochemical results with techno-typological data from obsidian assemblages of 7 major Neolithic sites in the Middle Euphrates and the Zagros, we can precisely identify the structure of diffusion networks, and the place of the site in the hierarchy of said network. These results can then be extrapolated to suggest how groups were interacting with each other and shed light on the mobility of communities in the early stages of the Near Eastern Neolithic.

SESSION 2 – BEYOND PPN

Elizabeth Healey and Stuart Campbell

University of Manchester

Long-term continuities and discontinuities in obsidian use: a view from Iraq

Mesopotamia is a geographically diverse region within which complex societies develop and the earliest urban states appear. In many areas lithic and other raw materials are scarce and mostly imported; obsidian is no exception. However, archaeological focus on this region has been uneven, with Iraq in particular inaccessible for fieldwork for a long period and consequently neglected for study more generally. While modern nation states clearly provide poor boundaries for archaeological investigation, this has left a significant gap in our knowledge of obsidian distribution patterns for crucial periods of prehistory and proto-history. Our paper aims to counter this by drawing Iraq back into the wider discussion of changing obsidian exploitation in Mesopotamia.

The earliest obsidian artefacts (and first documented use of obsidian away from source) come from the Late Upper Palaeolithic levels of Shanidar Cave in northern Mesopotamia; two were assigned to source by Renfrew et al. in 1960s. One was made of obsidian from Nemrut Dağ, the other they attributed to their 1e-f group (Ağıcöl-Kars); however, it is now considered more likely to be of obsidian from Suphan Dağ (Chataigner 1998). Of the other artefacts from Iraq identified by them, most also come from Nemrut Dağ with a lesser number from the calcalkaline source of Bingöl B and only one (Arpachiyah) from their group 3a (now known to be Meydan Dağ). Fifty or more years later the number of sites using obsidian has of course expanded and the number of analyses has slowly grown. The emphasis however has tended to be on provenancing the obsidian rather than on the morpho-technological and functional aspects of the artefacts or socio-economic-relations between the sites. From the published data, one is left with the view that for the most part obsidian was acquired as blades and tools with only a few communities producing their own artefacts, and that Nemrut Dağ was the chief source exploited. Other sources (again mainly the calcalkaline source of Bingöl B) appear to have had a lesser role.

Over the last five or so years though, new, more holistic analyses from both north and southern Iraq have become available from sites extending in date from the Neolithic into the Bronze Age. These include our own analyses of artefacts from older excavations as well as analyses by others of recently excavated sites in Kurdistan. They challenge the status quo and, when aggregated, suggest that there is a more complex picture emerging over time in terms of how and from where the obsidian was acquired and used, as well as of the wider relations of the sites. While our results are still preliminary and part of a wider long-term project, our paper will explore the results in some detail and consider how the use of obsidian in Mesopotamia compares with the wider region (particularly greater Mesopotamia).

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Go West. New discoveries concerning the PPNB in the Eastern Desert of Egypt Between the Sinai and the Nile Valley

Wâdî ‘Araba is a dry valley located in the Egyptian Eastern Desert that extends approximately 160 km from Za’farana, at the East, on the Gulf of Suez, to Beni Suef, about 120 km south of Cairo. Wâdî ‘Araba is, significantly, one of the only communication routes that connect the Red Sea Coast to the Nile Valley. As this archaeological region was never completely surveyed, there are only a limited number of documents attesting to the unique archaeological and historical potential of this area. The archaeological project conducted by the Institut français d’archéologie orientale (IFAO, Cairo) in collaboration with Macquarie University (Sydney) from 2008 to 2016 provided new data with regard to the use of desert tracks between the Nile Valley and the Sinai, a region in the Eastern Desert that had been exploited since Prehistory for its stone, gold and copper resources.

The main goal of the project was to record all sites (settlements, cemeteries, mining sites, etc.), rock inscriptions and more broadly all archaeological, historical and geographical documents concerning the occupation of the region from Prehistory until modern times. Amongst the nearly 300 localities identified, including Palaeolithic, Neolithic and Predynastic sites, Old and Middle Kingdom camps linked with mining activity (copper), roman/byzantine settlements and cemeteries, Coptic hermitages, rock art panels, cairns and unidentified stone features, particular attention has been given to the locality of Bir Buerat, 50 km west of the Red Sea coast, where remains of PPNB occupations were found. The material includes scalene bladelet tools and arrowheads, some of them from with bilateral notches and a tang (Helwan points) associated with ostrich eggs.

This paper presents the results of the test excavation conducted in October 2016 on one of the main Neolithic loci. It highlights the importance of the region in the early interrelations between Nile Valley and the Near-East, and the role played by the eastern peripheral part of Egypt in the elaboration of the processes, which led to the development of the first Egyptian farming cultures.

Dmitry Yegorov, Jacob Vardi, Davida Eisenberg-Degen, Valentina Caracuta and Elisabetta Boaretto

Israel Antiquities Authority

Har Harif 45: A Timnian Site in the Negev Highlands, Israel

During the spring of 2012, a salvage excavation was conducted at Site 45 on the southern slope of Har Harif (Mount Harif) in the Negev Highlands along the western border between Israel and Egypt. The site includes a number of occupational phases stratigraphically separated by the accumulation of alluvium. The excavation revealed a circular structure built from field stones, an enclosure wall and a number of hearths. The excavation yielded a rich collection of organic material. Radiometric analysis of charcoal samples collected from two hearths provided dates that indicate that the occupational phase of the structure extended between late 6th and the mid- 5th millennium BCE (calibrated), the Early Timnian phase.

The lithic assemblage uncovered in the site was remarkable in that it comprised a large group (44 items) of polished bifacial tools, mainly axes. One of the axes bears the remains of an adhesive that was probably used for its hafting. A large portion of the bifacial tools evince edge damage caused either by wood-working or other tasks. Other formal tool types include tabular scrapers and transverse arrowheads. The rest of the assemblage is mostly represented by *ad hoc* tools that were used for a wide variety of domestic tasks. The excavation yielded data that sheds new light on the nature of the Timnian culture during the late 6th – 5th Millennia BCE in the Negev and also the adjacent part of central Sinai. The assemblage also included a profusion of charcoal that shed light on local environment of Har Harif in the Neolithic and Chalcolithic periods.

Yamandú H. HILBERT and Rémy CRASSARD [*Proceedings*]
CNRS, Lyon, France

Naviform technology from Saudi Arabia

Discovered in March 2015, the sites of DAJ-112 and DAJ-125 in the Al-Jawf province of northern Saudi Arabia consist of large collections of surface lithic artifacts that can be compared to well-known PPNB technology from the Mediterranean Levant. The DAJ sites include the naviform technology of core preparation and surface exploitation as well as burin production on a wide scale. Other surface scatters have been identified during the 2013 and 2015 surveys showing that these two sites are not isolated in Al-Jawf, but are important occurrences of Early Holocene technology have been identified in various places. Although the artifacts from the Al-Jawf region are on the surface and not radiometrically dated, the sites have proven to be extremely significant, representing an important incursion southward of classic naviform technology compared to its usually accepted geographic distribution exclusively in the northward zones. Through other lithic examples across the Arabian Peninsula, the expansion or the influence of PPN populations/cultures in Arabia will be discussed.

Milić, B.¹ & Horejs, B.¹

¹*Institute for Oriental and European Archaeology (OREA), Austrian Academy of Sciences,*

An Addendum to the PPNB Interaction Sphere -Pressure blade making from the 7th millennium BC Çukuriçi Höyük in western Anatolia

Çukuriçi Höyük is located at the centre of the western Anatolian coast, providing an insight into the Neolithic way of life from around 6700 cal. BC until the end of the 7th millennium BC. The main feature of the Çukuriçi Neolithic lithic assemblages is the extremely high amount of exotic obsidian accompanied with the abundance of standardized blade products. This paper seeks to provide the information about possible origins of the lithic technology of the 7th millennium BC Çukuriçi Höyük, by focusing on the onset of pressure blade making. Certain finds, amongst which is the cache of long obsidian blades (Fig. 1), will be used to look into specialisation among the local knappers, and trace the connections implied by certain practices, such as caching and depositing.

Technology, along with subsistence strategies, materiality and symbolism were previously used in the study of the first colonizers of western Anatolia arriving from the eastern regions, based on the new data from Çukuriçi Höyük (Horejs et al. 2015). After the initial appearance of pressure technique in Anatolia, in 9th millennium BC, restricted to the regions of the southeast and Cappadocia at this time, it seems that its penetration into the other regions of Anatolia takes place only after two millennia. The first emergence of pressure blade making in western Anatolia is attested at Çukuriçi Höyük in the first half of the 7th mill. BC. We suggest two possible centers of its origin - southeastern Anatolia and Eastern Mesopotamia (Milić-Horejs 2016). This paper deals with indepth analysis on the lithic technology, which is used as a source for understanding mobility and migration, through the spread of know-how by the transfer of ideas and movement of people.

Utilizing the spread of pressure technique as the case study, we will try to show how a particular site of the 7th millennium BC relates to "the PPNB interaction sphere", whereas the settlement is integrated in a completely different Neolithic world.

Horejs, B., Milić, B., Ostmann, F., Thanheiser, U., Weninger, B., & Galik, A. 2015. The Aegean in the Early 7th Millennium BC: Maritime Networks and Colonization, *Journal of World Prehistory* 28: 289-330. DOI 10.1007/s10963-015-9090-8

Milić, B., & Horejs, B. (in preparation). *The onset of pressure blade making in western Anatolia in the 7th millennium BC. A case study from Neolithic Çukuriçi Höyük.* In B. Horejs (Ed.), *Çukuriçi Höyük 1*. Vienna: ÖAW Verlag.

SESSION 2 – BEYOND PPN

Bastien Varoutsikos and Artur Petrosyan*VEPMO,*
CNRS

Blade Making in Aknashen and the origins of the Neolithic in the South Caucasus

Despite more than a century of research, the origins and mechanisms underlying the development of the first food-producing societies in the South Caucasus remains unclear (Chataigner et al. 2014). Various hypotheses have been suggested, ranging from independent development of agriculture to total replacement of the local population by external groups (Varoutsikos 2015).

The South Caucasus is an area located south of the Caucasus range, reaching the Caspian Sea to the east and Black Sea to the West, and covering the modern territories of Georgia, Armenia, and Azerbaijan. The first clear evidence of agricultural society in this region is associated with the Shulaveri Shomutepe culture around 6000-5900 BCE. These groups are characterized by tell-type settlements composed of mud-brick circular structures, and they rely on fully domesticated species such as emmer wheat, hulled barley, sheep and goats. Their industry is targeted towards the production of long standardized blades, in large majority manufactured in obsidian (Chabot et al. *in press*).

The absence of “pre”-Neolithic sites during the 7th millennium does not support a local development, but genetic studies of crops highlight a potential importance of the Caspian area in the domestication of crops found at Shulaveri-Shomu sites (Hovsepian and Willcox 2008). Furthermore, although some elements point towards connections with the Near Eastern culture, the origin and nature of these parallels are unclear.

In order to shed light on the connections between the South Caucasus and the Near East, as well as to highlight diffusion of lithic technology across a large territory, this paper will present an overview of the Shulaveri-Shomu typo-technological behaviours and compare them to lithic traditions found in the Near East during the course of the late 7th and 6th millennium BCE.

We focus especially on the transfer of blade-making traditions found in the Near East until the end of the 7th millennium at sites such as Sabi Abyad (Altınbilek-Algül et al. 2012). These traditions and techniques associated with it seem to disappear from the Near East and reappear in the South Caucasus in the context of the Shulaveri-Shomu culture. This paper considers this transfer in the context of the development of the Neolithic in the South Caucasus.

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**The development of lithic industries in the earliest farming communities in the middle Kura valley,
Azerbaijan**

The Shomutepe culture, variously referred to by other researchers as the Shulaveri-Shomu or Shulaveri-Shomu-Aratashen culture comprises the earliest full-fledged food producing communities of the southern Caucasus. An increasing number of field investigations over the last decade have demonstrated that this culture emerged around 8,000 years ago in both the northern and southern foothills of the southern Caucasus Mountains most likely as a result of cultural and population contacts with Neolithic communities in southwest Asia. Thus, the most important research questions to be addressed in this context include evaluation of how, and to what extent, local and supposedly incoming communities contributed to the emergence of this new socio-economy.

In this paper, lithic assemblages from Hacı Elamxanlıtepe, the earliest Shomutepe culture farming settlement so far known in Azerbaijan, and Göytepe, the largest developed settlement, are discussed. Both these settlements have been dated to the first half of the 6th millennium BC, and comparative study of their assemblages, as well as those from earlier Mesolithic sites, indicates that Shomutepe culture lithic industry was established via a series of rapid cultural developments during the first few centuries of the 6th millennium BC. In other words, the lithic industry that characterizes this culture was not imported intact from the Fertile Crescent, but was established as the result of local evolution. The analysis presented here also demonstrates that the lithic assemblages from these early farming communities reflect both local Mesolithic and exotic traditions.

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Please help us find the origins of Greek and Italian Early Neolithic lever pressure-flaking!

The Early Neolithic lithic assemblages from Greece and from Southern Italy both contain long blades produced by a very specific technique, lever pressure-flaking. The dates of these assemblages differ — 7th millennium cal B.C. in Greece, early 6th millennium for Italy —, as do details of the techniques used and the varieties of flint raw materials. In both cases, however, the Neolithic way-of-life is considered to have been introduced from Anatolia or the Levant, by migrant farmers. An independent invention of this complex technique, which requires important know-how, appears highly unlikely. It can thus be presumed that it was introduced with all the other new elements and techniques brought by Neolithic farmers, and that its origins must be sought in Anatolia and the Levant. The earliest evidence for lever pressure-flaking in these regions is provided by the large obsidian blades from Çayönü, in the second half of the 8th millennium, followed, one millennium later, by the obsidian blades of Sabi Abyad. According to the raw material, the workshops must have been located in Eastern Anatolia (Bingöl/Nemrut Dağ area).

A direct introduction from eastern Anatolia to Greece and Italy cannot be ruled out, but lever pressure-flaking has only been mentioned in western Anatolia in Çukuriçi, near Izmir, on Milian obsidian and a supposedly local flint. It is highly unlikely however, that lever pressure-flaking was restricted to this site or this region. There is indeed no argument in favour of a direct link between the Greek and the Italian earliest Neolithic settlements, which differ by the chronology, architecture, ceramics, etc. We should therefore look for several regions of origins, possibly or probably making use of different raw materials and variants of the technique.

Our presentation, thus, simply wishes to draw the attention on these specific productions, whose singularity would constitute an excellent marker of regional technical traditions and help defining the routes followed by the early colonists of Europe.

POSTER SESSION

- **Tristan Carter¹, Danny Rosenberg², Zachary Batist¹ and Kathryn Campeau¹**

¹ *McMaster University*

² *University of Haifa*

A Re-Analysis of the Nahal Lavan 109 Obsidian

This study aimed to derive more nuanced information concerning supra-regional interaction during the early PPNB from a southern Levantine perspective. This was achieved via an obsidian characterisation study of 52 artefacts from the site of Nahal Lavan 109 from the Negev using the non-destructive technique of EDXRF.

This assemblage is noteworthy in a southern Levantine context for not only its size (n=365), but also the fact that structurally the material attests to the on-site reduction of obsidian and self-sufficiency in tool manufacture, as opposed to a reliance on intermediaries to access ready-made implements as documented at many other sites of the period.

Forty-five obsidian artefacts from the site had previously been analysed (using INAA) by Yellin and Frachtenberg (1992), who demonstrated that the community was in the habit of procuring their raw materials from the central Anatolian source of Göllü Dağ.

Our reason for re-analysing material from this assemblage stemmed from recent geo-archaeological work at Göllü Dağ that has allowed archaeometrists to recognise sub-sources whose raw materials have subtly distinct products at a trace elemental level. Thus, it is now possible to offer a more nuanced reconstruction of which regional and supra-regional populations were exploiting which specific outcrops, something that in turn allows us to discuss potential social networks through which ideas concerning such new practices as plant and animal management may ultimately have flowed.

- **Christoph Purschwitz**

Institute of Near Eastern Archaeology, Freie Universität Berlin

The Lithological Landscape of the Greater Petra Region. Availability and Early Neolithic Raw Material Procurement of Flint and other Abiotic Resources.

The "Lithological Landscape of the Greater Petra Region" is part of a Ph.D-Dissertation, which has been completed recently at Freie Universität Berlin (Purschwitz 2016). This poster presents the results of a flint raw material survey that was carried out at the Greater Petra Region at September / October 2012. The research aimed at providing an archaeo-geological framework on flint raw material availability and geological distribution at the Greater Petra Region. It also aims at correlating the Flint Raw Material Group-system (FRMG, Muheisen et al. 2004) with the geological environments of related source areas. The FRMG-system was initially established on the basis of artefacts from the Basta excavation (FRMG 1-9) and has been later extended according to the flint spectrum found at other sites of the Greater Petra Region (such as Ail 4, Ba'ja, Beidha and Shkârat Msaied, cf. Purschwitz 2016). The correlation of site-established raw material classifications with their geological availability and distribution is considered as a methodological key for investigating the procurement modes involved with specific raw materials and is an important contribution to the reconstruction of prehistoric lithic economies.

This survey revealed that primary sources of flint raw materials are restricted to few geological formations, however, with noticeable differences in quality, quantity and regional distribution of specific

flint raw material groups (FRMG). The archaeologically established FRMG show a high degree of correlation with certain geological formations of the Greater Petra Region, which makes flint a promising material for the study of acquisition and distribution modes within early Neolithic lithic economies.

Muheisen, M. / Qadi, N. / Gebel, H.G.K. 2004 "Raw Materials of the Flint and Ground Stone Industries." In: H.J. Nissen / M. Muheisen / H.G.K. Gebel (eds), Basta I. *The Human Ecology*: 129-154, bibliotheca neolithica Asiae meridionalis et occidentalis. Berlin: ex oriente

Purschwitz, C. 2016 *The Lithic Economy of Flint during the Early Neolithic of the Greater Petra Region. Geological Availability, Procurement, Production, and Modes of Distribution of Flint from the Early to Late PPNB-Period*. Ph.D.-Thesis, Freie Universität Berlin. (in german).

- **Christoph Purschwitz**

Institute of Near Eastern Archaeology, Freie Universität Berlin

Shkârat Msaied: A MPPNB bidirectional blade workshop and its socio-economic implications

A pit with a dump of a bidirectional blade workshop was found during the 2010 season of the southern Levantine Middle PPNB site of Shkârat Msaied. The dump consisted of 3739 artefacts, which all resulted from the reduction bidirectional cores. Based on refitting studies and a comprehensive technological analysis, I propose that the dump stems from the reduction of 9 to 11 bidirectional cores. The use of only one raw material and a very homogeneous chaîne opératoire suggest that only one person was involved. A very low rate of probable knapping errors illustrates the high skill level of the knapper, and the context of deposition suggests that the dump was created within a very short period (within one season, probably only few days).

This presentation will outline the detailed data on composition, raw materials used and refitting studies. The data will be compared with bidirectional workshop dumps known from Basta and other PPNB sites and socio-economic implications for the MPPNB community of Shkârat Msaied will be drawn.

- **Omry Barzilai¹, Dudu Biton² and Ron Lavi³**

¹ *Israel Antiquities Authority*

² *Ben Gurion University of the Negev*

³ *Independent Researcher, Israel*

Bidirectional blade recycling at Mishmar Ha'emeq, Israel

Bidirectional blade production is one of the hallmark material cultural remains of the PPNB period. In the Mediterranean woodland region of the southern Levant this technology was aimed at producing standardized tools such as arrowheads and sickle blades by craft specialists (e.g. Barzilai 2010). Many of the bidirectional blades and tools were made of high quality esthetic flints and exhibit an elaborate configuration. Several studies proposed that bidirectional blades and tools had an economical value and were integrated in the early village exchange economy (e.g. Quintero and Wilke 1995).

The current paper is concerned with the recycling pattern of bidirectional blades and tools at MPPNB Mishmar Haemeq. The site functioned as a small village with an exceptional ritual complex composed of a rectangular flagstone building and a burial complex (Barzilai et al. 2011). Unlike other contemporary sites in the region (e.g. Yiftahel, Kfar HaHoresh, Nahal Zippori 3), Mishmar Haemeq is not located near flint outcrops. Previous lithic studies showed that the bidirectional blade components were not knapped on-site

(Barzilai et al. 2011). The near absence of bidirectional cores and diagnostic core trimming elements together with the relatively high presence of blades and tools gave the impression the latter were imported as complete products to the site.

A detailed analysis of the lithic assemblages from all PPNB contexts at the site show an unusual presence of a variety of burin types made on blades and the associated spalls. Moreover, there are many truncated blades exhibiting dorsal and transversal truncations. We conclude that these recycled objects attest to the shortage of raw materials at the site, but also indicate the high value of the bidirectional blade products at Mishmar Haemeq.

Quintero, L.A. and P. J. Wilke 1995, Evolution and Economic Significance of Naviform Core-and-Blade Technology in the Southern Levant. *Paléorient* 21(1): 17-33.

Barzilai, O. 2010, Social Complexity in the Southern Levantine PPNB as Reflected through Lithic Studies the Bidirectional Blade Industries. Oxford: BAR International Series 2180.

Barzilai, O., N. Getzov, Y. Givol-Barzilai, N. Marom and O. Marder 2011. Lithics in a Ritual Context at the PPNB Site of Mishmar Haemeq, Israel: Do They Display Special Characteristics? In E. Healey, S. Campbell and O. Maeda (eds.), *The State of the Stone. Terminologies, Continuities and Contexts in Near Eastern Lithics*. Pp. 305–316. Berlin: SENEPSE 13. ex oriente.

- **Vardi, J.,¹ Ben-Ari, N.,¹ Storchan, B.,¹ Golani, A.,¹ Paz, I.,¹ Nov, E.,¹ Mizrahi, S.,¹ Matskevich, Z.,¹ Tzur, Y.,¹ Turgman, Z.,¹ Marom, N.,² and Aga, N.¹**

1-Israel Antiquities Authority

2-Archaeology Institute, University of Haifa

The Neolithic site of Eshta'ol

In the past decade a number of salvage excavations were undertaken at the prehistoric and proto-historic site of Eshta'ol. The site is located in the Judean foothills north of modern Bet Shemesh. The excavations have uncovered settlement remains from the Pre-Pottery Neolithic (PPNB), Pottery Neolithic (PN), Chalcolithic, Early and Intermediate Bronze Age periods. During the most recent and most extensive excavations (Areas H and J), remains of a large Pre Pottery Neolithic B (hereafter PPNB) and Pottery Neolithic settlement were uncovered, which are the focus point of this paper.

During the excavations of Area H, a nearly complete PPNB structure, found below archaeological strata of the EB period, was excavated. Within the central room of structure, a sequence of four successive superimposed plaster floors was uncovered. The floors were remarkably well preserved, and the earliest of the plaster floors was found coating the inner face of the structure's walls. The structure is comparable to remains uncovered at the contemporaneous site Yiftahel located in northern Israel. The lithic assemblage from the structure is composed of mainly Jericho and Byblos arrowheads, which confirm the dating of the structure to the middle part of the PPNB period. Furthermore, the faunal assemblage is dominated by *Gazelle sp.* and *Bos*.

Additional PPNB remains at Eshta'ol were discovered in other areas of the site, both during the present and previous excavation seasons (Areas F, G, and J). Excavations at Area J, uncovered a large polished monolith (130×60×35cm, weight 650Kg), which may be associated to the PPNB period, however, it was found in a secondary use context dated to the chalcolithic period. The material culture of the PPNB stratum in this area of the site is comparable to that of Area H and further attests to the existence of a widespread PPNB village at Eshta'ol.

To date, the PPNB site of Eshta'ol is the only such settlement in the Judea foothills and is one of the southernmost PPNB settlements in the Mediterranean region west of the Jordan River. The closest known PPNB sites in the region are located to the northeast in the mountain region at Motza (LYR-V) and Abu Gosh.

In addition to the PPNB remains, the excavations of Area H at Eshta'ol yielded numerous remains attributed to the Pottery Neolithic Period. Although the architectural remains from this strata were fragmented and limited, a considerable assemblage of ceramics associated with the Lodian culture (Jericho IX phase) were found. In addition, the PN remains include a large range of lithics tools including small arrowheads and denticulated sickle blades modified with pressure retouch. In general, the PN ceramic and flint assemblages from Eshta'ol are comparable to other late Lodian and perhaps early Wadi Raba sites in the region. One interesting discovery dated to the PN at Eshta'ol was a cache of nine bifacial tools made of limestone and flint found above a crushed limestone floor.

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Jarmo Revisited: New Light on Lithics

In the late 1940's and early 1950's, the site of Jarmo in Iraqi Kurdistan became renowned for the then groundbreaking excavations directed by Robert Braidwood, which set out to document the transition from mobile foraging to settled agriculture in the Near East, utilising for the first time an expansive multidisciplinary approach.

Since then, with discovery and excavation of many new sites, its importance within late PPNB and early PN studies has declined, especially due to the lack of reliable dating. Current small-scale excavations by UCL Institute of Archaeology aim to fine-sample the site and fill the gaps in our understanding of the site by conducting specialist analysis of all types of artefacts and dating excavated contexts.

This paper will present preliminary results of an ongoing lithic analysis of both the original legacy data and new material from the recent excavations. In the process of techno-typological analysis several lithic attributes, which were not included in the previous analysis have been recorded, thus allowing a fuller characterisation of the nature of the industry. The presence of a number of obsidian cores and higher than previously documented variability in raw materials, necessitates a more complex understanding of the lithic economy than previously assumed. This understanding is supplemented through re-evaluation and comparison with assemblages from other sites in the Near East.

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Chipped stones from the earliest Neolithic occupation in Northern Aegean (Uğurlu, Gökçeada Island, ca 6600 cal BC)

The origin(s) and the development of the farming economy in Aegean are still discussed, not only about their chronology but also about their modalities. Was it a local development under the influence and through contacts with Central/Southern Anatolia and the Near-East/Cyprus? Was it the result of the arrival of new groups, and if so from where? Or, more likely, was it a mix of different processes?

The ongoing excavation of the tell site of Uğurlu in the northern Aegean (Gökçeada Island) gives new evidence for understanding this period. The earliest occupation by farming settlers is dated by three C14

dates around 6600 cal BC. Up to now, there is no pottery associated with this first phase, but there is evidence of red plastered floors. The chipped stone industry is quite rich and diversified. The preliminary study already gives important information about the technical traditions, the transmission of the skills and about the networks for the distribution of some raw materials like obsidian.

- **Makoto Arimura**

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Early Holocene in Armenia: Synthesis of recent archaeological works

Our knowledge of the transition from hunting-gathering to agrarian societies in the southern Caucasus has gradually increased during the 21st century. In particular, many archaeological excavations have clarified that well-developed Neolithic settlements in the southern Caucasus appeared during the Middle Holocene (6th millennium BC) with the first appearance of mound sites (*tells*). These sites could indicate that there was (more or less) a similar cultural group in the Ararat Basin and Kula Valley: the so-called 'Aratashen-Shulaveli-Shomutepe' culture. On the contrary, the Early Holocene era preceding the 'Aratashen-Shulaveli-Shomutepe' culture, is not archaeologically obvious, and our research has been focused on discovering sites of this era.

Thus far, the results of archaeological surveys and excavations in Armenia can be summarized as follows:

- 1) Most of the sites discovered are small-sized caves or rock-shelters, which do not include *tell*-type sites;
- 2) Continuity in the lithic tradition from the Upper Palaeolithic to the Early Holocene has been observed, including backed bladelet making;
- 3) From a lithic perspective, the Early Holocene can be divided into two phases, an early phase and a late phase, around 10-9th millennia and 8-7th millennia BC respectively. The early phase is characterized by a strong continuity with the Upper Palaeolithic, while the late phase has new 'Neolithic type' tools, such as 'Kmlu tools';
- 4) Archaeological sites with similar characteristics are probably distributed in other countries in the southern Caucasus and in Turkey.

Although the subsistence strategy of Early Holocene sites in Armenia remains unclear, we infer that in the Early Holocene era, most of the northern mountainous area of Western Asia was occupied by hunter-gatherers with the cultural tradition of the Upper Palaeolithic, which was different from other areas, such as the Levant and Mesopotamia, where Neolithic life-style settlements emerged.

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An integrated approach to obsidian studies: the work of the GeObs Project.

The GeObs project (supported by ANR - n°13-BSH3-0003, 2014-2017) proposes an integrated and multi-disciplinary approach to study the exploitation of Eastern Anatolian obsidian by ancient groups for the manufacture of tools and prestige objects, and its spatial diffusion through exchange networks among

communities across the ancient Near-East (including Anatolia and Caucasus). Because of low precision and/or the lack of data, it is, until now, still very difficult to properly understand obsidian diffusion from its origin to its discard; i.e. from the geological sources to the archaeological sites.

The aim of the project is to establish a detailed database and geographical information system of the obsidian sources in eastern Anatolia. We thus propose an integrated and multi-disciplinary approach for obsidian sourcing based first on the assessment of the obsidian outcrops through an intensive field research in order to precisely characterize the morphological and volcanic settings of the studied obsidian sources. This is accompanied by methods of characterization of obsidian associating chemical (using LA-ICP-MS, XRF methods) as well as physical properties (magnetic properties, petrography, and mineralogy). All the results will be interpreted in association with the results of the field investigation.

The archaeological part of the project is dedicated to the study of prehistoric networks and their role in the development and diffusion of the Neolithic in southwest Asia. Indeed, due to its cultural and analytical interest, obsidian is a raw material that has been broadly studied in the context of Near Eastern Neolithic.

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Harvesting practices and Wear Mechanisms on Near-Eastern Sickles

The interpretation of sickle elements as agricultural tools has a long history. In the Near-East, they were first defined by specific technological and typological characteristics and are considered as markers of the birth and diffusion of agricultural traditions through time and space. Since the 80's, continuous research has taken place in different laboratories based on botanical evidence, ethno-archaeology and use-wear analysis. Wear on sickles is characterized by macroscopic glosses that provide information on harvesting practices: indications of the nature of the plants, the type of harvesting whether low or high cut. Meanwhile, gloss distribution on tools allows us to reconstruct hafting techniques.

The multiplication of macro and micro-observations has provided a large amount of data in the Near-East as well as other geographical and cultural areas. The results help us to interpret inter- and intra-community organization. In the context of technology (studied from raw material acquisition to the discard of the implements), tools and their spatial and chronological distribution are markers of cultural traditions and to a lesser extent, reveal the spread of agricultural traditions and consequently the spread of the Neolithic itself.

The relatively recent developments of confocal microscopy allow the acquisition of new images of a precise category of functional attributes using the texture of the polish. As always in microscopy there is a basic question remaining: what are we looking at exactly? In which way are our interpretations relevant? Since the 90's, P. Anderson has been collaborating with a hard science laboratory (LTDS, Ecole Centrale de Lyon) specialized in tribology – the science and engineering of interacting surfaces. Among many research areas opened by this research, studies on the wear mechanisms involved during harvesting have been conducted. We will not go into detailed methodological approaches here. We want to emphasize how we have improved our knowledge of wear mechanisms and that we are capable of replicating them.

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High-Resolution technological and experimental study of incised patterns on Chalcolithic basalt vessels: Results from macro- and microscopic analyses